ENDRIYA VIDYALAYA JAMALPUR

KVS RO PATNA

STUDY MATERIAL FOR CLASS XII TERM 2- 21-22

MATERIAL COMPILATION MEMBERS

PATRON- SIR K C MEENA

1. **MR. K. C. MEENA (PRINCIPAL)**
2. **MR. M. K. GUPTA (PGT COMMERCE)**
3. **DR. S. K. SHUKLA (PGT HINDI)**
4. **MRS. P. P. DHAL (PGT ECONOMICS)**
5. **MR. MANIK KUMAR (PGT COMPUTER SC)**
6. **MR. ANJAY KUMAR (PGT CHEMISTRY)**
7. **MR. BIDHAN CHANDRA SINGH (PGT ENGLISH)**
8. **MR. RUPESH ROSHAN (PGT PHYSICS)**
9. **MR. M. P. MANU (PGT CHEMISTRY)**
10. **MR. P. K. MISHRA (PGT MATHS)**

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ENGLISH STUDY MATERIAL FOR TERM 2

APPLICATION FOR JOB

Points to Remember

Start body of the letter giving source of information about the job (newspaper) day, date, advertisement number etc.

Close the letter giving note that Bio-data / resume is enclosed. Write 10-12 points in Bio-Data

Bio-data / Resume, Curriculum Vitae is integral part of the job application. Bio-data should include:

1. **0Name**
2. **Father's Name**
3. **Date of Birth/Age**
4. **Address**
5. **Hobbies**
6. **Language Known**
7. **Nationality**
8. **Educational Qualifications:**
   (a) Years, Marks and Subjects of the candidate, name of university etc.
9. **Professional Qualifications**
10. **Experience**
11. **Salary Expected**
12. **Reference - At least 2 references**

Example: You are Sudha/ Sudhir resident of A-7, Shanti Park. You read the following advertisements in a newspaper.

SITUATION VACANT

Wanted a young and experienced graduate with fluency in English and Hindi to work as receptionist at customer care booths of NCR groups of hotels, Delhi.Contact Manager along with your complete C.V. within 7 days of this advertisement.

Draft an application in response to the advertisement giving your detailed resume.

Job Application

Two Parts (A) Covering Letter (B) Bio-Data

A-7, Shanti Park

Delhi

16 December, 2017

The Manager

NCR Group of Hotels

Delhi

Subject: Application for the post of receptionist.

Sir,

In response to your advertisement in the Hindustan times dated December, 2017 for the post of receptionist, I hereby offer my candidature for the same.

I possess requisite qualifications and experience. I want to join your hotels to utilize my potential to the fullest extent.

You may call me for an interview on any date as per your convenience. I shall be able to join my duties at one month's notice if appointed. I am enclosing my detailed resume for your perusal.

Thank You

Sincerely yours,

Sudha / Sudhir

Enclosure: Detailed Resume

Resume / Bio Data

Name: Sudha / Sudhir

Father's Name: Mr. Subhas

Age: 25 Years

Address: A-7, Shanti Park, Delhi

Hobbies: Music, Net Surfing, Photography, sports.

Language Known: Hindi, English

Religion: Hinduism

Nationality: Indian

Educational Qualifications:

–Passed Secondary Exam. from CBSE with 8.5 CGPA – Passed Senior Secondary Exam. from CBSE with distinction –Passed Graduation from Delhi University with first division.

Professional Qualification: Diploma in Computers from Aptech with first division.

Experience: Worked as Receptionist with ABC group of companies for 2 years.

Expected Salary: Negotiable

References:

1. **Dr. MohitAggarwal**
   (Surgeon), GTB Hospital, Delhi

2. **Mr. Ashok Kumar**
   Principal
   AB Public School, Delhi

Questions for Practice

(a) You are Krishna / Krishan from F-9, MayurVihar, Delhi. You have come across an advertisement in a national daily for recruitment of Radio Jockey by Radio one, Noida. Apply in response to this advertisement giving your detailed bio-data.

(b) You are Ritu / Ritva of 131, JagritiVihar, Gurgaon. You recently read about a post of chemist being advertised by Charak Research Ltd. Noida. You wish to apply for it. Apply with full details to the Managers of the Production Unit.

INVITATION

An invitation is sent to near and dear ones on the occasions such as marriage, births celebrations, etc. It is formally extended to general masses for public events or functions.

Points to Remember

To be written in third person

No abbreviation to be used
Simple present tense is used

Each entry to be mentioned in a separate line e.g.,

(a) The name of the person(s) who is/are inviting
(b) Formal expressions like 'request the pleasure of your company'
(c) Time and date of event
(d) Purpose and occasion of invitation.

For RSVP, address and telephone no. is given at which the invitee may contact for any queries.

Name of the Chief guest, programme may be given

FORMAL INVITATION

(For Marriages / Auspicious Occasions)

Example: Write a formal invitation for the marriage function of your daughter.

Mrs. and Mr. Madan Sharma

Solicit your gracious presence on the auspicious occasion

of the marriage of their grand daughter

SONALI

(Daughter of Mrs. Savita and Mr. Rahul Sharma)

With

SHRIDHAR

(Son of Mrs. Suma and Kapil Sharma)

on

17 December 2017

at 7.30 p.m.

at

Red Carpet, Party Lawn, Preet Vihar, Marg, Delhi-110031

With best compliments from

Vinod Sharma & All Relatives

R.S.V.P.

Madan Sharma

B-36, Rajdhani Enclave,

Vikas Marg, Delhi

Ph. : 9868xxxxxx

FORMAL INVITATION

(for School Events / Exhibition for General Public)

Example: You are a student of Laxmi Public School, Model Town, and Delhi. The School is holding its Annual Function at 5.30 p.m. on 24th Dec. 2017. The Education Minister has consented to be the Chief Guest. Design an invitation card to be sent to the parents and other invitees. (Word Limit 50) .

FORMAL INVITATION

The Principal, Staff and Students of

Laxmi Public School, Model Town, Delhi

request the pleasure of your company

on

ANNUAL DAY CELEBRATION

On Sunday, 24 December 2017

At 5.30 p.m.

In the school auditorium

Honourable Education Minister has very kindly consented to be the Chief Guest.

R.S.V.P.

Admn. Officer

011-27xxxxxx

Special Instructions:

(This card admits only two.)

You are requested to be seated by 4.30 p.m.)

Note: ENTRY FREE

Questions for Practice

(a) You are the member of Punjab Academy, Delhi. Draft a formal invitation to invite all the members for the discussion on a book written by an eminent writer,

(b) You are organising an Exhibition of Painting 'Nayika Series' on 30th November, 2017 at Azad Bhavan Art Gallery at 5:45 p.m. Draft an invitation card to invite the General Public.

(c) On the occasion of Van Mahotsav function in your school. Draft an invitation to renowned environmentalist for a tree plantation drive in your school.

(d) You are Suman/Sonu the head girl/boy of new field school. Your school has decided to celebrate "The Grand Parent's Day" in school. Draft a formal invitation to be sent to the grand parents of students of your school giving details of the programme.

(e) Your school is celebrating Annual sports day. Draft a formal invitation to be sent to parents SMC members giving details of event.

FORMAL REPLIES

ACCEPTANCE / REFUSAL

Points to Remember

Acknowledge the invitation

Express thanks in third person Not to be signed at the end

When accepting, confirm date and time

If declining, give reason, convey your best wishes Give date and address at top left hand

Formal Acceptance

Example: You are Mr. Ajay Kumar of 7 Park Avenue, Delhi. Draft a reply accepting an invitation to attend a house warming party hosted by your colleague.

9 January 2017

Mrs. and Mr. Ajay Gupta thanks Mrs. and Mr. Satish Sharma for their kind invitation on the house warming party on 17 January, 2017 at 11 a.m., which they are delighted to accept. It's their great pleasure to attend the ceremony.

Formal Refusal

Example: You are Mr. Ajay Gupta of 7 Park Avenue, Delhi. Draft a reply of refusal expressing inability to attend a house warming party hosted by your colleague.

9 January 2017

7, Park Avenue, Delhi

Mrs. and Mr. Ajay Gupta thanks Mrs. and Mr. Satish Sharma for their kind invitation on the house warming party on 17 January, 2017 at 11 a.m., but regret their inability to accept the same due to urgent and unavoidable assignment abroad.

Question for Practice

(a) You are AV Raman of Mysore Prepare a formal reply expressing inability to attend the marriage of a colleague owing to a prior engagement.

(b) You are Vidya Sagar for 21 Rajya Park, Jaipur. Draft a formal reply of acceptance to an engagement function.

(c) You are a renowned environmentalist Sh. Vinod Kumar of 10, Nehru Park, Delhi. You have been invited to inaugurate the Van Mahotsav function. Due to prior engagement you will not be able to come for the occasion. Draft a suitable reply of refusal for the same.

(d) You are renowned environmentalist Sh Vinod Kumar of 10, Nehru Park, Delhi. You have been invited for a tree plantation drive function draft a suitable replay of acceptance of attends the function.

FORMAL INVITATION

To Preside / Inaugurate / Judge Events, etc

Example: You are Neha / Nakul, the President of the English Literary and Cultural Society of Government Model Sr. Sec. School, Sector 1 Chandigarh. You have to organise an Inter Zonal Declamation Competition on the topic "Communication Skills are very important in modern world" at the +2 level. You wish to invite Dr. Shailesh Gupta, an eminent educationist to preside over the function to be held on 16 Jan, 2017 at 9:30 p.m.

Govt. Model Sr. Sec School, Sector-19

Chandigarh

16 January 2017

Sub: Invitation to preside over Inter Zonal Declamation Competition. Sir,

The English Literary and Cultural Society of four school is organising an English Declamation Competition on the topic 'Communication Skills are very important in modern world.' on 21 January 2017 at 9:30 a.m. in the school auditorium. Kindly consent to preside over the above said programme.

Yours sincerely.

Neha

FORMAL ACCEPTANCE

(To preside / inaugurate / judge events etc.)

Example: You are Dr. Shailesh Gupta, an eminent educationist. You have been invited to preside over on Inter Zonal Declamation competition by Neha the President of English Literary club of Government Model Sr. Sec. School, Sector-19, Chandigarh. Write a letter of acceptance of the invitation.

73, Sector-11-A

Chandigarh

18, January 2017

Dear Neha

Many thanks for inviting me to preside over the Inter Zonal Declamation Competition to be held on 27 January 2017 at

9.30 p.m. I shall be highly delighted to attend the function and enjoy listening to the views of students. It will be kind of you, if you could provide me the official transport.

Yours truly

Shailesh Gupta.

Chandigarh. You have to organise an Inter Zonal Declamation Competition on the topic "Communication Skills are very important in modern world" at the +2 level. You wish to invite Dr. Shailesh Gupta, an eminent educationist to preside over the function to be held on 16 Jan, 2017 at 9:30 p.m.

Questions for Practice

(a) JKL Public School, Dehradun is going to organise its Annual Day in the coming week. As A.K. Sharma, the Principal of the School. Draft a formal invitation to invite noted author Sudesh Gupta to preside over the function.

FORMAL REFUSAL

(To Preside / Inaugurate / Judge events, etc.)

Example: You are Dr. Shailesh Gupta, an eminent educationist you have been invited to preside over an Inter Zonal Declamation competition by Neha, the President of English Literary Club of Government Model Sr. Sec. School Sector-19, Chandigarh. Write a letter for refusal of the invitation.

73, Sector-11-A

Chandigarh

18, January 2017

Dear Neha

Many thanks for inviting me to preside over the Inter Zonal Declamation Competition to be held on 2 January 2017 at 9.30 p.m. but I am sorry to say that I shall not be able to attend the same due to a prior appointment with my doctor.

With warm regards

Yours sincerely

Shailesh

Questions for Practice

(a) As secretary of the literary society of your school, write a letter to an eminent journalist inviting him to address the students on a talk show to be held in your school.

(b) You are a well-known scientist you have been invited to deliver a lecture on the importance of Nuclear energy in the science centre. Write a reply accepting the invitation.

You are a noted stage artist and have been invited to perform at a stage show in a cultural event in Noida. However, due to a prior engagement, you are unable to attend the same. Write a reply refusing the invitation.

INFORMAL INVITATION

Points to Remember

Use first person 'I', 'We' and 'You' and avoiding using 'he', 'she' and 'they'

Do not write subject and receiver's address. Write in warm and personalised style.

Avoid writing unnecessary details.

Begin with 'Dear' _____ (Name).

Example: You are Anuj / Anuja Goel. Write a letter of Invitation to invite all your friends for the party you are giving to celebrate your selection in B-Tech in DTU.

Yojna Vihar, Delhi

10 Jan, 2017.

My Dear Rahul,

I have much pleasure in inviting you to post selection party after my admission in DTU. Reach my residence at 7.30 p.m. on 16 Jan, 2017 to join my family and friends in my moment of joy.

Yours truly,

Anuj / Anuja.

Question for Practice

1. **You have been successful in IIT entrance examination. Write a suitable invitation to your friends inviting them for a get together to celebrate the occasion.**

2. **Mrs. and Mr. Sharma wishes to celebrate the 25th wedding anniversary. As Mr. Sharma write an informal invitation inviting their best friend Mrs. and Mr. Vohra. Write necessary details.**
3. **Neeraj/ Neha has got very good percentage in final board exams. He got admission in reputed college in Delhi University. He wants to celebrate with his friend. Write an informal invitation giving necessary details.**

4. **You are Neena/ Naveen of 21, Shakti Vihar Delhi. You have opened a departmental store in Chandani Chowk. Draft an informal invitation to invite your friend on the inauguration ceremony.**

INFORMAL ACCEPTANCE

Example: You are Rahul and have been invited to the post selection party of your friend Anuj. Write a reply accepting the invitation you got.

ACCEPTANCE

7-C, Yojna Vihar,

Delhi

10 May, 2017

Dear Anuj

Many thanks for inviting me to attend your post selection party which will be held on 16th May 2017 at your home. I shall be highly delighted to attend the same and will enjoy the party with great fun.

Yours truly

Rahul Gupta

Questions for Practice

1. **You are Akash/Ashini. You have been invited to attend the wedding of your friend's sister. Respond to the invitation accepting it.**

2. **You are Varun/Veena of 23, Ramesh Nagar Delhi. Your friend Neeraj has invited you for a party to celebrate his good board result and admission to a prestigious college. Draft a reply accepting the invitation.**
3. **You are Shaan/Shruti of C-29, Pragati apartment, Rohini Delhi. You have received an invitation to attend the inauguration ceremony of his newly opened departmental store. Write a replay accepting the invitation.**

INFORMAL REFUSAL

Example: You are Rahul and you have been invited to the post selection party of your friend Anuj. Write a reply regretting your inability to attend the same.

7-C, Yojna Vihar, Delhi

10 May, 2017

Dear Anuj

Many thanks for inviting me to attend your post selection party, but I am sorry to say that I shall not be able to attend the same as I shall be out of station next week. I shall miss this joyous occasion. I wish you all the best for the future.

God Bless You

Yours truly

Rahul Gupta

Questions for Practice

1. **Your friend is throwing a party to celebrate his success in board exams. Send a reply regretting your inability to attend the same due to a prior engagement.**

2. **Mr. and Mrs. Narang of 2, Newland Apartment, Rohini have decided to have a party on the occasion of Sixteenth birthday of their daughter. You are unable to attend the function. Write a reply in about 50 words.**

3. **You are Shaan/Shruti of C-29, Pragati Vihar. You have received an invitation to attend the inauguration ceremony newly opened shop of your friend Karan. Write a reply of refusal, regretting you inability to attend the ceremony.**

4. **You as Mr. Vohra write a reply of refusal, regretting your inability to attend the celebrations of 25th anniversary of Mrs. and Mr. Sharma due to same prior engagement.**

NEWS PAPER REPORT

Example: You are Sanjay / Sanjana, a reporter with. The Hindustan Times. You witnessed a fire accident in a crowded market in Delhi. Write a report to be published in the newspaper. Invent necessary details.

Fire Engulfed Central Market

–Sanjay / Sanjana, Staff Reporter

10 May, 2017, New Delhi: Over a hundred persons were trapped for two hours when a devastating fire broke out yesterday in the Central Market Lajpat Nagar between 5 p.m. and 7 p.m. Though no casualties were reported officially, fifty people were injured.

The fire broke out around 4.50 p.m. due to a short circuit in the main line and spread quickly. There was panic and stampede as people rushed out of the overcrowded market place. Fire brigade and police arrived at the venue within half an hour. About a dozen firemen battled for two hours to bring the fire under control. The loss incurred is estimated to be about five crore rupees.

The injured persons were rushed to a nearby hospital. Many people sustained minor burns. The Governor has announced an enquiry into the mishap. The police are investigating the matter.

LITERATURE SECTION

4. THE RATTRAP

–Selma Lagerlof

The Rattrap Man made his living by selling rattraps, but this business was not profitable. So, he had to beg and steal. His philosophy that the whole world was a rat trap reflected his negative attitude towards the world. It offers riches, joys, shelter food etc. as bait. Everything comes to an end and with no return. one night rattrap man stayed at an old man's house. The Old man was happy to get a company. The old man was a simple, generous, hospitable man. He served porridge offered big slice from tobacco roll; played cards, told him about his prosperous past. Now his cow supported him and earned thirty kronors. He showed the rattrap man pouch having those kronors. The next day the rattrap man stole money. He did not continue on public highway went into woods, lost his way. He walked endlessly and got tired. Then a realisation came to him that he himself had been caught in a rattrap. While he was lying on the ground he heard sounds of hammer strokes. He walked in that direction and reached the iron mill. He found master smith who did not notice the rattrap man. Later the blacksmith granted him permission to sleep. The Iron master Mistook rattrap man for an old acquaintance called Von Stahle. He invited him home to spend Christmas with him, but the rattrap man did not agree. He, overwhelmed by her compassionate and friendly manner, agreed when Edla came and requested. The rattrap man was given bath and new dress the iron master realized his mistake that the rattrap man was not his friend. He complained that the rattrap man made no attempt to hide the peddler ready to leave the new dress and wear old rags. Edla requested her father to allow him to stay.They had promised him to celebrate Christmas with him. He quietly ate food, slept whole timenext morning. The father and the daughter went to church wherethey heard that the crofter was robbed by a rattrap man. The daughter became very sad, but the father became anxious if their house had also been robbed. To their surprise the peddler had left a gift of a small rattrap with thirty kronors and a note wherein he expressed his wish that the money to be returned to crofter. He confessed that he had made a mistake and got caught in his own rattrap. He thanked Edla for treating him like a real captain.

Who is the speaker of the following?

(i) “Please don’t think that I have such a fine home that you cannot show yourself there”

(ii) “I am so sorry, Captain, that you are having such a hard time.”

(iii) “Yes, God knows things have gone downhill with me”, he said.

(iv) “That was the mistake. If only I had still been in the service at the time, it never would have happened.Well, now of course you will come home with me.”

(v) “You may be sure, Captain that you will be allowed to leave us just as freely as you came. Only please stay with us over Christmas Eve.”

(vi) “First of all we must see to it that he gets a little flesh on his bones,”

(vii) “And then we must see that he gets something else to do than to run around the country selling rattraps.”

(viii) “It is queer that things have gone downhill with him as badly as that,”

(ix) “As soon as he gets clean and dressed up, you will see something different. Last night he was naturally embarrassed. The tramp manners will fall away from him with the tramp clothes.”

(x) “This whole world is nothing but a big rattrap.

SL	A	B
1	Monotonous	Currency of Sweden
2.	Vagabond	a game played with playing cards
3.	Wretch	a flat-bottomed boat used for transporting cargo to and from ships in harbour
4.	Bait	A machine in which metal is melted to form into a shape
5.	Ploddings	air bag that emits a stream of air used for blowing air into a fire.
6.	Snare	Move
7.	Trudging	Jaws
8.	mjolis	vagabond, wanderer
9.	Crofter	A person in rags
10.	Kronor	do something that one considers to be beneath one's dignity
11.	Impenetrable	Trap
12.	Stagger	hat bend on one side of the head.
13.	Barge	Wanderer
14.	Scow	personal attendant
15.	sifted	Learner
16.	Smelter	a foretelling
17.	Bellows	Wrinkled
18.	Shovelled	A person who works on a rented farm
19.	Maw	Pretend
20.	Tramp	Unbelieving
21.	Ragamuffin	A dense group of bushes
22.	Deigned	descended lightly or sparsely as if sprinkled from a sieve
23.	Slouch hat	walking slowly
24.	Valet	a long flat-bottomed boat for carrying freight on canals and rivers
25.	Forebodings	To walk with difficulty
26.	Puckered	Impassable
27.	Dissimulate	Boring
28.	Thumping	walks heavily
29.	Incredulous	Food placed on a hook to trap a rat,
30.	Thickets	miserable person

The Rattrap Man made his(1) _____by selling rattraps, but this business was not (2)__ _____. So, he had to (3)_____ and steal. His philosophy that the whole world was a(4) _____ reflected his (5)_____attitude towards the world. It offers(6)_____, joys, shelter food etc. as bait. Everything comes to an end and with no return. one night rattrap man stayed at an old man's house. The Old man was happy to get a(7)_____. The old man was a simple, (8) _____ and a hospitable man. He (9)_____ porridge offered big slice from tobacco roll; played cards, told him about his (10)_____past. Now his cow (11)_____ him and (12)_____ thirty kronors. He showed the rattrap man a (13)_____ having those kronors. The next day the rattrap man (14)_____ _____ money. He did not continue on public highway rather he went into (15)_____, and lost his way. He walked endlessly and got tired. Then a realisation came to him that he himself had been caught in a (16)_____. While he was (17)_____on the ground he heard sounds of (18)_____ strokes. He walked in that direction and reached the iron mill. He found master smith who did not (19)_____ the rattrap man. Later the blacksmith (20)_____ him permission to sleep. The Iron master Mistook rattrap

man for an old (21)_____ and called him Von Stahle. He invited him home to (22)_____ Christmas with him, but the rattrap man did not agree. He, overwhelmed by her compassionate and friendly manner,agreed when Edla came and requested. The rattrap man was given bath and new dress the iron master realized his (23)_____ that the rattrap man was not his friend. He complained that the rattrap man made no attempt to hide his true (24) _____and the peddler was ready to leave the new dress and wear old rags. Edla requested her father to (25)_____ him to stay.They had promised him to (26)_____ Christmas with him. He quietly ate food, slept whole timenext morning. The father and the daughter went to church wherethey heard that the crofter was (27)_ _____ by a rattrap man. The daughter became very sad, but the father became anxious if their house had also been (28)_____. To their surprise the (29)_____ had left a gift of a small rattrap with thirty kronors and a note wherein he expressed his wish that the money be returned to crofter. He (30)_____ that he had made a mistake and got caught in his own rattrap. He thanked Edla for treating him like a real captain.

CHAPTER 5 INDIGO

INDIGO by Louis Fischer

POINTS TO REMEMBER

Rajkumar Shukla- A poor sharecropper from Champaran wishing to meet Gandhiji.

- Raj Kumar Shukla- an illiterate but resolute hence followed Gandhiji Lucknow, Cawnpore, Ahemdabad, Calcutta, Patna, Muzzafarpur &then Champaran.
- Servants at Rajendra Prasad's residence thought Gandhiji to bean untouchable.
- Gandhiji considered as an untouchable because of simple living styleand wearing, due to the company of RajkumarShukla.
- Decided to go to Muzzafarpur first to get detailed information about Champaransharecropper.
- Sent telegram to J B Kriplani &stayed in Prof Malkani home- a governmentservant.
- Indians afraid to show sympathy to the supporters of homerule.
- The news of Gandhiji's arrival spread- sharecroppers gathered in large number to meet theirchampion.
- Gandhiji chided the Muzzafarpur lawyer for taking highfee.
- Champaran district was divided into estate owned by English people, Indians only tenantfarmers.
- Landlords compelled tenants to plant 15% of their land with indigoand surrender their entire harvest asrent.
- In the meantime Germany had developed synthetic indigo –British landlords freed the Indian farmers from the 15% arrangement but asked them to paycompensation.
- Many signed, some resisted engaged lawyers, and landlord Gandhiji reached Champaran- visited the secretary of the British landlord

association to get the facts but denied as he was anoutsider.

- Gandhiji went to the British Official Commissioner who asked himto leave Trihut, Gandhiji disobeyed, went to Motihari the capital of Champaran where a vast multitude greeted him, continued his investigations.
- Visited maltreated villagers, stopped by the police superintendent butdisobeyed theorder.
- Motihari black with peasantsspontaneousdemonstrations, Gandhiji released without bail Civil Disobediencetriumphed.
- Gandhiji agreed to 25% refund by the landowners, it symbolized the surrender of theprestige.
- Gandhiji worked hard towards social economic reforms, elevated their distress aided by his wife, Mahadev Desai, NarhariParikh.
- Gandhiji taught a lesson of self reliance by not seeking help ofan English man Mr.Andrews.

Reference-to-Context Questions

Read the extracts given below.

1. When I first visited Gandhi in 1942 at his ashram in Sevagram, in central India, he said, "I will tell youhow it happened that I decided to urge the departure of the British. It was in 1917." Answer the following.

(a) The extract is a conversation between two freedom fighters. (True False)
(b) Gandhi was being interviewed by the author. (True False)
(c) Gandhi wanted to share his _____with the narrator.
(d) Find a word from the extract that means 'the act of leaving a place'.

Ans. (a) False
(b) True
(c) Strategy
(d) departure

2. "I am Rajkumar Shukla. I am from Champaran and I want you to come to my district!" Gandhi hadnever heard of the place.

Answer the following.
(a) The speaker here is the Congress president Rajendra Prasad. (True False)
(b) Gandhi had not heard of Champaran because no one had ever approached him with anyproblem. (True False)
(c) Gandhi wanted to be a _____ .
(d) Find a word from the extract which means the same as 'an dministrative area?

Ans. (a) False
(b) True
(c) a negotiator
(d) district

3. Rajendra Prasad was out of town, but the servants knew Shukla as a poor yeoman who pestered their master to help the indigo sharecroppers. So they let him stay on the grounds with his companion, Gandhi, whom they took to be another peasant.

Answer the following
a) Rajendra Prasad was out of town because he never wanted to entertain anyone in the house.
(b) Gandhi was allowed to stay there because Shukla was a familiar face in the house. (True/False)
(c) Gandhi experienced _____ there.
(d) Find a word from the extract which means the same as 'harass' or 'torment' ?

Answers
(a) False
(b) True
(c) Untouchability
(d) Pestered

4.Under an ancient arrangement, the Champaran peasants were sharecroppers. Rajkumar Shukla was one of them. He was illiterate but resolute. He had come to the Congress session to complain about the injustice of the landlord system in Bihar, and somebody had probably said, "Speak to Gandhi.".
Answer the following.
(a) Shukla was the one who took initiative to contact Gandhi.
(True/False)
(b) Leaders at the Congress session were reluctant to help Shukla.
(c) Under the ancient arrangement, the sharecroppers were _____ .
(d) Find a word from the extract which means the same as 'indefatigable'.

Ans (a) True
(b) False
(c) exploited
(d) resolute

5. The sharecropping arrangement was irksome to the peasants, and many signed willingly. Those who resisted, engaged lawyers; the landlords hired thugs.

Answer the following.
(a) Peasants happily accepted the sharecropping arrangement as they were the beneficiaries.
(True/False)
(b) The landlords were hesitant to accept the arrangement.
(c) The peasants feel _____ .
(d) Find a word from the extract which means the same as 'refrain from"

Ans. (a) False
(b) True
(c) betrayed/cheated
(d) resist

6. All night Gandhi remained awake. He telegraphed Rajendra Prasad to come from Bihar with influential friends. He sent instructions to the ashram, He wired a full report to the Viceroy. Morning found the town
of Motihari black with peasants.
Answer the following.
(a) Gandhiji sent a full report to the Viceroy.
(True/False)
(b) The large demonstration by the peasants was unprecedented. (True/False)
(c) Gandhi planned his next move _____.
(d) Find a word from the extract which means the same as 'authoritative'.

Aas (a) True
(b) True
(c) meticulously
(d) influential

Answer the following.
7. The government was baffled. The prosecutor requested the judge to postpone the trial. Apparently, the authorities wished to consult their superiors. Gandhi protested against the delay.

(a) The prosecutor was not confident of facing the court. (True/False)
(b) Gandhi was apologetic about the delay in judgment due to him. (True/False)
(c) The authorities wished to consult the _____ .
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8. Rajendra Prasad, Brij Kishor Babu, Maulana Mazharul Huq and several other prominent lawyers arrived from Bihar. They conferred with Gandhi. What would they do if he was sentenced to prison, Gandhi asked. Why, the senior lawyer replied, they had come to advise and help him; if he went to jail there would be nobody to advise and they would go home.

Answer the following.
(a) Many prominent lawyers had come to Motihari to discuss the possible eventualities if Gandhi was arrested. (True/False)
(b) Gandhi did not expect any assurance from the lawyers. (True/False)
(c) The lawyer's response was _____ .
(d) Find a word from the extract which means the same as 'agree'.

Ans. (a) True
(b) False
(c) Irresponsible
(d) Confer

9. They accordingly went back to Gandhi and told him they were ready to follow him into jail. "the battleof Champaran is won", he exclaimed. Then he took a piece of paper and divided the group into pairs and put down the order in which each pair was to court arrest.

Answer the following.
(a) Gandhi felt jubilant after the lawyers' assurance. (True/False)
(b) Their next plan of action faced hurdles. (True/ False)
(c) _____ inspired Gandhi to say, "The battle of Champaran is won".
(d) Find a phrase from the extract which means the same as 'assign/formulate"?

Ans.
(a) True (b) False (c) mass co-operation (d) put down

10. First he visited the secretary of the British landlord's association. The secretary told him that they could give no information to an outsider. Gandhi answered that he was no outsider.

Answer the following.
(a) Gandhi wanted to meet the official to get the facts about the synthetic indigo. (True/False)
(b) Though he was not given any information, he was allowed to meet the commissioner. (True/ False)
(c) What does Gandhi's refusal to leave the place and claim his rights says about his character?
(d) Find a word from the extract which means the same as an organized group of people for a jointpurpose?

Answers (a) True
(b) True
(c) Righteousness
(d) association

Reference-to-Context Questions
Read the extracts given below.
1. When I first visited Gandhi in 1942 at his ashram in Sevagram, in central India, he said, "I will tell youhow it happened that I decided to urge the departure of the British. It was in 1917."
Answer the following.

(a) The extract is a conversation between two freedom fighters. (True False)
(b) Gandhi was being interviewed by the author. (True False)
(c) Gandhi wanted to share his _____with the narrator.
(d) Find a word from the extract that means 'the act of leaving a place'.

Ans. (a) False
(b) True
(c) Strategy
(d) departure

2. "I am Rajkumar Shukla. I am from Champaran and I want you to come to my district!" Gandhi hadnever heard of the place.

Answer the following.
(a) The speaker here is the Congress president Rajendra Prasad. (True False)
(b) Gandhi had not heard of Champaran because no one had ever approached him with anyproblem. (True False)
(c) Gandhi wanted to be a _____ .
(d) Find a word from the extract which means the same as 'an dministrative area?

Ans. (a) False
(b) True
(c) a negotiator
(d) district

3. Rajendra Prasad was out of town, but the servants knew Shukla as a poor yeoman who pestered their master to help the indigo sharecroppers. So they let him stay on the grounds with his companion, Gandhi, whom they took to be another peasant.

Answer the following
a) Rajendra Prasad was out of town because he never wanted to entertain anyone in the house.
(b) Gandhi was allowed to stay there because Shukla was a familiar face in the house. (True/False)
(c) Gandhi experienced _____ there.
(d) Find a word from the extract which means the same as 'harass' or 'torment' ?

Answers
(e) False
(f) True
(g) Untouchability
(h) Pestered

4.Under an ancient arrangement, the Champaran peasants were sharecroppers. Rajkumar Shukla was one of them. He was illiterate but resolute. He had come to the Congress session to complain about the injustice of the landlord system in Bihar, and somebody had probably said,
"Speak to Gandhi.".
Answer the following.
(a) Shukla was the one who took initiative to contact Gandhi.
(True/False)
(b) Leaders at the Congress session were reluctant to help Shukla.
(c) Under the ancient arrangement, the sharecroppers were _____ .
(d) Find a word from the extract which means the same as 'indefatigable'.

Ans (a) True
(b) False
(c) exploited
(d) resolute

5. The sharecropping arrangement was irksome to the peasants, and many signed willingly. Those who resisted, engaged lawyers; the landlords hired thugs.

Answer the following.
(a) Peasants happily accepted the sharecropping arrangement as they were the beneficiaries. (True/False)
(b) The landlords were hesitant to accept the arrangement.
(c) The peasants feel _____ .
(d) Find a word from the extract which means the same as 'refrain from"

Ans. (a) False
(b) True
(c) betrayed/cheated
(d) resist

6. All night Gandhi remained awake. He telegraphed Rajendra Prasad to come from Bihar with influential friends. He sent instructions to the ashram, He wired a full report to the Viceroy. Morning found the town
of Motihari black with peasants.
Answer the following.
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(d) Association

A THING OF BEAUTY

A THING OF BEAUTY

Summary

Some words are missing in the summary of the poem. Use suitable words to complete the summary:

A beautiful thing is a source of joy, its grows with the passage of time and its impact never .away. It is as soothing as a shade. It never passes into . It gives us good health, sound sleep and peace. It provides the beholder with a haven of tranquillity and solace.

Man and nature are inseparable. It is the beauty of nature that keeps us attached to this earth. Every morning we collect fresh lovely flowers and prepare . They refresh our moods and we forget our for a while.

Every person gets a bitter taste of sorrow, suffering and grief. Disease, disappointments and misfortunes give us mental and suffering. It is the beautiful things that remove the of sadness from our lives and make us happy and hopeful.

All beautiful things of nature are a for human beings. The sun, the moon, the trees, , simple sheep, clear streams, forests ferns, musk rose etc. provide us peace and happiness. In addition to these lovely objects of nature, there are plays and poems to our spirits. The glorious achievements of mighty heroes and magnificent rewards by God on the day of judgement for those mighty men, lovely tales of olden days are endless source of joy. The poet feels that nothing can surpass the beauty of nature. They are an of life. They are like an endless fountain that pours drink from the heaven into our hearts. So beauty is a gift of God and it gives us joy forever.

Main points

1. The beautiful things of nature are permanent source of joy and make our lives sweet.
2. A thing of beauty is a joy forever.
3. It does not pass into nothingness but its beauty keeps on increasing.
4. It gives us sound sleep and good health;
5. This world is full of frustrations, disappointments and dearth of noble people.
6. These make our life gloomy and sad.
7. But things of beauty remove the pall and sadness from our spirits.
8. Nature is a constant source of happiness for human beings.
9. The beautiful things are – sheep, daffodils, clear streams, musk roses and forest thickets.
10. These things soothe and make us happy.
11. Stories of heroes who have died in peace of war are also things of beauty and have a stimulating effect.
12. But the beauties of nature are lovelier than all the lovely tales and are like the immortal drink from heaven.

1. Name the long poem authored by John Keats whose excerpt is cited in the Lesson A Thing of Beauty?
2. What happens to the joy derived from a thing known to have true beauty?
3. According to the poet, What are the evils that prevail in the world?

4. How the gloom of our spirit is driven away?
5 What shapes of beauty does the poet mention in the poem?
6. What is the linking bond between man and nature?
7. What does 'grandeur of the dooms' refer to?
8. How did we come to know about the grandeur of dooms that we have imagined for the mighty dead?
9. What is the joy born out of beauty compared to?
10. How does the Heaven bless us?

The poet expresses the inner feelings of a woman - Aunt Jennifer. The aunt is embroidering a motif comprising of energetic, fearless tigers moving freely around the bright greenery.
She is living a life of submissiveness to her husband's command. Her acts are dominated by him and she fears him constantly. This pattern of the free and fearless tigers reflects her inner desire to live a free and fearless life. The tigers are graceful, elegant and bright.
Aunt Jennifer's fingers tremble as she embroiders. She is old but still fears her husband. She does not enjoy the freedom to do anything as per her wish. She is scared doing the embroidery too and fears his wrath. Since the day she got married, she has been fulfilling the demands of her husband. The wedding ring on her hand is a constant reminder that she belongs to her husband. The burden of the demanding marriage has exhausted her. The torment will not end until her death.
Even after her death, the ring will remain on her hand and she will never be free. On the other hand, the tigers that she is embroidering will continue to move around freely forever. Her desire of freedom and fearlessness will live on through her tigers.

The first stanza opens with Aunt Jennifer's visual tapestry of tigers who are fearless of their environment. "*Bright topaz denizensof a world of green*" – evoke an image that these regal tigers are unafraid of other beings in the jungle. Bright here signifies their powerful and radiant persona. There is a sense of certainty and confidence in the way these tigers move as can be seen in the line – "*They pace in sleek chivalric certainty*".

In the second stanza, the reality of Aunt Jennifer is revealed as she is feeble, weak and enslaved, very much the opposite of the tigers she was knitting. Her physical and mental trauma is depicted in the line – "*find even the ivory needle hard to pull*". Even though a wedding ring doesn't weigh much, "*the massive weight of uncle's wedding band, sits heavily upon Aunt Jennifer's hand*" signifies the amount of dominance her husband exercised over her. This also means that her inner free spirit has been jailed by the patriarchal society.

The last stanza starts on a creepy note about Aunt Jennifer's death. Even her death couldn't free her from the ordeals she went through which can be seen in "*When Aunt is dead, her terrified hands will lie still ringed with ordeals she was mastered by*". But her art work which was her escape route or in a way, her inner sense of freedom, will stay forever, proud and unafraid.

Prance – To move ahead like a spirited horse
Topaz – a golden coloured gem
Sleek – elegant
Denizen – an animal or a person found in a particular place
Chivalry – courageous and courteous behaviour, especially towards women
Patriarchal society – A society where men hold the positions of power and prestige, typically involved in decision making.

SHOULD WIZARD HIT MOMMY?

5. Should Wizard Hit Mommy?

By John Updike

The story, 'Should Wizard Hit Mommy?' deals with a child's view of the world and the difficult moral questions she raises during her story sessions with her father. It also raises the issue whether parents should decide for their children or children should decide for themselves.

Jack is the protagonist of the story. His story telling sessions with his daughter Jo began two years ago. Each story was a variation of a basic story line. The main character was always a small creature named Roger who faced a problem. To solve his problem, Roger would go to the owl who in turn asked Roger to go to the wizard. The wizard would finally solve his problem. But of late, the story telling sessions had become tiresome for Jack as Jo was growing up and questioned everything she heard.

One Saturday, Jack told Jo a story about a new animal — Roger Skunk. Roger Skunk smelt very bad, so bad that no one played with him. All the animals of the forest teased him and called him Stinky Skunk. Roger Skunk, then, went to the owl and told him his story. The owl sent him to the wizard who made him smell like roses for the price of a few pennies. Roger Skunk was happy as he could now play with his friends. But the Skunk's mother didn't like the smell of roses. She was very angry and took Roger back to the wizard, hit him on his head and ordered him to change Roger back to his original smell. Roger Skunk once again smelt very bad.

But Jo did not like the ending of the story. She did not like the idea that Roger Skunk had no friends. She wanted her dad to change the ending and make the wizard hit mommy. Jack told her that it would be wrong because a mommy is always right.

– By John Updike

Point to Remember

- Jack fabricated a story to tell to his two year old daughter Jo.
- He created a basic plot where the main protagonist was an animal named Roger, a small creature.
- The animal had a problem and went to the owl. The owl advised him to go to the wizard.
- The wizard solved the problem and charged Roger Pennies more than he had however he also guided him how to get the required pennies.

- One day Jack told Jo a story about Roger Skunk who smelled so bad that the other animals ran away from him.
- Roger Skunk went to the owl who in turn sent him to the Wizard who changed his foul smell to sweet smell of roses.
- Roger Skunk was ecstatic and ran to the jungle to play with the other animals, who loved his smell very much.
- When he reached his house, his mother scolded him for the new smell.
- The mother took him to the wizard.
- Roger's mother shouted at the wizard and hit him hard on the head.
- The little Roger got the foul smell again and was very sad.
- Jo did not like the behaviour of the mommy and wanted her father to hit mommy. Jack disaproved Jo's decision to hit mommy.
- Jo's mother is annoyed at Jack's taking so much time in telling the story. Jo didn't like the ending to the story, forced him to change it.
- Jack is in a dilemma whether to go to help his wife in her work or to change the end of the story.

Short Answer Questions

How did the Wizard help Roger Skunk?

Ans. The wizard was moved by Roger skunk's story. On finding his magic wand he chanted some magic words & granted that Roger should smell like roses. Roger was very happy and ran out into the woods. All other animals gathered around him because he smelled so good.

How did Roger Skunk's Mommy react when he went home smelling of roses? How did the Skunk's mother get him his old smell back?

Ans. Roger Skunk began to smell like roses. Mommy asked about thesmell. Roger Skunk replied that the wizard had given him the smell. The mother did not like that and asked Roger to come with her. Mother was furious to learn about the wizard who had changed his original smell. She immediately visited the wizard and hit him on his head and asked him to restore the original smell.

Who is Jo? How did Jo behave in 'reality phase'?

Ans. Jo is Jack's 4 year- old daughter. She is not a patient listener. She does not take things for granted and tries to see things in her own way. She raises questions on the figments of her father.

Why did Jo want the wizard to hit mommy?

Ans. Jo was drawing a parallel between mommy skunk and her own mother. She perceived both of them as an interfering factor in the independent growth of their

children. So, she wanted wizard to hit mommy as she had failed to empathize with her son's (baby skunk) problem of not having any friend.

Was Roger skunk's mother justified in forcing him to retain his original smell?

Ans. Up to some extent I agree with the point of view of mother but not with the way she behaved. She wanted her child to retain his uniqueidentity, but she resented the rose smell very sternly. The child should have been taken into confidence and should have been made aware of the pros and cons.

Short Answer Questions for Practice

Why did Roger Skunk go to the Wizard?

How did Roger skunk’s mother react to her newly acquired smell?

How did the Wizard fulfil young Skunk's wish?

What was the cause of Roger Skunk's sadness?

Why was Skunk happy after meeting the Wizard?

What was unique about the story that Jack told?

How did Jack justify his ending of the story?

Long Answer Questions

How does Jo want the story to end? Why?

Ans. Children have a very different view of life than that of adults. They dream and live in their imaginative world. Jo does not like the ending

that mommy should hit the wizard. Rather she wants that the Wizard should hit the Mommy for her failure to realize the problems of Roger Skunk. She calls her 'Stupid Mommy" and insists for a change in the storyline. She has got sympathy for Roger Skunk. She thinks it to be unfair on the part of the mother to go to the Wizard and get Roger his bad smell again.

Drawing inference from the lesson "Should Wizard Hit Mommy", elucidate perception of imposing parents?

Ans. In the lesson 'Should Wizard hit Mommy', Mother Skunk did not support the idea of a changed identity for baby Skunk. The story says that Roger Skunk felt alienated because of his bad smell. The elders failed to recognize his feeling and pain. His mother vehemently opposed the changed smell. She perceived the bad smell as unique characteristic of a Skunk, but her reaction was impulsive.

She could have responded in a subtle manner to make the child understand her point of view. A healthy discussion in an amiable environment leads to agreeable solution.

Long Answer Questions for Practice

What is Jack's way of telling stories? Why is it appealing?

What does Jack want to convey through the story of Roger Skunk?

How is Jack's childhood interwoven in the story of the stinky Skunk?

How does Jack assert his authority as a father over his daughter?

What part of the story did Jack himself enjoy the most? Why?

Why does Jo want the Wizard to hit Mommy? Justify your answer on the basis of your understanding of the story?

The parents sometimes do not understand the moral fiber of the children. As a result they feel isolated." Justify the statement in the context of the lesson.

Roger Skunk's mother did not want to retain the changed smell of the young Roger. Why are mothers so strict with their children? Are they justified? Why or why not?

ON THE FACE OF IT

The story speaks about two individuals, who meet unfortunate odds but develop different attitudes while facing those odds. The two persons are Derry, a young acid-attack victim and Mr Lamb a much older man who lost his limb in a blast.
Through the contrast in the outlook of both these survivor, the author tries to create a tale of overcoming odds and seemingly insurmountable difficulties and retaining hope in the ability to find happiness.
The story begins Derry, a 14-year-old boy, strolling into a garden hoping to not find anyone there. Having suffered an acid injury which burnt almost half of his face, he had become reclusive and pessimistic. Therefore, he tended to be isolated and aloof and avoid interaction with people.

However, he was not alone in the garden. Suddenly, a man with a tin leg appeared in front of him and engaged in a conversation with him. Mr Lamb was completely opposite of Derry. He had learned to be content with his deformity and find meaning in his life.
Derry, on the other hand, was young, angry and confused. He thought nobody could ever love him because they feared him. He was so self-conscious that he hated his own face and thought only his mother loved him. She only loved him only because she was her son, thought young Derry.
Mr Lamb said that he also used to think like that but time heals every wound. He gives an analogy of bees that irritate people with their buzzing but if one observe and hear them patiently, one will find music in their sounds.
Derry confessed that he was disturbed by other people's comments and stares and therefore felt comfortable in seclusion. Mr. Lamb reassures him there are many who are a lot worse than him and he can still do whatever he wants. He still had his limbs, eyes, ears etc. to fulfill all his dreams.
Mr. Lamb tells him that after his leg got blown off in a blast he conquered his own fear. He learnt to walk and even climb trees. He welcomes Derry to join him in plucking apples of his trees when or if he comes back.
Mr. Lamb tries to encourage Derry to embrace all of his abilities that God had given him and not just focus on his one flaw. He tells him that he lives in a house without curtains and keeps his doors opens for others. He wants to be friendly everyone and advises Derry that hate and anger is worse than any kind of corrosive acid.
Derry narrates another incident when he heard his parents talking about his deformity and that they thought he would die with his deformity. This was really tough for Derry to take. Even his relatives thought he would be at peace in a hospital with other persons with deformities.
Mr. Lamb assures Derry that people get tired of talking and staring eventually. He needed to not concentrate on what they rather and focus on his own aspirations and abilities.
Mr. Lamb also tells him that the World and the people living in it will gradually move onto some other new thing or person to critique or notice. He should not waste away his life by pondering on other people's opinions of him.
He tells Derry a story of a man who stayed inside his house because he feared death by an accident. However, in the end, he died inside his room when a painting fell over his head. Thus, even Derry should come out his 'room of fear' and embrace the outside world and its people.
He calls Derry his friend even thought Derry does not reciprocate the same feelings. Derry says that he would never return to the garden so he could not call Mr. Lamb a friend.
Mr. Lamb asserted that the same fact did not make them enemies also. He reiterated that they were friends and that Derry is always welcome to his garden.

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Mr. Lamb asserted that the same fact did not make them enemies also. He reiterated that they were friends and that Derry is always welcome to his garden.
Derry tells Mr. Lamb that if he comes to his garden, all his other friends will get scared of his face and Mr. Lamb will lose his friends. Mr. Lamb consoles him by saying that kids often call him by funny names like 'Lamey Lamb' but still comeback to his garden.
Derry finally expresses some optimism and hopes to have a house without curtains of his own. He too wants to live in the light of faith and self-belief and come out of the shadows of self-doubt and fear.
Derry then returns home to his mother and narrates his encounter with Mr. Lamb. She warns him to stay away from Mr. Lamb who she thought was a dangerous person.
However, Derry defies her injunctions and returns to Mr. Lam's garden. He was finally free of all his inhibitions, all thanks to the encouragement and comforting words of Mr. Lamb.
However, he returns to see Mr. Lamb lying flat on the ground. The ladder had slipped from the tree and Mr. Lamb had suffered a terrible fall. He laid there unmoved, injured (or even worse). The story ends with Derry breaking into melancholic tears.

EVANS TRIES AN O LEVEL

Historical Context of *Evans Tries an O-Level*

Much of "Evans Tries an O-Level" takes place at HM Prison Oxford, which was housed in Oxford Castle from 1888 to 1996. By the fourteenth century, the Norman medieval castle was no longer a valuable military post and was in increasingly poor shape. It then served a stint as a county administration building, an informal jail, and a criminal court. In 1611, King James sold the castle, whose new owners promptly sold it to Christ Church College. Although much of the castle was destroyed in the English Civil War, the remaining structures were turned into a formal prison by the seventeenth century and gradually built upon in the following century. Conditions were harsh—the prison was infested with vermin, and there were often 60 people to a room. It was also a for-profit entity, as Christ Church College leased the space to prison wardens who then made money by charging prisoners for room and board. John Howard, a prison reformer, visited the prison in the 1770s and made scathing criticisms that spurred the County to purchase, rebuild, and remodel the premises. By 1876, the prison also housed children—the youngest being a seven-year-old girl named Julie-Ann Crumpling, who was sentenced to seven days of hard labor at the prison after being caught stealing a baby carriage. At the time, it was common for children to be jailed at Oxford Castle as punishment for relatively minor offenses—a dramatic attempt to break the child's rebellious spirit and scare them into proper behavior. In 1888, the establishment took on the name HM Prison Oxford (as it appears in "Evans Tries an O-Level") in the wake of national prison reforms. Despite the reforms, the prison closed in 1996 due to overcrowding and poor conditions only a few years after Dexter's story was published. Oxford Castle was then renovated and turned into a multiuse development, boasting of a hotel, marketplace, museum, restaurant, and office building.

Key Facts about *Evans Tries an O-Level*

- **Full Title:** Evans Tries an O-Level
- **When Published:** 1993
- **Literary Period:** Twentieth-century literature

- **Genre:** Short story, detective fiction
- **Setting:** HM Prison Oxford in the Oxford Castle in Oxford, UK
- **Climax:** Stephens returns to Evans's prison cell to find McLeery (who is actually Evans in disguise) covered with blood.
- **Antagonist:** James Evans
- **Point of View:** Third person omniscient

In March, **the Secretary of the Examinations Board** receives a call from **the Governor** at Oxford Prison, asking if one of his prisoners can take the final exam in O-level German. The prisoner, **James Roderick Evans**, has been taking night classes since September and claims to be "dead keen to get some sort of academic qualification." The Governor isn't sure if Evans is especially talented at German, but he was the only student in the **German teacher**'s class, so he's basically had a private tutor for the past six months.**The Secretary** bends to **the Governor**'s request to let **Evans** take the exam, agreeing that they should "give him a chance." He asks if Evans is violent, but the Governor hurriedly assures him that Evans is "Quite a pleasant sort of chap," though he is a "Bit of a card." He's "just a congenital kleptomaniac" with a penchant for "Imitations […] Mike Yarwood stuff." The Governor is about to add something else but quickly decides against it—"He'd look after that particular side of things himself," he thinks. The Governor explains that Evans has his own cell, so he can sit for the exam there. He suggests they ask a parson from St. Mary Mags to be the proctor, and the Secretary agrees. Known as "Evans the Break" by prison officers, **James Evans** has escaped three times from various prisons. He was going to be sent to a maximum-security prison in the north, but due to the "wave of unrest" up there, he was sent to Oxford Prison instead. **The Governor** is determined to keep Evans secure and avoid being "disgrace[d]." He doesn't consider Evans a significant threat—more of a "persistent, nagging presence." Thinking about Evans's upcoming exam, the Governor decides there's a "possibility" that Evans is truly passionate about German—"Just a slight possibility. Just a very slight possibility." In early June, **Evans** attends his final night class in German before his big exam. His **German teacher** wishes him good luck in a thick German accent, and Evans awkwardly asks him to repeat himself. The German teacher repeats his well wishes in English and reminds Evans that he doesn't have "a cat in hell's chance of getting through." Evans interrupts, breezily claiming that he "may surprise everybody." The next morning, two prison officers visit **Evans**, who is wearing his signature "filthy-looking red-and-white bobble hat." **Jackson**, the senior prisoner officer, has "already become warm enemies" with Evans. The other man, **Stephens**, is a "burly, surly-looking man" who is new to Oxford prison and to the prison-officer profession in general. Jackson gruffly greets Evans by calling him "Einstein" and reminds Stephens to confiscate Evans's razor before the proctor arrives; Jackson has already taken away Evans's nail scissors, much to Evans's dismay (Evans claims that he's always been "worried about his hands").**Jackson** barks at **Evans** to clean himself up for his exam and to remove his filthy hat. Evans's hand immediately flies up to his hat; "smil[ing] sadly," he explains that it's "the only thing that's ever brought [him] any sort o' luck in life," and that he especially needs it for his exam today. Evans thinks to himself that there must be "a tiny core of compassion" somewhere inside of Jackson. Jackson gruffly lets him keep it, but "just this once, then, Shirley Temple." Jackson thinks to himself that the only thing he genuinely hates about Evans is his "long, wavy hair." At 8:45 A.M., **Reverend Stuart McLeery** leaves his bachelor flat and makes his way across town to Oxford Prison, where the two-hour exam is scheduled to begin at 9:15 A.M. In his briefcase is the proctor form, the exam in a sealed envelope, a "special 'authentication' card from the Examinations Board," a Bible (for McLeery's talk later that day at the

Women's Guild on the Book of Ruth), a paperknife, and an issue of The Church Times. After **Evans** washes up, **Jackson** pays him another visit. He orders Evans to take down his posters of pin-up girls on the wall, and Evans nods—he was already planning on taking those down, given that his proctor is a minister. Jackson quietly asks Evans how he knows his proctor is a minister, and Evans says that it was listed on the forms he signed earlier. Gesturing to the ceiling, **Evans** asks **Jackson** why he had to be bugged. Jackson reminds him that the prison officers have to be extra cautious with Evans, and that **the Governor** himself will be listening in on the exam. Evans thinks to himself that he already accounted for that—"Number Two Handkerchief was lying ready on the bunk." Jackson brusquely tells Evans, "Good luck, old son," and leaves. Once at the prison, **Reverend Stuart McLeery** signs in and follows a **silent prison officer**, who then hands him off to Jackson, who hands him off to **Stephens**. Meanwhile, **the Governor** switches on the receiver to listen in to **Evans**'s cell, wondering if all the extra safety precautions are a bit over the top. Suddenly, the Governor realizes something he's overlooked—it's not enough to confiscate potential weapons Evans might have and make sure he's securely locked in. McLeery could have unknowingly brought something that Evans could use against him as a weapon. The Governor quickly orders **Jackson** to search McLeery.**Jackson** retrieves **McLeery** and searches him. The minister is patient and understanding as Jackson riffles through his belongings—until Jackson questions him about a "semi-inflated rubber ring" buried in the briefcase, asking in jest if the minister is going swimming later. McLeery stiffens, replying to "this tasteless little pleasantry" that it's a special cushion for his hemorrhoid problem. Jackson flushes pink and stammers an apology. The exam begins a few minutes behind schedule, made even later by **Evans**'s insistence that he can't concentrate with **Stephens** hovering in the cell. Having overheard this through the receiver, **the Governor** orders Stephens to leave, admitting that they might be "overdoing it." After a few administrative tasks (**McLeery** instructs Evans to write his "index number" and "centre number" in the corner of the exam), the test begins at 9:25 A.M. At 9:40 A.M., **the Governor** receives a call from the Examinations Board. The "**Assistant Secretary** with a special responsibility for modern languages" asks what time the exam began and explains that there's been an error on their end: "there was a correction slip which some fool had forgotten to place in the examination package." The Governor wonders if the phone call is fake—a signal or distraction of some kind—but transfers the call to **Jackson** so that he can take care of it. To check if the call really did come from the Examinations Board, the Governor dials their number, but all he hears are the "staccato bleeps of a line engaged." The Governor assures himself that this is to be expected, given that the Assistant Secretary is probably still speaking with Jackson. Moments later, **the Governor** hears **McLeery** reading off the corrections to the exam to **Evans**: "the fourth word should read goldenen, not goldene; and the whole phrase will therefore read zum goldenen Löwen, not zum goldene Löwen." Having studied German in his youth, the Governor smiles as he hears familiar words and adjectives. The Governor's phone rings again—the Magistrates' Court needs a prison van and a couple of prison officers due to a remand case. After hanging up, the Governor thinks to himself that perhaps that phone call was fake, but he quickly reassures himself that he's being paranoid. No longer stationed inside the cell, **Stephens** now peers through the peephole into **Evans**'s cell for five seconds every minute (eventually transitioning to every two minutes)—a task he finds entirely pointless, given that Evans has barely moved. At the small table across from Evans is **McLeery**, silently reading his issue of The Church Times with one finger hooked under his clerical collar. He strokes his beard with his other hand, his fingers "meticulously manicured." Sometime later, **the Governor** is startled to hear noise coming from **Evans**'s cell—the prisoner is asking for permission to drape his blanket over his shoulders. **McLeery** tersely gives him permission. One minute later, when **Stephens** peers into the peephole, he's surprised to see that Evans has donned a blanket. He wonders if this "slight

irregularity" ought to be reported (**Jackson** did say to report "Anything at all fishy") but decides he's overreacting. The prison is cold, after all. Still, Stephens decides to return to one-minute intervals at the peephole. At 11:20 A.M., The Governor listens as **McLeery** informs **Evans** that there are only five minutes remaining in the exam. With "something still gnaw[ing] away quietly in the Governor's mind," he picks up the phone. At 11:22 A.M., **Jackson** shouts for **Stephens** to come to the phone—the Governor is on the line. The Governor instructs Stephens to escort McLeery off the premises after the exam and to ensure that Evans is properly locked in his cell. At 11:25 A.M., **Stephens** escorts **McLeery** to the prison's main gates, bursting with pride that **the Governor** had chosen "him, and not **Jackson**" for the task. As the two men walk, Stephens privately observes that the proctor's Scottish accent sounds thicker than before, and that the proctor's long, knee-length coat "fostered the illusion that he had suddenly grown slimmer." After McLeery has gone, Stephens returns to **Evans**'s cell to check on him. He feels slightly paranoid—like a TV show he'd seen "about a woman who could never really convince herself that she'd locked the front door when she'd gone to bed."**Stephens** peers into **Evans**'s cell and is met with a horrifying sight: **McLeery** is slumped in Evans's chair and is drenched in blood. The blood is seeping through his beard, short hair, and clerical collar. As Stephens shouts for **Jackson**, McLeery weakly presses a white linen handkerchief to his bleeding head. Clutching the German exam in one hand, McLeery murmurs that he knows where Evans went. The prison explodes with noise and activity—sirens wail, officers shout, and heavy metal doors clang into place. When **the Governor** arrives, **McLeery** shows him the German exam: "A photocopied sheet had been carefully and cleverly superimposed over the last (originally blank) page of the question paper." Clunkily translating the German, the Governor reads, "You must follow the plan already somethinged. The vital point in time is three minutes before the end of the examination but something something—something something... Don't hit him too hard—remember, he's a minister! And don't overdo the Scots accent when..." A police car whizzes up to the prison gates, and **Detective Superintendent Carter** jumps out, demanding an explanation. Wincing in pain, **McLeery** tells the men to go to Elsfield Way. **The Governor** quickly realizes that the Examinations Board is headquartered there—one of their employees must have been involved in **Evans**'s escape. He tells **Carter** to take McLeery with him, since McLeery knows the most about the situation. Turning sharply to **Stephens** and **Jackson**, **the Governor** demands to know who led **Evans** off the premises; Stephens stutters that it was him, but that the Governor was the one who gave him the orders over the phone. The Governor screams that it wasn't him who gave those orders—the call was a fake. The Governor thinks to himself that he had been using the phone at that time, trying (unsuccessfully) to get in touch with the Examinations Board.**The Governor** screams at **Jackson** for his stupidity. Jackson had searched **Evans**'s cell for two hours the previous night—and yet, the prisoner had managed to hide a clerical collar and shirt, reading glasses, a fake beard, a coat, and whatever weapon he attacked **McLeery** with. The Governor turns his attention back to the instructions on the last page of the German exam, trying to make sense of what "Neugraben" means. He decides it must mean the town of Newbury. He barks at a prison-van driver to get Jackson and Stephens to the police station and to ask for **Chief Inspector Bell** when they get there.**The Governor** quickly gets **Chief Inspector Bell** on the phone to bring him up to speed. After this, **Detective Superintendent Carter** calls, explaining that **McLeery** is now at Radcliffe Hospital—once they got to the Examinations offices, McLeery started feeling particularly poorly, so they called an ambulance for him and left him to wait for it while they continued their search. Carter also mentions that McLeery spotted **Evans** near Elsfield Way, and he looked to be heading back to the city. The Governor explains his theory about Evans heading for Newbury and then hangs up, telling himself that finding Evans is "a police job now." The Governor "was just another good-for-a-giggle, gullible governor, that was all."**The Governor** calls the hospital and asks

after **McLeery**. The hospital clerk says they don't have a patient with that name, and the Governor explains that McLeery was picked up from Elsfield Way. The clerk interrupts, saying that the ambulance did go to pick up a patient from Elsfield Way earlier, but no one was there: "the fellow had gone. No one seemed to know where he was. Just vanished!" Suddenly, the Governor realizes his horrible mistake. Fifteen minutes later, the prison officers discover the real **Reverend Stuart McLeery**, bound and gagged at his flat, as he had been since 8:15 A.M. By that afternoon, everyone at Oxford Prison had heard the story: "It had not been **Evans**, impersonating McLeery, who had walked out; it had been Evans, impersonating McLeery, who had stayed in." After a pleasant evening, **Evans** returns to the Golden Lion Hotel. His new hat hides "the wreckage of his closely cropped hair." It was a shame that **Jackson** had confiscated his nail scissors—Evans had to cut his hair with his razor blade instead, which was arduous. He's glad that Jackson at least let him keep his hat on for the exam—"old Jackson wasn't such a bad fellow," he thinks. As he climbs the stairs to his room, **Evans** thinks about how it was such "a jolly good idea" for the fake **McLeery** to wear two clerical shirts and two clerical collars. It was tricky, though, especially since one of the collars kept slipping off—"there'd been that one panicky moment when 'McLeery' had only just got his hand up to his neck in time to stop the collars springing apart before **Stephens**…" He trails off. It was also challenging to do "all that fiddling about under the blanket" to get the clerical shirt on. Luckily, **Evans**'s friends had left him all the necessary supplies in the getaway car: clothes, soap and water, and the Ordnance Survey Map of Oxfordshire. He's grateful to have such "good" and "very clever friends." Evans opens the door to his room and suddenly freezes "like a man who has just caught a glimpse of the Gorgon." There, sitting on the bed, "was the very last man in the world that Evans had expected—or wanted—to see," **the Governor**.**The Governor** quietly tells **Evans** it's no use trying to escape—he has the place surrounded (he only has two officers outside, but chooses not to reveal this detail). "Visibly shaken," Evans sinks into a chair. After a few minutes of silence, he asks if the correction slip gave him away. Unable to conceal "the deep satisfaction in his voice," the Governor says, "there are a few people who know a little German."**Evans** relaxes, knowing he's been caught and there's no use fighting it. Evans excitedly tells **the Governor** that the most important thing in his plot was the phone call that distracted **Stephens** and **Jackson** a few moments before the end of the exam. The correction slip was important, too, though, because it gave Evans the name of his hotel, and it ensured that Evans's outside help—whoever called pretending to be the Examinations Board with a correction to the exam—know exactly when the exam started, so that they could know exactly when to make the distracting phone call three minutes before the end of the exam.**Evans** also explains how he knew which Golden Lion Hotel to go to: **McLeery** had instructed Evans to write "index number 313" in one box and "centre number 271" in another box, as if it were some administrative task in filling out his exam sheet properly. Then, in the getaway car, Evans looked up "the six-figure reference 313/271," which led to the city of Chipping Norton. **The Governor** says he figured this out too, which is how he knew to track Evans down in Chipping Norton, though he admits to initially thinking Evans was headed for Newbury; Evans says that he left that clue on purpose as a red herring.**The Governor** asks **Evans** if he really did understand German all this time, and Evans says he just knew the gist. The Governor also asks how Evans managed to cover himself in blood. Evans excitedly recounts his clever idea to have the fake **McLeery** bring the inflatable rubber ring under the pretense of needing it for a hemorrhoid problem—Evans knew that such a thing wouldn't be confiscated. Filling it with blood was easy (they got pig's blood from a slaughterhouse), but the issue was keeping it from clotting. To do so, "you've got to mix yer actual blood […] with one tenth of its own volume of 3.8 cent trisodium citrate!" The Governor shakes his head with "reluctant admiration," saying, "come on, m'lad." The two men walk alongside one another down the stairs. **The Governor** asks how **Evans** managed to communicate with the outside world—he's had

no visitors or letters. Evans breezily replies that he has "a lot of friends," including his **German teacher**. The Governor is incredulous, declaring that the German teacher was from the Technical College. Playfully, Evans asks, "Was 'e? […] Ever check up on 'im, sir?" In the lobby, a blonde receptionist informs **the Governor** that the prison van is waiting out front. **Evans** gives her a wink, and she winks back, which "almost ma[kes] his day." Outside, a **silent prison officer** handcuffs Evans and loads him into the van.**The Governor** says goodbye to **Evans** as if he were "saying farewell to an old friend after a cocktail party." Evans brightly answers, "Cheerio, sir," and asks the Governor if he knows any other modern languages besides German. The Governor says no and asks why; Evans smiles and says that he noticed that the prison would be offering O-level Italian classes in September, "that's all." The Governor tells Evans that he might not still be at Oxford Prison in September. "Ponder[ing] the Governor's words deeply," Evans answers that the Governor may be right. As the prison van merges onto the road, the **silent prison officer** who had loaded **Evans** into the van sharply tells the driver to speed up—"It won't take 'em long to find out." In a thick Scottish accent, the driver asks where they should go; Evans suggests Newbury.

Themes

Intelligence and Deception

Instinct, Paranoia, and Pride

"Evans Tries an O-Level" follows **the Governor** of Oxford Prison as he deals with a new and particularly unruly prisoner named **James Evans**, a cheerful kleptomaniac known for his uncanny ability to break out of prison. The prison officers find Evans's sudden interest in German particularly suspicious—he takes night classes in O-level German for six months (as the only student in the class) and eagerly asks to take the final exam, claiming he's "dead keen to get some sort of academic qualification." In the story, the prison officers' suspicions about Evans are right. However, all of the prison guards repeatedly ignore their own nagging suspicions, telling themselves that they're just being paranoid. This careful, logical self-talk is almost always a way to avoid looking stupid. As the story unfolds, Dexter emphasizes the power and accuracy of human instinct while also revealing the extremes people will go for the sake of protecting their pride.

Dexter gives his readers insight into the prison officers' minds to show humans' unproductive (and sometimes dangerous) impulse to protect their sense of dignity and avoid looking silly. From the outset, the Governor is particularly preoccupied with preserving his pride. Evans has already escaped three times from various prisons, making him a bit of a national celebrity, and the Governor is determined to not let Evans "disgrace them." As the head of the prison, all mishaps and scandals directly reflect on the Governor. Since Evans is so well known at other prisons, his escape from Oxford Prison could seriously threaten the Governor's reputation. Even months before the exam date, the Governor instinctively feels that Evans will try to make a break for it during his test. That day, the Governor puts several extra security measures in place. However, the Governor's pride slowly begins creeping in, and he questions if he's being overzealous: "But wasn't it all a bit theatrical? Schoolboyish, almost? How on earth was Evans going to try anything on today?"

The Governor's repeated internal questions reveal a conflict between his persistent instincts, which are fighting to be noticed, and his desire to look and feel like he's in control. If the Governor looks too concerned about Evans, he may also appear weak and impotent to the other officers at the prison. Despite the "little nagging doubt" that crops up throughout the two-hour exam, the Governor continues to go back on his careful security measures, like having Stephens simply look through the peephole to Evans's cell every minute instead of sitting inside the cell and watching the exam. When the Governor receives a call from the **Assistant Secretary** at the Examinations Board

claiming that “some fool” at their office forgot to include a corrections slip in Evans’s testing materials, the Governor’s suspicions are aroused again. After transferring the call to **Jackson** to take care of the situation, the Governor wonders if the call is a fake, and if it’s a “signal” or “secret message” of some sort. He quickly dials the number for the Examinations Board to confirm that the call did just come from them and not an imposter, but the line is in use. He assures himself that this is to be expected, since Jackson is presumably still speaking with the Assistant Secretary: “But then the line was engaged, wasn’t it? Yes. Not very intelligent, that…” As he does throughout the story, the Governor ignores his reasonable (and accurate) hunch and instead carefully convinces himself that he’s just being paranoid and might appear “silly.”

Stephens, too, ignores his intuition out of pride. New to Oxford Prison and to the profession in general, Stephens is concerned about looking stupid or incapable as a prison officer. At the beginning of Evans’s exam, he “dutifully” follows orders and looks through the peephole at one-minute intervals to ensure Evans isn’t misbehaving. The job seems pointless to him, though, so he takes the liberty to change the interval time to two minutes. However, one of the next times he peers through the peephole, he’s surprised to see that Evans has donned a blanket around his shoulders. Stephens grapples internally with whether or not to “report the slight irregularity.” He tells himself to not be “daft,” and swiftly convinces himself that Evans is just cold: Deep down, however, it seems that Stephens knows his instincts are correct, and that the blanket is suspect: immediately after constructing a logical explanation for Evans’s behavior, “Stephens decided to revert to his early every minute observation” through the peephole rather than looking every two minutes.

Prior to the exam, Jackson had firmly instructed Stephens to report “Anything at all fishy.” The fact that this order came from Jackson, Stephens’s immediate superior, seems to play a role in Stephens’s subsequent decision to disregard the blanket situation. Later, when Stephens receives (fake) orders from the Governor, ordering him to be the one to escort **McLeery**, Evans’s proctor, out of the prison, Stephens swells with pride, “pleased that the Governor had asked him, and not Jackson, to see McLeery off.” Stephens’s desire to look confident and capable at his new post—and apparently to have the Governor like him more than Jackson—causes him to overlook his instincts out of pride, ultimately opening up room for error to let Evans escape.

By the end of the story, the prison officers’ suspicions prove well-founded—Evans does escape, and the exam was the epicenter of his scheme. Evans has outmaneuvered the prison officers, effortlessly sidestepping their efforts to keep him secure at the prison. “Evans Tries an O-Level” ultimately stresses the necessity of listening to one’s gut feelings and not only following one’s sense of pride and decorum. The critical mistake the prison officers make in the story is talking themselves out of their genuine, persistent feelings in order to seem like they’re still in control of the situation at hand.

Appearances vs. Reality In Colin Dexter’s “Evans Tries an O-Level,” a notorious kleptomaniac named **James Evans** makes his fourth escape from prison, this time from Oxford Prison, overseen by the no-nonsense Governor and a senior prison officer named **Jackson**. A tension between appearances and reality runs throughout the story, as many characters—especially Evans—subvert the expectations and judgments other people make of them based on their appearance. This impulse to judge based on appearance is particularly dangerous in the world of this mystery story, which is filled with deception and disguises. Dexter ultimately highlights how making

judgments based on appearances is an unproductive habit, and that people and situations are not always what they seem.

It's the grubby James Evans—who is terrible at German, dresses in ridiculous clothes, and cracks jokes so frequently that no one sees him as a "real burden"—who outwits everyone, showing that appearances can be deeply deceiving. Evans's silly "red-and-white bobble hat" symbolizes the way Evans intentionally fulfills and subverts people's expectations of him based on his appearance. The hat, a grimy knit beanie with a massive pom-pom fastened to the top, plays into people's perceptions of him as a cheerful, ridiculous trickster. The Governor himself articulates the common stereotype of Evans at the beginning of the story: "Quite a pleasant sort of chap […] Bit of a card, really. One of the stars at the Christmas concert. Imitations, you know the sort of thing: Mike Yarwood stuff." Evans's penchant for impressions sums up the story's warning of mistaking appearances for reality. Like Mike Yarwood—the 1960s impressionist, actor, and comedian—Evans has the capacity to convincingly pretend to be other people. However, this isn't always for comedic effect; his well-honed acting skills allow him to believably impersonate his test proctor, **McLeery**, taking on the man's clerical dress, Scottish accent, choppy haircut, and general demeanor in order to break out of prison. The extent to which appearances are misleading run even deeper in the story, however, when it's revealed that Evans is actually doing an impersonation of an impersonation—the so-called Reverend McLeery who comes to conduct Evans's German exam is an imposter himself (one of Evans's many accomplices), as the real McLeery is bound and gagged back at his apartment.

The aftermath of Evans's clever escape also reveals the futility of trusting in appearances. The two detectives, **Detective Superintendent Carter** and **Chief Inspector Bell**, are supposed to be the ones to solve the crime—once a prisoner has escaped the prison's walls, it's "a police job." However, the confident detectives prove incompetent and fade from the story soon after being introduced. Despite being a "good-for-a-giggle, gullible governor" (as he assumes the police see him), the Governor is the one who cracks the case of Evans's escape from Oxford Prison, piecing together Evans's convoluted clues and ultimately tracking him down in the nearby city of Chipping Norton.

The story closes with yet another startling reminder that not everything is what it seems. After tracking down Evans, the Governor gloats quietly as he watches a **silent prison officer** handcuff Evans outside the Golden Lion Hotel and load him up in the prison van to be transported back to Oxford Prison. The Governor tells Evans that he'll see him soon, and the two men say goodbye like "old friend[s] after a cocktail party," leading the reader to believe that this a story that ends neatly with the "good guy" winning and the "bad guy" being successfully captured and sent back to prison. However, as the Governor watches the van drive away, the narrative suddenly jumps to the conversation unfolding inside the van, where the silent prison officer is unlocking Evans's handcuffs and bickering with the driver about where they should run off to next. Once again, Evans (with help from his friends) has outsmarted everyone, a bittersweet ending that leaves readers with the unsettling reminder that appearances aren't always trustworthy.

Friendship

In "Evans Tries an O-Level," "congenital kleptomaniac" **James Evans** comes up with a creative and ultimately successful plan to break out of Oxford Prison: he takes night classes in German for six months, asks to take the final exam, and then disguises himself as the proctor, Reverend McLeery (who is actually one of Evans's accomplices disguised as the real proctor) when the day finally comes. Having escaped three times from other prisons in the past, "Evans the Break" has

quite the reputation among prison guards. However, as the story unfolds, it's clear that Evans doesn't work alone, nor does he proudly assume credit for himself—he's grateful to have a lot of "friends," and also has the skillful ability to endear people to him (whether they realize it or not). The value Evans places on friendship, coupled with his ability to make friends (or at least "warm enemies," as his relationship with the senior prison officer, **Jackson**, is described) is critical to his eventual escape from prison—and his ability to escape again in the process of being sent back.

Evans forms a playfully irreverent relationship with the prison officers, warmly exchanging insults and cracking crude jokes with them. This behavior endears Evans to the officers, even if they won't admit it. Although this doesn't necessarily make his initial escape from prison easier, it does make the aftermath of his escape less severe, ultimately allowing him to escape again. When **the Governor** carefully pieces together how Evans managed to escape from Oxford Prison, he intercepts Evans at the Golden Lion Hotel in the nearby town of Chipping Norton. After Evans's initial (apparent) shock upon finding the Governor waiting for him in his hotel room, the two men act like old friends playing a game of chess—not a domineering prison warden tracking down a notoriously slippery criminal. In his typical open, cheerful way, Evans excitedly tells the Governor all about how he managed to escape. After Evans is done recounting his exploits, all the Governor can do is shake his head in "reluctant admiration." He then says, "Come on, m'lad," implying that it's time for them both to head back to the prison. In using the term of endearment "m'lad" to refer to Evans, the Governor betrays just how much Evans has ingratiated himself to the prison officers. The Governor doesn't yank Evans outside in handcuffs and throw him into a prison van; instead, the two men walk "side by side" as they continue to chat and casually make their way down the hotel stairs. Even when Evans does get handcuffed and loaded into a van, it's the silent prison officer (later revealed to be one of Evans's accomplices), and not the Governor, who does it. The Governor just stands back and continues chatting with Evans. Despite being recaptured, Evans happily calls "Cheerio," and the Governor tells Evans that he'll see him soon, "as if the Governor were saying farewell to an old friend after a cocktail party." The complex, high-stakes chase to recapture Evans is conflated with a cocktail party, emphasizing how the aftermath of his escape from prison is much less severe—and far more fun—than it would have been for other criminals.

Evans' many "friends" from the outside world are also critical to his successful escape from prison (and his escape from the Governor that same day). When the Governor asks Evans how he managed to pull off such a complicated plan, given that the prisoner hasn't had any visitors or letters, Evans simply replies, "I've got lots of friends though […] Me **German teacher**, for a start." Dexter breezes past this moment quickly, leaving readers to sort through the implications of this statement. Given that Evans took night classes in German for six months and was the only student in the class all that time, it seems that Evans's plan to break out of prison was formed over the course of six months of unsupervised "class" time with his supposed German teacher. Evans's other crucial accomplices include the silent prison officer, the fake McLeery, and the **Assistant Secretary**—a small handful of what's implied to be a large pool of loyal friends willing to help Evans however they can. In explaining his ingenious and complicated escape plan to the Governor, Evans frequently uses the collective pronoun "we," pointing to the value he places in friendship and teamwork. He doesn't take all the credit for himself, stating that "we" planned a phone call as a diversion at the end of the exam, "we" planted a fake clue, "we" used pig's blood, and so on. In this way, both Dexter and Evans himself stress that this prison break was not a one-man job. The "congenital kleptomaniac" (which sounds fittingly reminiscent of "congenial kleptomaniac") is charismatic to his core, earning varying degrees of respect (or "reluctant admiration"), loyalty, and camaraderie from criminals and prison officers alike.

TERM II

SAMPLE QUESTION PAPER (2021-22)

ENGLISH – CORE

CLASS-XII

Time allowed: 2 Hrs. **Maximum Marks: 40**

General Instructions:

1. The Question Paper contains THREE sections-READING, WRITING and LITERATURE.
2. Attempt questions based on specific instructions for each part.

	SECTION A – READING (14 marks)	**Marks**
1.	**Read the passage given below.** I saw *'Jaws',* the popular shark movie, the summer it came out, in 1975 and became paranoid about sharks. Though I kept swimming after *Jaws*, it was always with the vague fear that a shark's teeth could tug on my leg at any moment. Never mind that there'd been only two shark bites since 1900 on the Connecticut coast, where I lived. So, when I got this assignment for the *National Geographic* magazine, I decided to accept and do what I'd never wanted to do: swim with the sharks. I had to go to a place in the Bahamas known as Tiger Beach and dive with tiger sharks, the species responsible for more recorded attacks on humans than any shark except the great white. It was to be my first dive after getting certified—which meant it would be my first dive anywhere other than a swimming pool or a quarry—and without a diver's cage. Most people who got wind of this plan thought I was either very brave or very stupid. But I just wanted to puncture an illusion. The people who know sharks intimately tend to be the least afraid of them, and no one gets closer to sharks than divers. The divers who run operations at Tiger Beach speak lovingly of the tiger sharks the way people talk about their children or their pets. In their eyes, these sharks aren't man-eaters any more than dogs are. The business of puncturing illusions is never just black and white. My fellow divers had hundreds of dives under their belt and on the two-hour boat ride to the site in the morning of our first dive, they kept saying things like, "Seriously, I really can't believe this is your first dive." All this was okay with me until I reached the bottom and immediately had to fend off the first tiger shark, I had ever laid eyes on. However, when I watched the other divers feeding them fish and steering them gently, it became easy to see the sharks in a very benign light. I think it would be unfair not to mention that though tiger sharks are apex predators. They act as a crucial balancing force in ocean ecosystems, constraining the numbers of animals like sea turtles and limit	

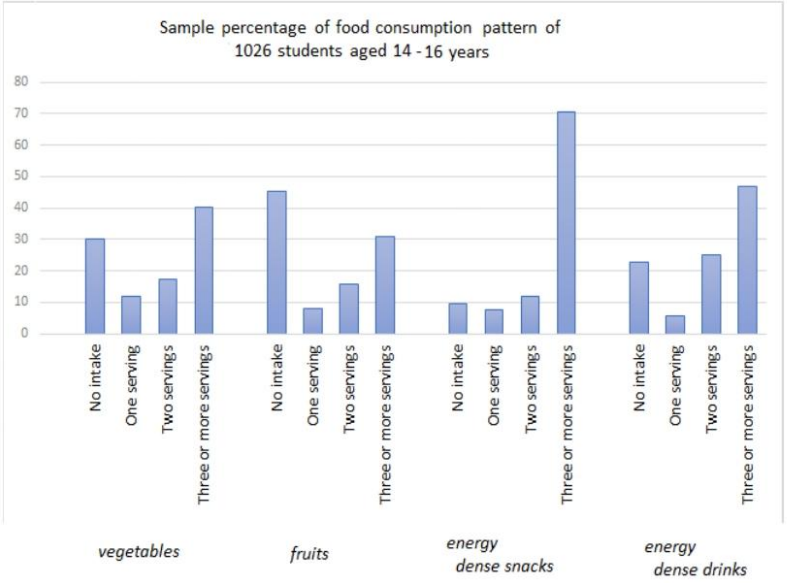
	their behaviour by preventing them from overgrazing the sea grass beds. Furthermore, tiger sharks love warm water, they eat almost anything, have a huge litter and are the hardiest shark species. If the planet and its oceans continue to warm, some species will be winners and others will be losers, and tiger sharks are likely to be winners.	
	Based on your understanding of the passage, answer <u>ANY EIGHT</u> questions from the nine given below.	**1*8**
i.	Cite a point in evidence, from the text, to suggest that the writer's post-*Jaws* fear was not justified.	**1**
ii.	State any one trait of the writer that is evident from lines 5-10 and provide a reason for your choice.	**1**
iii.	People thought the writer was 'either brave or very stupid'. Why did some people think that he was 'very stupid'?	**1**
iv.	Why does the writer say that people who know sharks intimately tend to be least afraid of them?	**1**
v.	Rewrite the given sentence by replacing the underlined phrase with another one, from lines 10 – 20. *Some academicians think that reward, as a form of discipline, is a simple <u>right or wrong</u> issue.*	**1**
vi.	What does the use of the phrase 'benign light' suggest in the context of the writer's viewpoint about the tiger sharks?	**1**
vii.	Select a suitable phrase from lines 15-25 to complete the following sentence appropriately. *I agree the team will find this experience tough, but competing will be easier next time after they get this tournament* _____.	**1**
viii.	Apex predators serve to keep prey numbers in check. How can we say that tiger sharks are apex predators?	**1**
ix.	Analyse why having a large litter is one of the features that empowers tiger sharks to emerge winners if global warming persists.	**1**
2.	**Read the passage given below**. Changing food preferences have brought about rapid changes in the structure of the Indian diet. The rapid proliferation of multinational fast-food companies and the influence of Western culture have replaced traditional home-cooked meals with ready-to-eat, processed foods thus 5 increasing the risk of chronic diseases in urban Indians. Therefore, nurturing	**6**

healthy eating habits among Indians from an early age would help to reduce health risks.

To date, little is known about the quality and quantity of foods and beverages consumed by urban Indian adolescents. This lack of evidence is a significant barrier to the development of effective nutrition promotion and disease prevention measures.

Therefore, a self-administered, semi-quantitative, 59-item meal-based food frequency questionnaire (FFQ) was developed to assess the dietary intake of adolescents. A total of 1026 students (aged 14–16 years) attending private, English-speaking schools in Kolkata completed the survey.

A sample percentage of the food consumption pattern is displayed (Fig. 1)



The survey results report poor food consumption patterns and highlights the need to design healthy eating initiatives. Interestingly, while there were no gender differences in the consumption of legumes and fried snacks, the survey found more females consumed cereals, vegetables and fruits than their male counterparts.

In conclusion, the report suggested that schools ought to incorporate food literacy concepts into their curriculum as they have the potential of increasing the fruit and vegetable intake in teenagers. Additionally, healthy school canteen policies with improved availability, accessibility, variety and affordability of healthy food choices would support the consumption of nutritious food in students.

	Adapted from: https://nutritionj.biomedcentral.com/articles/10.1186/s12937-017-0272-3 **Based on your understanding of the passage, answer ANY SIX out of the seven questions given below.** **i.** What does the researcher mean by 'changing food preferences'? **ii.** Why was this survey on the food consumption of adolescents undertaken? **iii.** With reference to fig.1, write one conclusion about students' consumption of energy-dense drinks. **FOR THE VISUALLY IMPAIRED CANDIDATES** What do you understand by the term *food frequency*, as stated in lines 12-13? **iv.** What can be concluded by the 'no intake' data of fruit consumption versus energy dense snacks, with reference to fig.1? **FOR THE VISUALLY IMPAIRED CANDIDATES** Comment on the significance of incorporating food literacy concepts into student curriculum. **v.** There were no gender differences observed in the consumption of healthy foods, according to the survey. Substantiate. **vi.** Why is 'affordability' recommended as a significant feature of a school canteen policy? **vii.** Identify a word from lines 9 - 18 indicating that the questionnaire was specifically designed to be completed by a respondent without the intervention of the researcher collecting the data.	**1*6** **1** **1** **1** **1** **1** **1**
	SECTION B – WRITING	**8**
3.	You are Natasha, residing in Pune. Your cousin, from the same city is hosting your grandmother's eighteenth birth anniversary and has extended an invite to you. He has also requested your assistance for arrangements needed. Draft a reply of acceptance, in not more than 50 words.	**3**
4. **A.**	Attempt **ANY ONE** from **A** and **B** given below. You are Shantanu, residing at Ghar B-94, Balimela Road, Malkangiri. You come across the following classified advertisement in a local daily. Write a letter, in about 120-150 words, applying for the position of a volunteer for the *Each One Teach One* campaign.	**5**

B.	**SITUATION VACANT** **WANTED** committed volunteers, aged 18 years and above, to teach underprivileged children, for one hour a week, in the district of Malkangiri. Ability to speak, read and write Odiya fluently, important. Experience not necessary. All volunteers to receive training. Contact Nethra N, Coordinator (*Each One Teach One*), *4Literacy*, Ambaguda, Malkangiri, Odisha -764045 **OR** The efforts of 400 volunteers working with the NGO, *4Literacy*, in the district of Malkangiri, Odisha, was lauded by the District Collector, Shri V. Singh (IAS). As a staff reporter of 'The Odisha Bhaskar', write a report about this in 120-150 words covering all the details of the event, such as training, teaching and infrastructure involved in the '*Each One Teach One*' campaign, initiated by the district administration in association with the NGO.	
	SECTION C - LITERATURE	**18**
5.	Attempt **ANY FIVE** of the six questions given below, within 40 words each.	**2x5=10**
	i. A mistaken identity led to a discovery of a new one for the rattrap peddler. How did this impact him?	**2**
	ii. As the host of a talk show, introduce Rajkumar Shukla to the audience by stating any two of his defining qualities. You may begin your answer like this: *Meet Rajkumar Shukla, the man who played a pivotal role in the Champaran Movement. He ……*	**2**
	iii. Adrienne Rich chose to express her silent revolt through her poem, *Aunt Jennifer's Tigers*, just as Aunt Jennifer did with her embroidery. Explain.	**2**
	iv. Rationalize why Keats uses the metaphor 'an endless fountain of immortal drink' in his poem, *A Thing of Beauty*.	**2**
	v. How do you think Derry's mother contributes to his sense of alienation and isolation? (*On the Face of It*)	**2**
	vi. Validate John Updike's open-ended title, '*Should Wizard Hit Mommy*?'.	**2**
6.	**Answer ANY TWO of the following in about 120-150 words each.**	**4*2**
i.	How does Keats' poem, *A Thing of Beauty* appeal richly to the senses, stimulating the reader's inner sight as well as the sense of touch and smell? Write your answer in about 120-150 words.	**4**

KENDRIYA VIDYALAYA JAMALPUR, MUNGER

Subject: Hindi Core

Q 1 किसी एक शीर्षक पर रचनात्मक लेख, आलेख अनुच्छेद या निबंध लेखन?
ऐसे प्रश्नों के उत्तर देने के लिए विषय वस्तु पर 2 अंक प्रस्तुति पर 1.5 अंक तथा भाषा तथा स्वच्छता पर 1.5 अंक मिलेंगे |
Q2 किसी विषय पर पत्र लेखन |
कक्षा 12 हिन्दी आधार पाठ्य क्रम में पत्र दो प्रकार के ही पाठ्य क्रम में हैं -औपचारिक और अनौपचारिक |औपचारिक में विषय लिखा जाता है जब कि अनौपचारिक में ऊपर अपना पता लिखेंगे डेट लिखेंगे पर विषय नहीं लिखेंगे |औपचारिकता निर्वाह पर 2 अंक ,विषय प्रस्तुति पर 2 अंक तथा भाषाई कौशल पर 1 अंक दिया जाएगा |

कहानी से नाटक
कहानी क्या है ?किसी घटना ,पात्र या समस्या की क्रमबद्ध जानकारी जिसमे परिवेश हो ,द्वन्द्वात्मकता हो ,कथा का क्रमिक विकास हो ,चरम उत्कर्ष हो उसे कहानी कहते हैं |
कहानी के तत्व :कथा वस्तु ,चरित्र चित्रण ,संवाद ,भाषा- शैली. देशकाल वातावरण,चरमोत्कर्ष ,उद्देश्य |
कथानक या कथा वस्तु क्या है?
Kahaani kaa वह रूप जिसमें प्रारंभ से अंत तक कहानी की सभी घटनाओं और पात्रों का उल्लेख होता है,कथानक कहा जाता है |
कहानी में पात्रों के संवाद कैसे होने चाहिए ? संवाद पात्रों के स्वभाव एवं पृष्ट भूमि के अनुकूल हों संवाद छोटे,स्वाभाविक,और उद्देश्य के प्रति सीधे लक्षित होने चाहिए \
नाटक की भाषा कैसी होनी चाहिए ?संक्षिप्त एवं सांकेतिक भाषा ,दृश्य निर्माण के लिए क्रियात्मक भाषा ,शाब्दिक अर्थ से अधिक व्यंजनात्मक भाषा |
नाटक रचना के तत्व :कथा वस्तु ,पात्र एवं चरित्र चित्रण ,संवाद,भाषा- शैली ,देश -काल-वातावरण ,अभिनेयता |\ फीचर किसे कहते हैं /: सुव्यवस्थि,सृजनात्मक एवं आत्मनिष्ठ लेख है | मनोरंजन

Important Questions_ Class 12 Hindi

पत्रकारीय लेखन के विभिन्न रूप और लेखन प्रक्रिया

21 पत्रकारीय लेखन क्या है ?

उ 0 अखबार या अन्य समाचार माधयमों में काम करने वाले पत्रकार अपने पाठकों दर्शकों व श्रोताओं तक सूचना पहुँचाने के लिए लेखन के विभिन्न रूपों का इस्तेमाल करते हैं । इसे ही पत्रकारीय लेखन कहते हैं ।

22. उल्टा पिरामिड शैली किसे कहते हैं ?

उत्तर -किसी भी घटना,समस्या या विचार के सबसे महत्वपूर्ण तथ्य,सूचना या जानकारी को सबसे पहले पैराग्राफ में लिखा जाता है ।उसके बाद के पैराग्राफ में उससे कम महत्वपूर्ण जानकारी दी जाती है तीसरे पैराग्राफ में घटना का विस्तार से वर्णन किया जाता है यह लेखन की सबसे लोकप्रिय एवं बुनियादी शैली है ।इसके तीन भाग है-मुखड़ा, कलेवर समापन ।

23. स्टिंगर या अंशकालिक पत्रकार किसे कहते है?

उत्तर -किसी समाचार संगठन के लिए एक निश्चित मानदेय पर काम करने वाला पत्रकार ।

24. पूर्णकालिक पत्रकार :किसी समाचार संगठन में काम करने वाला नियमित वेतन भोगी पत्रकार ।

25. फ्रीलांसर पत्रकार :इस पत्रकार का संबंध किसी एक पत्र से न होकर जो भुगतान के आधार पर अलग -अलग अखबारों के लिए लिखता है ।

26 फीचर के प्रकार :समाचार बैक ग्राउण्ड फीचर ,खोजपरक फीचर ,साक्षात्कार फीचर,जीवन शैली फीचर ,रूपात्मक फीचर ,यात्रा फीचर ,विशेष रुचि के फीचर ।

प्रतिदर्श प्रश्न पत्र 2021-22

विषय - हिंदी (आधार)

(विषय कोड - 302)

कक्षा - बारहवीं

निर्धारित समय : 2 घंटे **अधिकतम अंक : 40**

अंक

सामान्य निर्देश :-

- निम्नलिखित निर्देशों को बहुत सावधानी से पढ़िए और उनका पालन कीजिए :-
- इस प्रश्न पत्र में वर्णनात्मक प्रश्न पूछे गए हैं।
- इस प्रश्न पत्र में कुल ***07*** प्रश्न पूछे गए हैं। आपको ***07*** प्रश्नों के उत्तर देने हैं।
- प्रश्नों में आंतरिक विकल्प भी दिए गए हैं। निर्देशानुसार उत्तर दीजिए।

प्रश्न संख्या	कार्यालयी हिंदी और रचनात्मक लेखन	अंक (20)
प्रश्न 1.	**निम्नलिखित दिए गए 03 शीर्षकों में से किसी 01 शीर्षक का चयन कर लगभग 200 शब्दों का एक रचनात्मक लेख लिखिए :-** • प्रातः काल योग करते लोग • दुर्घटना से देर भली • जिन्हें जल्दी थी, वे चले गए	5x1=5
प्रश्न 2.	अपने क्षेत्र के मुख्य चिकित्सा अधिकारी, उनके चिकित्सकों और सहायक कर्मचारियों को कोरोना काल में उनके द्वारा किये गए कार्यों की प्रशंसा और सरहाना करते हुए एक पत्र लिखिए। ***अथवा***	5x1=5

	बस चालकों की असावधानी से हो रही दुर्घटनाओं पर चिंता व्यक्त करते हुए किसी समाचार पत्र के संपादक को पत्र लिखिए।	
प्रश्न 3. (i)	कहानी की परिभाषा बताते हुए इसके तत्त्वों के नाम लिखें। ***अथवा*** नाटक में अभिनय और संवाद योजना के महत्त्व को रेखांकित कीजिए।	3x1=3
प्रश्न 3. (ii)	रेडियो नाटक की अवधि छोटी क्यों रखी जाती है? ***अथवा*** कहानी में क्लाइमेक्स का क्या महत्त्व है?	2x1=2
प्रश्न 4. (i)	समाचार लेखन की रचना प्रक्रिया को स्पष्ट कीजिए। ***अथवा*** फ़ीचर कैसे लिखा जाता है?	3x1=3
प्रश्न 4. (ii)	समाचार और फ़ीचर में मुख्य अंतर क्या होता है? ***अथवा*** समाचार लेखन के छः ककार कौन से हैं?	2x1=2
प्रश्न संख्या	**पाठ्यपुस्तक आरोह भाग - 2 तथा अनुपूरक पाठ्यपुस्तक वितान भाग – 2**	**अंक (20)**
प्रश्न 5.	**निम्नलिखित 03 प्रश्नों में से किन्हीं 02 प्रश्नों के उत्तर दीजिए।**	3x2=6
(i)	शमशेर की कविता 'उषा' गाँव के जीवन का जीवंत चित्रण है। पुष्टि कीजिए।	3
(ii)	'कवितावली' के आधार पर सिद्ध कीजिए कि तुलसीदास को अपने समय की आर्थिक-सामाजिक समस्याओं की समझ थी।	3
(iii)	फ़िराक की गज़ल में अपना परदा खोलने से क्या आशय है?	3
प्रश्न 6.	**निम्नलिखित 04 प्रश्नों में से किन्हीं 03 प्रश्नों के उत्तर दीजिए।**	3x3=9
(i)	जाति प्रथा को श्रम विभाजन का ही एक अंग न मानने के पीछे डॉ. आंबेडकर के क्या तर्क थे?	3
(ii)	नमक कहानी में नमक की पुड़िया इतनी महत्त्वपूर्ण क्यों हो गई थी? कस्टम अधिकारी उसे लौटाते हुए भावुक क्यों हो उठा था?	3
(iii)	बाबा भीमराव आंबेडकर के अनुसार उनकी कल्पना का आदर्श समाज	3

PHYSICS PRACTICE QUESTIONS (TERM-2) XII

Q1. In a pure semiconductor crystal of Si, if antimony is added then what type of extrinsic semiconductor is obtained. Draw the energy band diagram of this extrinsic semiconductor soformed.

Q2. Consider two different hydrogen atoms. The electron in each atom is in an excited state. Is it possiblefortheelectronstohavedifferentenergiesbutsameorbitalangularmomentumaccording to the Bohr model? Justify youranswer.

OR

Explain how does (i) photo electric current and (ii)kinetic energy of the photo electron semitted in a photo cell vary if the frequency of incident tradiation is doubled, but keeping the intensity same?
Show the graphical variation in the above two cases.

Q3. Name the device which converts the change in intensity of illumination to change in electric current flowing through it. Plot I-V characteristics of this device for different intensities. State any two applications of thisdevice.

Q4. Derive an expression for the frequency of radiation emitted when a hydrogen atom de-excites from level into level (n–1). Also show that for large values of n, this frequency equals to classical frequency of revolution of anelectron.

Q5. Explain with a proper diagram how an ac signal can be converted into dc (pulsating) signal with output frequency as double than the input frequency using pn junction diode. Give its input and outputwaveforms.

Q6. How long can an electric lamp of 100W be kept glowing by fusion of 2kg of deuterium?
Take the fusion reaction as

$$_{1}^{2}\mathrm{H} + {}_{1}^{2}\mathrm{H} \rightarrow {}_{2}^{3}\mathrm{He} + \mathrm{n} + 3.27\ \mathrm{MeV}$$

Q7. Define wave front. Draw the shape of refracted wave front when the plane incident wave undergoes refraction from optically denser medium to rarer medium. Hence prove Snell's law of refraction.

Q8.(a)Draw a ray diagram of compound microscope for the final image for medat least distance of distinct vision?

An angular magnification of 30X is desired using an objective off oc all length 1.25 cm and an eye piece of focal length 5 cm. How will you set up the compound microscope for the final image formed at least distance of distinct vision?

OR

Draw a ray diagram of Astronomical Telescope for the final image for medat infinity.

A small telescope has an objective lens of focal length 140 cm and an eye piece of focal length 5.0cm.Find the magnifying power of the telescope for viewing distant objects when the telescope is in normal adjustment, the final image is formed at the least distance of distinct vision.

Q9.Light of wave length 2000Å falls on a metal surface of work function 4.2eV.

What is the kinetic energy (ineV) of the fastest electrons emitted from the surface?

What will be the change in the energy of the emitted electrons if the intensity of light with same wavelength is doubled?

If the same light falls on another surface of work function 6.5eV, what will be the energyof emitted electrons?

Q10. The focal length of a convex lens made of glass of refractive index (1.5) is 20cm.

What will be its new focal length when place

dinamedium of refractive index 1.25? Is focal length

positive or negative? What does itsignify?

Q11. (a)Name the .m. waves which are suitable for radar systems use dinair craft navigation.Write the range of frequency of these waves.

If the Earth did not have atmosphere, would it saverage surface temperature be higher or lower than what it is now? Explain.

Ane.m.wave exerts pressure on the surface on which it is incident. Justify.

OR

"If the slitsin Young's doubles lit experiments are identical, the intensity at any point on the screen may vary between zeros and four times to the intensity due to singles lit".

[2 marks]

12. Justify the above statement through a relevant mathematical expression.
13. Draw the intensity distribution as function of phase angle when diffraction of light takes place through coherently illuminated singles lit.

14. Write two properties of em waves.

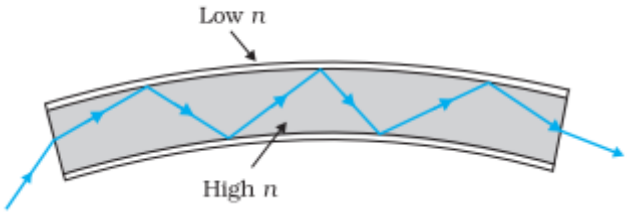
Ans: (a) All em waves travel in vacuum with the speed of light c = 3 x10^8 m/s.
(b) The frequency of em wave is same as the frequency of the oscillating source of em wave.
(c) EM waves are not deflected by electric and magnetic field.
(d) EM waves do not need any material medium for its propagation.
(e) EM waves carry energy and momentum.

15. Write one use of following em waves and how are they produced?
(i) UV rays (ii) Radio waves

Ans: (i) UV rays are used in water purifiers to kill germs. They are used in eye surgery LASIK operations because they can be focussed in narrow beams.
UV rays are produced by very hot bodies and special lamps.
Radio waves are used in radio, television and cell phone communication systems.
Radio waves are produced by acceleration of charges in conducting wires.

16. What are optical fibres? Show by diagram how light moves from one end to the other in a curved optical fibre. Write two uses of optical fibres.

Ans: - Optical fibres are transparent glass or plastic fibres. They include a core surrounded by a transparent cladding material. The refractive index of glass core is greater than refractive index of glass cladding.



Light travels from one end of the optical fibre to the other by Total internal reflection as shown above.

Uses of optical fibres-
They are used for transmitting audio and video signals through long distances.
They are used as light pipes for visual examination of internal organs like oesophagus, stomach and intestines.
Optical fibres are used in decorative lamps.

[2 marks]

17. Write three advantages of reflecting telescope over refracting telescope.

Ans: - Telescopes whose objectives are mirrors are called reflecting telescopes. They have following advantages over refracting telescope-

There is no chromatic aberration in a mirror.

Mechanical support is much less of a problem since a mirror weighs much less than a lens of equal optical quality and can be supported over its entire back surface.

Using parabolic mirror, spherical aberration can be removed.

Two lenses of focal lengths +20 cm and -10cm are placed in contact with each other. Find (a) the power of combined lens and (b) nature of the combined lens.

How does the fringe width change in YDSE when

The distance between the slits and the screen is increased

Slith width is decreased

Wavelength of light is increased and

Intensity of light is increased

Ans: - fringe width in YDSE is given by $\beta = \lambda D/d$ where D is the distance between the slits and the screen.

β is directly proportional to D, therefore fringe width increases when the distance between the slits and the screen is increased

β is inversely proportional to d, therefore fringe width increases with decrease in slit width

β is directly proportional to λ , therefore fringe width increases when the wavelength of light is increased.

Fringe width does not depend on the intensity of light.

(a) An n-type semiconductor material is produced by adding impurity atoms to a pure semiconductor material. How many valence electrons will the impurity atoms have in their outer shell? What will the net charge be on the semiconductor material after adding the impurityatoms?

What is the purpose of the followingdevices?

A photodiode in reverse bias

An LED in forward bias

18. (a) An electron of mass m and a photon carry the same energy E. What is the ratio of de Broglie wavelength associated with the electron to the wavelength of thephoton?

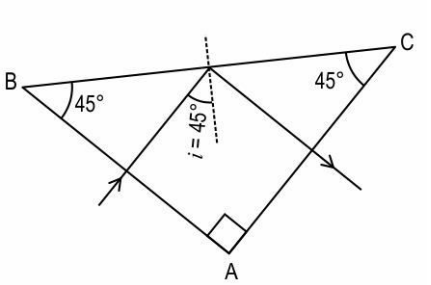
Why do macroscopic objects in our daily life not show wave-like properties whereas in the sub-atomic domain the wave-like character issignificant?

[2 marks]

[2 marks]

19. (a) Define barrier potential across a p-n junction. What is the impact on the barrier potential when the p-n junction is connected in forwardbias?
(b) How does the current change as the voltage applied across the p-n junction varies from small to very high in reverse bias condition?

20. A ray of light of wavelength λ falls normally on a right-angled isosceles prism ABC of refractive indexn.



Find the minimum value of refractive index n of the prism required for the total internal reflection of the light to occur on the face BC of the prism.

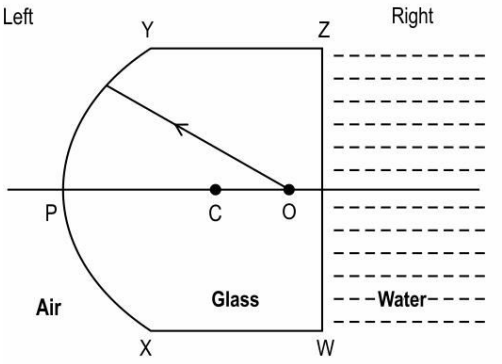
For any given thin prism of small angle a, refractive index n, and an incident blue light, answer the following questions.

Write the formula for angle of minimum deviation for a thin prism. If the whole arrangement is immersed in a liquid of refractive index n' < n, how will the angle of minimum deviationchange?

For some angle of incidence on the second face of the prism, the incident blue light undergoes total internal reflection. However, a red incident light for the same angle of incidence on the second face of the prism does not undergo total internal reflection. Give reason.

OR

A given glass slab WXYZ has a curved side on the left and plane side on the right. On the left of the curved side, XPY is air and on the right side of the plane side, WZ is water. An object is present inside the glass slab at O beyond its center of curvatureC.



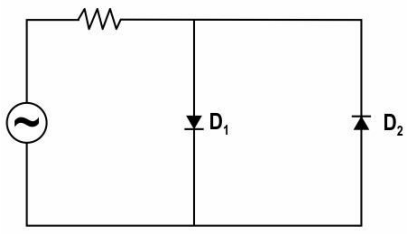
Copy the diagram and complete the ray diagram to represent an image I as viewed from the left side. Also state whether this image is real or virtual.

In a refracting type of telescope, what is the impact on its magnifying power ifthe objective and eyepiece lens are interchanged? Explain youranswer.

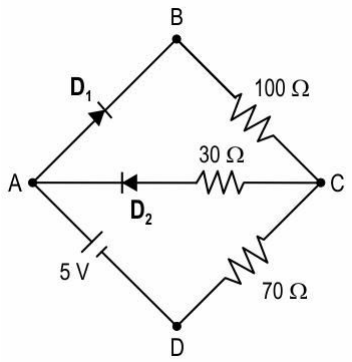
Give one advantage of using an objective lens with a large aperture in atelescope.

(a) What is the ratio of minimum to maximum energy of the radiations emitted by transition of an electron to the ground state of a hydrogenatom?
As per de Broglie's explanation of Bohr's quantization condition of an orbiting electron, represent a schematic diagram of particle waves associated with the electron of the hydrogen atom in the two states, n=2 andn=3.
Express the de Broglie's wavelength of an electron in the second orbit of Bohr's hydrogen atom in terms of the radius of theorbit.

(a) In the circuit given, identify the nature of biasing (forward or reverse) across each of thediodes.



(b) Consider a network ABCD containing two identical diodes D1 and D2. The two diodes offer a resistance of 30 Ω when in forward bias and infinite resistance when in reverse bias.



If the maximum current that can flow in either of the diodes is 30 mA beyond which they burn out, determine which of the diodes are safe in the above circuit?

A scientist hypothesizes the existence of a neutral particle of mass 2.0272 u which consists of two neutrons only. Take mass of neutron = 1.0086u.
What is the mass defect of thisparticle?
Can such a particle exist? Give a reason for youranswer.

[3 marks]

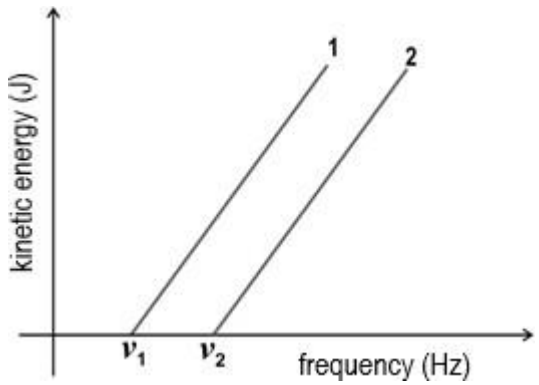
A student obtains an interference pattern formed in Young's double-slit experiment using a yellow light in the physics lab.

Suggest any two methods the student can use to increase the distance between the fringes.

What will happen if the student shifts the source such that it is slightly above the perpendicular bisector of the two slits?

Compare the distance between central and first maxima with that between second and third maxima obtained in the interferencepattern.

Radiations of different frequencies fall on two different metal surfaces. The graph below represents the kinetic energy of the emitted photoelectrons as a function of frequencies of incidentradiations.



If the two metals along with their work functions are: Potassium (2.3 eV) and Aluminium (4.3 eV), identify which line represents each metal. Give a reason for your answer.

Write the photoelectric equation that represents each of the above graphs. Find the slope of thegraph.

State one condition with respect to incident radiation for which the photoelectric current produced by it is proportional to itsintensity.

An object is placed at a distance of 4.5 cm to the left of a convex lens A of focal length 4cm.

Find the distance from lens A where a screen should be placed to obtain theimage.

[3 marks]

The screen is removed and the image is used as an object for a diverging lens B of focal length 2 cm so that a real image is formed at a distance of 8 cm from lens B. Find the distance between lens A and lensB.

[3 marks]

(a) Electromagnetic waves are believed to carry energy and momentum. Give one illustrative example that proves this characteristic of emwaves.

What is one common function of each ofthese?
Ozone layer, Glass windows, Special glass goggles used while welding metals

Write an equation that gives the speed of an electromagnetic wave in a material medium in terms of the electric and magnetic properties of the medium. Compare the speed of the em wave in a material medium and in vacuum.
OR
A red light of wavelength λ passes through a single slit of width w and produces a diffraction pattern on the screen. If the red light is replaced by the green light of wavelength 0.75λ, find the slit width required so as to keep the diffraction pattern for green light the same as that of the redlight.

Find the wavelength of the light that produces the first minimum at an angle of 30^0 Through a narrow slit of width 0.8 μm.

State the formula for the width of the central maximum of the single slit diffraction pattern. What will be the impact on the width of the central maximum if the whole of the diffraction apparatus is immersed in a liquid of refractive index n?Explain.

CAS E STUDY QUESTIONS.
RIA is walking slowly with her head above the water surface in the swimming pool that is about 1.5 m deep. She spots a coin at the bottom of the pool directly below. The coin appears raised to a depth that is less than the actual depth of the pool. The refractive index of water in the pool can be taken as1.3.

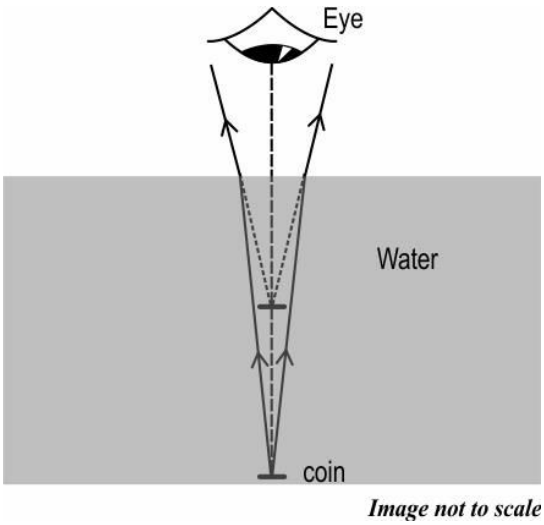


Image not to scale

RIA then gets under the water and begins looking up at the water surface. A friend of hers holds a coin directly above her eyes in the air. To RIA, the coin appears to be at a height more than the actual height.

In both the above cases, the virtual image of the coin is formed due to the refraction of light at the water-air interface. The bending of the light towards or away from the normal determines the position of the image formed at a distance that is more or less than its real depth/height.

State the formula Ria can use to find the apparent depth of the coin placed at the bottom of thepool.

Find the apparent depth of the coin placed at the bottom of the pool as seen by Ria from the air above the watersurface.

If the water in the pool gets polluted with an unknown liquid, thereby decreasing its refractive index, what will be the effect on the apparent depth of the coin placed in water as seen by Ria above the watersurface?

Represent the ray diagram for the second case when Ria looks at the coin in the air from inside thewater.

Find the apparent height of the coin from the water surface as seen by Ria underwater, when the coin is in the air at a height of 1.5 m from the watersurface.

Practice Questions 2021-22

Class XII

Term 2

Subject: Chemistry

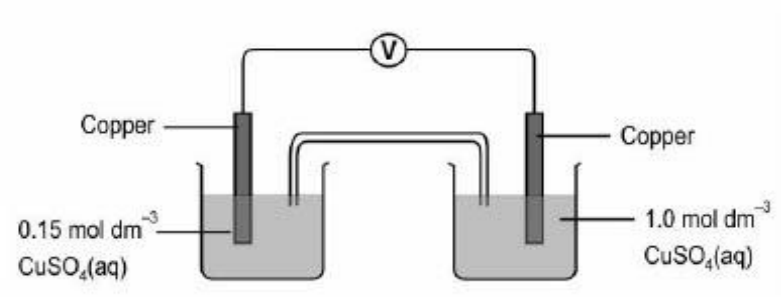
Time: 2 hours
Max. marks: 35

General instructions:

1. There are **12** questions in this question paper with internal choice
2. **SECTION A - Q. No. 1 to 3** are very short answer questions carrying 2 marks each.
3. **SECTION B - Q. No. 4 to 11** are short answer questions carrying 3 marks each.
4. **SECTION C- Q. No. 12** is case based question carrying 5 marks.
5. **All questions are compulsory.**
6. **Use of log tables and calculators is not allowed.**

SECTION A

1. In the chemistry lab, Zoya set up an electrochemical cell as shown below:



At room temperature, she found that the initial voltmeter reading was +0.16v.

(i) The standard electrode potential for the Cu^{2+}/Cu electrode is given by

$$Cu^{2+}(aq) + 2e^- \rightarrow Cu(s);\ E^o = +0.34\ V$$

Calculate the electrode potential of the electrode on the left-hand side of the above electrochemical cell.

(ii) Indicate the direction of current in the above cell. Also what will be the emf of the cell if the concentration of the beaker in the left side is raised to 1 mol dm^{-3}?

[2 marks]

2. (a) An aldehyde was produced on hydration of an alkyne P in the presence of H_2SO_4 and $HgSO_4$. Identify the alkyne P.

   (b) Arrange the following compounds in the increasing order of electrophilicity of the carbon atom of the carbonyl group.

   CH_3CH_2-CHO, CH_3CH_2-CO-CH_3, HCHO, CH_3-CO-CH_3

   [2 marks]

3. Answer any two of the following questions.

   (a) C_6H_5-CH_2-CH_2-CH_2- C_6H_5 is heated with alkaline potassium permanganate and the reaction mixture is then acidified with dilute hydrochloric acid. Name the product that will be formed.

   (b) Give the IUPAC name of HOOC - $CH_2CH_2CH_2CH_2$ -COOH.

   (c) Arrange the following in the increasing order of acidity:

   4-chlorobenzoic acid, 4-nitrobenzoic acid, 4-methylbenzoic acid

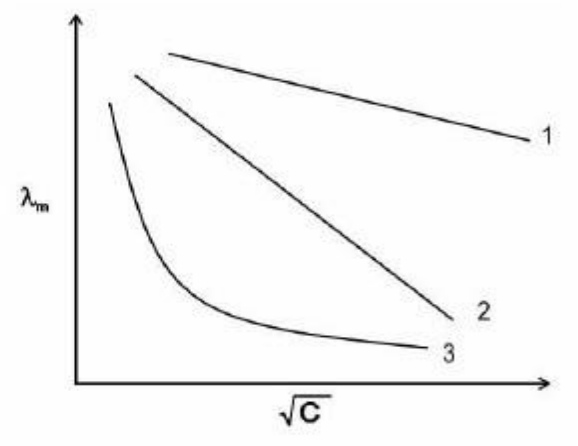
   [2 marks]

SECTION B

4. A sample of benzaldehyde contains a small amount of a water-insoluble alcohol. Explain the steps involved in a chemical method to obtain pure benzaldehyde from the mixture.

   [3 marks]

5. (i) The molar conductivity vs $\sqrt{c}$ curve for NaCl, HCl, and NH_4OH are shown below in random order.



Identify which graph corresponds to HCl, NaCl, and NH_4OH.

(ii) Give reasons to justify your answer in (i).

[3 marks]

6. An alkyl amide R-CO-NH_2 is converted to an amine in the following ways:
(i) by reduction with $LiAlH_4$
(ii) by treating with bromine in alcoholic NaOH

(a) Classify the type of amine produced in the methods above as primary, secondary or tertiary.
(b) State one major difference in the amine products produced in the two methods above.
(c) What advantages do these two methods of producing an amine have over producing an amine by treating an alkyl halide with alcoholic ammonia solution?

[3 marks]

OR

(a) Arrange the following amines in the increasing order of basicity. Consider all to be in the gaseous state.

$C_6H_5NH_2$, NH_3, $(C_2H_5)_2NH$, 4-nitro$C_6H_5NH_2$, $C_2H_5NH_2$

(b) Name the factor that exerts the most influence on the order of basicity of the compounds when in the gaseous state.

(c) Of the following two compounds (ii) is more acidic than (i). Explain why.

(i) C_6H_5 - CO - NH - C_2H_5

(ii) C_6H_5 - SO_2 -NH - C_2H_5

[3 marks]

7. Richa uses a rough charcoal surface instead of a flat surface to adsorb 'x' g of N_2 at room temperature (T_o). $\Delta H_{adsorption}$ was found to be very low and positive.

(i) Why is a rough surface better than a flat surface for adsorption. *(assume all the other variables are the same)*
(ii) Is the adsorption physical or chemical? Give a reason for your answer.
(iii) If x+20 g of N_2 is adsorbed at temperature T1, then compare T_o and T_1.

[3 marks]

OR

(i) The table below shows the volumes of nitrogen adsorbed by a sample of 3g of activated charcoal at 0°C:

pressure (mm)	180	540
volume (cm^3/g)	16.5	38.1

Evaluate the constants k and n if the above data fits Freundlich's adsorption isotherm.

(ii) Draw the adsorption vs temperature curve for the above case at p= 180 mm.

[3 marks]

8. The table below shows the oxidation potential for some of the first-row transition elements:

Element	Cr	Mn	Fe
$E^o(M^{2+}/M)$	-0.9 V	-1.18 V	-0.4 V
$E^o(M^{3+}/M^{2+})$	-0.41 V	+1.57 V	+0.8 V

Based on the above data,

(i) Why is the E^o value for Mn^{3+}/Mn^{2+} couple much more positive than that for Cr^{3+}/Cr^{2+} or Fe^{3+}/Fe^{2+}?
(ii) Arrange these elements in the decreasing order of their ease of getting oxidized.
(iii) Comment on the comparative stability of Fe^{3+} and Mn^{3+} in acid solutions.

[3 marks]

9. Answer the following:

(i) Arrange Ti^{3+}, Cr^{3+}, Ni^{3+}, Cu^{+1} in the increasing order of their magnetic moments.
(ii) Give the reason behind Zinc having the lowest melting point in the 3d series.
(iii) Although Mn has d^0 configuration in $KMnO_4$, it imparts color. Explain the reason behind this.

[3 marks]

10. Give reasons for the following:

(i) Both $[FeF_6]^{3-}$ and $[CoF_6]^{3-}$ contain F_6 as ligands but the former is a colorless compound and the latter is colored.
(ii) $[Co(NH_3)_6]^{3+}$ is diamagnetic whereas $[CoF_6]^{3-}$ is paramagnetic in nature.

(iii) Zn^{2+} is colorless whereas Cu^{2+} is colored.

[3 marks]

OR

(a) Ti^{3+} in an aqueous solution forms a complex and can absorb light of wavelength 5000 Å. Name one ligand which would form a titanium(III) complex such that this complex can absorb light of lower wavelength than 5000 Å. Similarly, name one ligand which would form a titanium(III) complex such that this complex can absorb light of higher wavelength than 5000 Å.
(b) Arrange the metal ions of the following compounds in the descending order of spin only magnetic moment:
$[V(CN)_6]^{4-}$, $[Fe(CN)_6]^{4-}$, $[Ru(NH_3)_6]^{3+}$, and $[Cr(NH_3)_6]^{2+}$

[3 marks]

11. Show how aniline can be converted to 4-bromoiodobenzene. (Mention all the steps involved.)

[3 marks]

OR

(a) Write the IUPAC name and structure of the product obtained by the reaction of ethanamine and benzoyl chloride.
(b) Can the product obtained in (a) undergo the Hoffmann degradation reaction? If yes, write the structure of the product that will be formed. If no, explain why.

[3 marks]

SECTION C

A major goal for the food scientist is the prediction of the change in the quality of a particular food as a function of both time and environmental conditions. This has become the focus of many research and development projects because the information obtained is needed by those in the food industry so that they can set an open date for the food on the package (e.g., a "use by" or "best if used by" date) so that consumers are better informed in handling the product.

In order to make useful predictions about shelf life, the research scientist needs information regarding the kinetics of the reactions leading to **loss of quality** or nutritional value as a function of the reaction phase conditions in the food and the external environment.

Some general modes of food deterioration are:

(1) Microbial decay of food: The initial population load and endpoint in terms of toxin level or the maximum allowed organism numbers are needed to make predictions of the change in the concentration level of the microbe with time. Much literature data exist for the growth rate constants of microbes under certain conditions.

OR

(a) Ti^{3+} in an aqueous solution forms a complex and can absorb light of wavelength 5000 Å. Name one ligand which would form a titanium(III) complex such that this complex can absorb light of lower wavelength than 5000 Å. Similarly, name one ligand which would form a titanium(III) complex such that this complex can absorb light of higher wavelength than 5000 Å.
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(1) Microbial decay of food: The initial population load and endpoint in terms of toxin level or the maximum allowed organism numbers are needed to make predictions of the change in the concentration level of the microbe with time. Much literature data exist for the growth rate constants of microbes under certain conditions.

To keep this mode of food deterioration in mind, the food corporation of India (FCI) mandates that the concentration of a microbial in any particular canned food would be unacceptable with a maximum +30% change from the initial value of a microbial.

(2) Senescence: Once a plant is harvested or an animal slaughtered the tissues are deprived of any external source of carbon or nitrogen, and thus utilize their internal carbohydrate, protein, or fat as a source of energy. They do this by continuing their normal enzymatic reactions in an aging process usually termed senescence. Eventually, the energy sources run out, or end products accumulate to render the food unacceptable. A familiar illustration of this process is the loss of sweetness in corn on the cob during storage. The study of the rates of these senescence reactions is important to the processor who wishes to ensure high-quality ingredients in processed food. It is also important for the fresh produce supplier

(3) Enzymatic Chemical Deterioration: When a food is processed in some way (heated, salted, dried, frozen, etc.) its internal structures are disrupted so that membranes are damaged. Thus, the neatly compartmentalized system is destroyed, and chemicals normally separated can now come into contact and react. These reactions then become the **major modes for loss in quality.**

As noted above, many of the chemical reactions that cause loss of quality also lead to physical changes, such as decreased solubility (NEB, oxidation) or mushiness (enzymatic reaction, senescence). Thus, **a physical property can be used as a quality index and its change over time can be treated kinetically.** Other physical reactions are almost all-or-none phenomena (thawing of ice or melting of fat), or they increase in rate as temperature decreases rather than as it increases, a situation that is not treatable by most simple kinetics models. An example of the first is the sudden loss of crispness of dry snack or cereal foods when they gain moisture and reach a certain water activity. The second type is represented by **loss of quality** in some frozen foods due to concentration acceleration and membrane damage as temperature decreases and by the physical staling of bread, which becomes tougher faster when it is stored refrigerated as compared to room temperature.

(Source: Application of Chemical Kinetics to Deterioration of Foods T. P. Labuza Department of Food Science and Nutrition, University of Minnesota, St. Paul, MN 55108)

12. (i) If the manufacturing date of a canned food is 1st June 2021, what should be the expiry date of this food as per the mandate of FCI? (given the average rate constant of microbial decay is 2 units day^{-1})

    (ii) The archaeological department uses kinetics theory to find the age of plants/trees. The department found an artifact of a rare tree having only 80% of the ^{14}C found in the living tree. Find the age of the sample if $t_{1/2}$ of the ^{14}C is 5730 years.

    (iii) Through the help of a graph, show the variation in the amount of quality index(factor) of food vs time for zero and 1st order reaction.

KENDREIYA VIDYALAYA JAMALPUR

IMPORTANT QUESTIONS WITH ANSWER

TERM – II

CLASS – XII

CHEMISTRY THEORY (043)

What is the effect of catalyst on:
(i)Gibbs energy (ΔG) and
(ii) activation energy of a reaction?

Answer:
(i) There will be no effect of catalyst on Gibbs .energy.
(ii) The catalyst provides an alternative pathway by decreasing the activation energy of a reaction.
Two half cell reactions of an electrochemical cell are given below :
$MnO^-_4(aq) + 8H^+ (aq) + 5e^- \rightarrow Mn^{2+} (aq) + 4H_2O (I)$, $E° = + 1.51$ V
$Sn^{2+} (aq) \rightarrow 4\ Sn^{4+} (aq) + 2e^-$, $E° = + 0.15$ V

Construct the redox equation from the two half cell reactions and predict if this reaction favours formation of reactants or product shown in the equation. (All India 2009)
Answer:
The reactions can be represented at anode and at cathode in the following ways :
At anode (oxidation) :
$Sn^{2+} \rightarrow = Sn^{4+} (aq) + 2e^-] \times 5$ $E° = + 0.15$ V
At cathode (reduction) :
$MnO^-_4(aq) + 8H^+ (aq) + 5e^- \rightarrow Mn^{2+} (aq) + 4H_2O (I)] \times 2$ $E° = + 1.51$ V
The Net $R \times M = 2MnO^-_4(aq) + 16H^+ + 5Sn^{2+} \rightarrow 2Mn^{2+} + 5Sn^{4+} + 8H_2O$
Now $E°_{cell} = E°_{cathode} – E°_{anode}$
$= 1.51 – 0.15 = + 1.36$ V
∴ Positive value of $E°_{cell}$ favours formation of product.
Given that the standard electrode potentials (E°) of metals are:
$K^+/K = -2.93$ V, $Ag^+/Ag = 0.80$ V, $Cu^{2+}/Cu = 0.34$ V,
$Mg^{2+}/Mg = -2.37$ V, $Cr^{3+}/Cr = -0.74$ V, $Fe^{2+}/Fe = -0.44$ V.

Arrange these metals in increasing order of their reducing power.

Answer:
$Ag^+/Ag < Cu^{2+}/Cu < Fe^{2+}/Fe < Cr^{3+}/Cr < Mg^{2+}/ Mg < K^+/K$
More negative the value of standard electrode potentials of metals is, more will be the reducing power.

Determine the values of equilibrium constant (K_c) and ΔG° for the following reaction :
$Ni(s) + 2Ag^+ (aq) \rightarrow Ni^{2+} (aq) + 2Ag(s)$,
$E° = 1.05$ V

(1F = 96500 C mol^{-1}) (Delhi 2011)

Answer:
According to the formula
$\Delta G° = -nFE° = -2 \times 96500 \times 1.05$
or $\Delta G° = -202650$ J $mol^{-1} = -202.65$ KJ mol^{-1}
Now $\Delta G° \Rightarrow -202650$ J Mol^{-1}
R = 8.314 J/Mol/K, T = 298 K

$$\log K = \frac{\Delta G°}{2.303\,RT}$$

$$\text{or } \log K = \frac{-202650}{2.303 \times 8.314 \times 298}$$

$$\log K = \frac{-202650}{5705.84831} = 35.52$$

$$K = \text{Antilog of } 35.52 \quad \therefore \mathbf{K = 0.35 \times 10^7}$$

The standard electrode potential for Daniell cell is 1.1 V. Calculate the standard Gibbs energy for the cell reaction. (F = 96,500 C mol^{-1}) (Comptt. Delhi 2013)

Answer:
Given : E° = 1.1V, F = 96,500 C mol^{-5}, n = 2
$Zn + Cu^2 \rightleftharpoons Cu + Zn^{2+}$
Using $\Delta G° = -nFE° = -2 \times 96500 \times 1.1$
= 212,300 CV mol^{-1}

Calculate the emf of the following cell at 298 K: Fe(s) | Fe^{2+} (0.001 M) || H^+ (1M) | H_2(g) (1 bar), Pt(s) (Given $E°_{cell} = +0.44$V) (Delhi 2013)
Answer:
As $Fe + 2H^+ \rightarrow Fe^{2+} + H_2$ (n = 2)
According to Nernst equation

$$E_{cell} = E^0_{cell} - \frac{0.0591}{2}\log\frac{[Fe^{2+}]}{[H^{+2}]^2}$$

$$\Rightarrow \quad E_{cell} = 0.44 - \frac{0.0591}{2}\log\frac{10^{-3}}{1^2}$$

$$\therefore \quad E_{cell} = 0.44 - \frac{0.0591}{2} \times (-3)$$

$$= 0.44 + 0.0887 = \mathbf{0.529\ V}$$

Define ‘activation energy’ of a reaction.
Answer:
The minimum extra amount of energy absorbed by the reactant molecules to form the activated complex is called activation energy.
The activation energy of the reaction decreases by the use of catalyst.

Express the rate of the following reaction in terms of the formation of ammonia :
$N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$
Answer:

$$\frac{-d[N_2]}{dt} = \frac{-1}{3}\frac{d[H_2]}{dt} = +\frac{1}{2}\frac{d[NH_3]}{dt}$$

If the rate constant of a reaction is $k = 3 \times 10^{-4}\ s^{-1}$, then identify the order of the reaction. (Comptt. All India 2013)

Answer:

S^{-1} is the unit for rate constant of first order reaction.

For a reaction R → P, half-life ($t_{1/2}$) is observed to be independent of the initial concentration of reactants. What is the order of reaction? (Delhi 2017)

Answer:

The $t_{1/2}$ of a first order reaction is independent of initial concentration of reactants.

A reaction is of second order with respect to a reactant. How will the rate of reaction be affected if the concentration of this reactant is
(i) doubled, (ii) reduced to half? (Delhi 2009)

Answer:

Since Rate = $K[A]^2$

For second order reaction Let [A] = a then Rate = Ka^2

(i) If [A] = 2a then Rate = $K(2a)^2 = 4\ Ka^2$

∴Rate of reaction becomes 4 times

(ii) If $[A] = \frac{a}{2}$ then Rate = $K\left(\frac{a}{2}\right)^2 = \frac{Ka^2}{4}$

∴ Rate of reaction will be $\frac{1}{4}^{th}$.

The rate constant for a reaction of zero order in A is 0.0030 mol $L^{-1}\ s^{-1}$. How long will it take for the initial concentration of A to fall from 0.10 M to 0.075 M? (Delhi 2010)

Answer:

For a zero order reaction,

$$\text{Time, } t = \frac{1}{K}[(A)_0 - (A)]$$

$$\text{or, } t = \frac{1}{0.003}(0.10 - 0.075)$$

$$\therefore \quad \textbf{Time, } t = \frac{1}{0.003} \times \frac{0.025}{1} = \frac{25}{3} = \textbf{8.3 seconds}$$

(a) For a reaction A + B → P, the rate law is given by, $r = k[A]^{1/2}[B]^2$.
What is the order of this reaction?
(b) A first order reaction is found to have a rate constant $k = 5.5 \times 10^{-14}\ s^{-1}$. Find the half life of the reaction. (All India 2013)

Answer:

(a) According to the formula : $r = k[A]^{1/2}[B]^2$

Order w.r.t. A = $\frac{1}{2}$, Order w.r.t B = 2

$\therefore$ Overall order = $\frac{1}{2}+\frac{2}{1}=\frac{5}{2}$

(*b*) For first order reaction, $t_{1/2} = \frac{0.693}{k}$

Given: $k = 5.5 \times 10^{-14}\ s^{-1}$

Thus, $t_{1/2} = \frac{0.693}{5.5\times10^{-14}s^{-1}}$

Hence $t_{1/2} = \mathbf{1.26 \times 10^{13}s}$

Define the term 'Tyndall effect'.

Answer:

Tyndall effect : When a beam of light is passed through a colloidal solution and viewed perpendicular to the path of the incident light, the path of light becomes visible as a bright streak. The illuminated path is called Tyndall cone and the phenomenon is called Tyndall effect.

What is the 'coagulation' process?

Answer:

The process of settling of colloidal particles is called coagulation or precipitation of the solution.

Define 'electrophoresis'.

Answer:

Electrophoresis : When electric current is passed through a colloidal solution, the positively charged particles move towards cathode while negatively charged particles move towards anode where they lose their charge and get coagulated. The phenomenon is known as Electrophoresis.

Define 'peptization'.

Answer:

Peptization may be defined as the process of converting a precipitate into colloidal sol by shaking it with dispersion medium in the presence of a small amount of electrolyte.

Out of NH_3 and CO_2 which gas will be adsorbed more readily on the surface of activated charcoal and why? (Comptt. Delhi 2012)

Answer:

NH_3 gas will be adsorbed more readily on activated charcoal. It has higher critical temperature than CO_2 and is an easily liquifiable gas. Its van der Waals forces are stronger.

Write two applications of adsorption. (Comptt. All India 2012)

Answer:

Applications of adsorption :

In decolorisation of sugar.

In gas masks, charcoal is used which adsorbs poisonous gases in mines.

Out of physisorption or chemisorption, which has a higher enthalpy of adsorption?

Answer:
Chemisorption has higher enthalpy of adsorption than physisorption due to chemical bond formation

Why do transition elements show variable oxidation states?
Answer:
The variability of oxidation state of transition elements is due to incompletely filled d-orbitals and presence of unpaired electrons, i.e. (ns) and (n -1) d electrons have approximate equal energies.

Write the formula of an oxo-anion of Manganese (Mn) in which it shows the oxidation state equal to its group number.
Answer:
Permanganate ion, i.e., MnO_4^- with oxidation number +7.

Write the formula of an oxo-anion of Chromium (Cr) in which it shows the oxidation state equal to its group number.
Answer:
$Cr_2O_7^{2-}$ (dichromate ion) in which oxidation state of Cr is +6 which equal to its group number 6.

Explain the following observations :
(i) Generally there is an increase in density of elements from titanium (Z = 22) to copper (Z = 29) in the first series of transition elements.
(ii) Transition elements and their compounds are generally found to be good catalysts in chemical reactions.
Answer:
(i) From titanium to copper the atomic size of elements decreases and mass increases as a result of which density increases.
(ii) The catalytic properties of the transition elements are due to the presence of unpaired electrons in their incomplete d- orbitals and variable oxidation states.

Explain the following observations :
(i) Transition elements generally form coloured compounds.
(ii) Zinc is not regarded as a transition element. (Delhi 2010)
Answer:
(i) Because of presence of unpaired d electrons, which undergoes d-d transition by absorption of energy from visible region and then the emitted light shows complementary colours. This is how transition elements form coloured compounds.
(ii) Zinc in its common oxidation state of +2 has completely filled d-orbitals. Hence considered as non-transition element.

Give IUPAC name of ionization isomer of $[Ni(NH_3)_3NO_3]Cl$.
Answer:
IUPAC name : Triammine nitrato nickel (III) chloride
Write down the formula of : Tetraamineaquachloridocobalt(III) chloride. (Comptt. All India 2012)

Answer:
$[Co(NH_3)_4(H_2O)Cl]Cl_2$

Which of the following is more stable complex and why?
$[Co(NH_3)_6]^{3+}$ and $[Co(en)_3]^{3+}$
Answer:
$[Co(en)_3]^{3+}$ is more stable complex than $[CO(NH_3)_6]^{3+}$ because of chelate effect.

Why are low spin tetrahedral complexes not formed?
Answer:
Law spin tetrahedral complexes are rarely observed because orbital splitting energies for tetrahedral complexes are sufficiently large for forcing pairing.

SAMPLE PAPER QUESTION (2021-22)

TERM – II

CHEMISTRY THEORY (043)

MM:35 Time: 2 Hours

GENERAL INSTRUCTIONS:

Read the following instructions carefully.

1. There are **12** questions in this question paper with internal choice.
2. **SECTION A - Q. No. 1 to 3** are very short answer questions carrying 2 marks each.
3. **SECTION B - Q. No. 4 to 11** are short answer questions carrying 3 marks each.
4. **SECTION C- Q. No. 12** is case based question carrying 5 marks.
5. **All questions are compulsory.**
6. **Use of log tables and calculators is not allowed**

SECTION A

1. Arrange the following in the increasing order of their property indicated (any 2):
   a. Benzoic acid, Phenol, Picric acid, Salicylic acid (pka values).
   b. Acetaldehyde, Acetone, Methyl tert butyl ketone (reactivity towards NH_2OH).
   c. ethanol, ethanoic acid, benzoic acid (boiling point) (1x2=2)

2. Solutions of two electrolytes 'A' and 'B' are diluted. The Λm of 'B' increases 1.5 times while that of A increases 25 times. Which of the two is a strong electrolyte? Justify your answer. Graphically show the behavior of 'A' and 'B'. (2)

3. Give reasons to support the answer:
   a. Presence of Alpha hydrogen in aldehydes and ketones is essential for aldol condensation.
   b. 3 –Hydroxy pentan-2-one shows positive Tollen's test. (1x2=2)

SECTION B

4. Account for the following:
   a. Aniline cannot be prepared by the ammonolysis of chlorobenzene under normal conditions.
   b. N-ethylethanamine boils at 329.3K and butanamine boils at 350.8K, although both are isomeric in nature.
   c. Acylation of aniline is carried out in the presence of pyridine. (1x3=3)

OR

4. Convert the following:
   a. Phenol to N-phenylethanamide.
   b. Chloroethane to methanamine.
   c. Propanenitrile to ethanol. (1x3=3)

5. Answer the following questions:
   a. $[Ni(H_2O)_6]^{2+}$ (aq) is green in colour whereas $[Ni(H_2O)_4(en)]^{2+}$(aq)is blue in colour , give reason in support of your answer .
   b. Write the formula and hybridization of the following compound:
      tris(ethane-1,2–diamine) cobalt(III) sulphate (1+2)

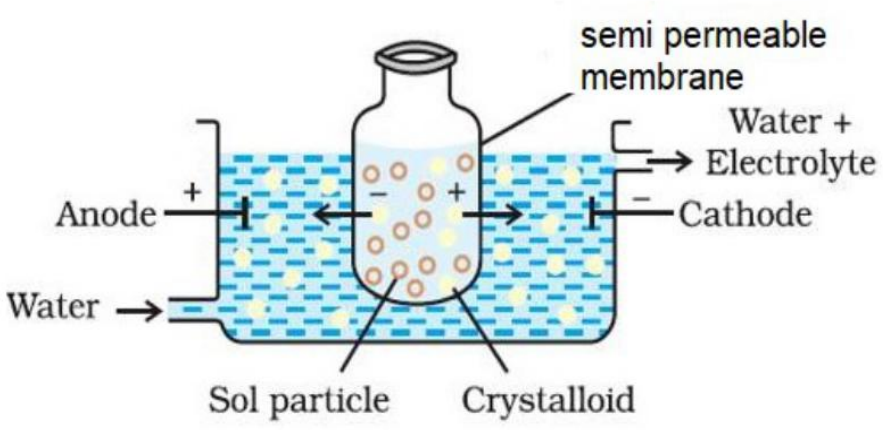
OR

5. In a coordination entity, the electronic configuration of the central metal ion is $t_{2g}^3 e_g^1$
   a. Is the coordination compound a high spin or low spin complex?
   b. Draw the crystal field splitting diagram for the above complex. (1+2)

6. Account for the following:
   a. Ti(IV) is more stable than the Ti (II) or Ti(III).
   b. In case of transition elements, ions of the same charge in a given series show progressive decrease in radius with increasing atomic number.
   c. Zinc is a comparatively a soft metal, iron and chromium are typically hard. (1x3=3)

7. An alkene 'A' (Mol. formula C_5H_{10}) on ozonolysis gives a mixture of two compounds 'B' and 'C'. Compound 'B' gives positive Fehling's test and also forms iodoform on treatment with I_2 and NaOH. Compound 'C' does not give Fehling's test but forms iodoform. Identify the compounds A, B and C. Write the reaction for ozonolysis and formation of iodoform from B and C. (3)

8. Observe the figure given below and answer the questions that follow:



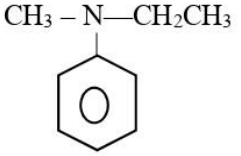
   a. Which process is represented in the figure?

b. What is the application of this process?
c. Can the same process occur without applying electric field? Why is the electric field applied?

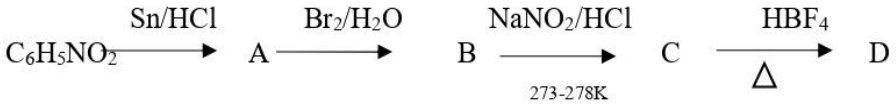
9. What happens when reactions:
   a. N-ethylethanamine reacts with benzenesulphonyl chloride.
   b. Benzylchloride is treated with ammonia followed by the reaction with Chloromethane.
   c. Aniline reacts with chloroform in the presence of alcoholic potassium hydroxide. (1x3=3)

OR

9. a. Write the IUPAC name for the following organic compound:



b.Complete the following:



(1x3=3)

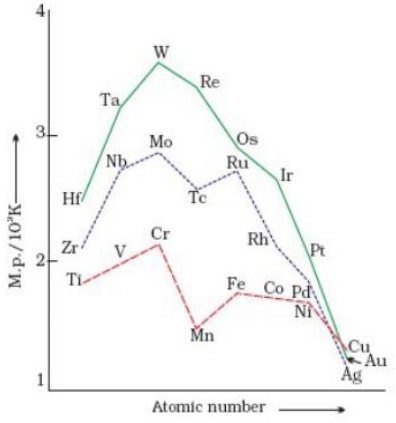
10. Represent the cell in which the following reaction takes place.The value of E° for the cell is 1.260 V. What is the value of E_{cell} ?

$$2Al(s) + 3Cd^{2+}\ (0.1M) \rightarrow 3Cd\ (s) + 2Al^{3+}\ (0.01M) \qquad (3)$$

11. a. Why are fluorides of transition metals more stable in their higher oxidation state as compared to the lower oxidation state?
    b. Which one of the following would feel attraction when placed in magnetic field: Co^{2+}, Ag^{+} ,Ti^{4+} , Zn^{2+}
    c. It has been observed that first ionization energy of 5 d series of transition elements are higher than that of 3d and 4d series, explain why? (1x3=3)

OR

11. On the basis of the figure given below, answer the following questions:



(source: NCERT)

a. Why Manganese has lower melting point than Chromium?

b. Why do transition metals of 3d series have lower melting points as compared to 4d series?

c. In the third transition series, identify and name the metal with the highest melting point.

(1x3=3)

SECTION C

12. Read the passage given below and answer the questions that follow.

Are there nuclear reactions going on in our bodies?

There are nuclear reactions constantly occurring in our bodies, but there are very few of them compared to the chemical reactions, and they do not affect our bodies much. All of the physical processes that take place to keep a human body running are chemical processes. Nuclear reactions can lead to chemical damage, which the body may notice and try to fix.

The nuclear reaction occurring in our bodies is radioactive decay. This is the change of a less stable nucleus to a more stable nucleus. Every atom has either a stable nucleus or an unstable nucleus, depending on how big it is and on the ratio of protons to neutrons. The ratio of neutrons to protons in a stable nucleus is thus **around 1:1** for small nuclei ($Z < 20$). Nuclei with too many neutrons, too few neutrons, or that are simply too big are unstable. They eventually transform to a stable form through radioactive decay. Wherever there are atoms with unstable nuclei (radioactive atoms), there are nuclear reactions occurring naturally. The interesting thing is that there are small amounts of radioactive atoms everywhere: in your chair, in the ground, in the food you eat, and yes, in your body.

The most common natural radioactive isotopes in humans are carbon-14 and potassium-40. Chemically, these isotopes behave exactly like stable carbon and potassium. For this reason, the body uses carbon-14 and potassium-40 just like it does normal carbon and potassium; building them into the different parts of the cells, without knowing that they are radioactive. In time,

carbon-14 atoms decay to stable nitrogen atoms and potassium-40 atoms decay to stable calcium atoms. Chemicals in the body that relied on having a carbon-14 atom or potassium-40 atom in a certain spot will suddenly have a nitrogen or calcium atom. Such a change damages the chemical. Normally, such changes are so rare, that the body can repair the damage or filter away the damaged chemicals.

The natural occurrence of carbon-14 decay in the body is the core principle behind carbon dating. As long as a person is alive and still eating, every carbon-14 atom that decays into a nitrogen atom is replaced on average with a new carbon-14 atom. But once a person dies, he stops replacing the decaying carbon-14 atoms. Slowly the carbon-14 atoms decay to nitrogen without being replaced, so that there is less and less carbon-14 in a dead body. The rate at which carbon-14 decays is constant and follows first order kinetics. It has a half - life of nearly 6000 years, so by measuring the relative amount of carbon-14 in a bone, archeologists can calculate when the person died. All living organisms consume carbon, so carbon dating can be used to date any living organism, and any object made from a living organism. Bones, wood, leather, and even paper can be accurately dated, as long as they first existed within the last 60,000 years. This is all because of the fact that nuclear reactions naturally occur in living organisms.

(source: The textbook Chemistry: The Practical Science by Paul B. Kelter, Michael D. Mosher and Andrew Scott states)

a. Why is Carbon -14 radioactive while Carbon -12 not? (Atomic number of Carbon: 6)
b. Researchers have uncovered the youngest known dinosaur bone, dating around 65 million years ago. How was the age of this fossil estimated?
c. Which are the two most common radioactive decays happening in human body?
d. Suppose an organism has 20 g of Carbon -14 at its time of death. Approximately how much Carbon -14 remains after 10,320 years? (Given antilog 0.517 = 3.289)

OR

d. Approximately how old is a fossil with 12 g of Carbon -14 if it initially possessed 32 g of Carbon -14? (Given log 2.667 = 0.4260)

(1+1+1+2)

KENDRIYA VIDYALAYA JAMALPUR

IMPORTANT QUESTIONS FOR TERM II EXAM 2022
CLASS XII
SUBJECT BIOLOGY

Human Health and Disease
2 Marks

1. **Q. Name the two types of cells in which HIV multiplies after gaining entry into the human body.**
Ans. HIV multiplies first in macrophages and then in helper T-cells or lymphocytes

2. **Q. High fever, loss of appetite, stomach pain and constipation are some of the symptoms seen in a patient. How would the doctor confirm that the patient is suffering from typhoid and not amoebiasis?**
Ans. Typhoid can be confirmed by widal test.

3. **Q. It was diagnosed by a specialist that the immune system of the body of a patient has been suppressed. Name the disease the patient is suffering from and its causative agent.**
Ans. Patient is suffering from AIDS disease. Where in the immune system gets suppressed making the person susceptible to infections caused by pathogens. The causative agent of the disease is HIV (Human Immunodeficiency Virus).

4. **Q. Why is secondary immune response more intense than the primary immune response in humans?**
Ans. Since, the secondary immune response is based on the memory of primary response, i.e. first encounter with antigen. The second generated immune response is more fast having higher affinity for antigen, and therefore more intense than primary immune response.

5. **Q. Name any two types of cells that act as 'cellular barriers' to provide innate immunity in humans.**
Ans. Certain type of leucocytes (such as PMNL- neutrophils, monocytes) and natural killer cells are two types of cells that act as 'cellular barriers' to provide innate immunity in humans

6. **Q. How does colostrum provide initial protection against disease to new born infants? Give one reason.**
Ans. Colostrum contains antibody IgA that provides protection against disease, thus protecting the newborn infants

7. **Q. Some allergens trigger sneezing and wheezing in human being. What causes this type of response by the body?**
Ans. Immune system of the body produce exaggerated response (allergy) against allergens and release chemicals like histamines and serotonin from mast cells. This is the cause of sneezing and wheezing, in response to these allergens.

8. **Q. A boy of ten years had chickenpox. He is not expected to have the same disease for the rest of life. Mention how it is possible?**
Ans. (i)The antibodies developed in his body would circulate in body fluids and neutralise the pathogenic agent during subsequent encounters.
(ii) Further memory B-celis and T-cells are retained in the system, which trigger a more intense and quick response against the same antigen, thus preventing the occurrence of same disease in his life

9. **Q. How does haemozoin affect the human body when released in blood during malarial infection?**
Ans. The release of toxic haemozoin by the ruptured RBCs during malarial infection accounts for recurrence of high fever and chill every 3-4 days.

10. **Q. What is an autoimmune disease? Give an example.**
Ans. The abnormal response of an immune system in which it fails to recognise 'self and 'non-self' and start destroying its own cells and molecules is called autoimmune disease. Rheumatoid is an example of autoimmune disease which destroys articular cartilage and fusing bones

11. **Q. State two different roles of spleen in the human body?**
Ans. The two roles of spleen in human body are:
(i) Spleen acts as a filter to trap blood-borne microorganisms.
(ii) It is also a large reservoir of erythrocytes

12. **Q. Mention the useful as well as the harmful drug obtained from the latex of poppy plant.**
Ans. Morphine is obtained from latex of poppy plant. It is useful as a sedative and harmful when used as opioids

13. **Q. How does smoking tobacco in human lead to oxygen deficiency in their body?** **Ans.** Smoking increases carbon monoxide (CO) content in blood and reduces the concentration of haem-bound oxygen. This causes oxygen deficiency in the body.

Human Health and Diseases
3 marks

14. **Q. What is 'withdrawal syndrome'? List any two symptoms it is characterised by.**
Ans.If the regular does of drug or alcohol in an addicted person is discontinued abruptly, the body exhibits a characteristic and unpleasant symptoms called 'withdrawal syndrome', The 'withdrawal syndrome' is characterised by symptoms like anxiety, nausea and sweating

15. **Q. Why is using tobacco in any form injurious to the health? Explain.**
Ans. Tobacco is injurious to health because it, contains alkaloid nicotine which releases adrenaline and noradrenaline. It also,
(i) causes cancer of lungs, urinary bladder and throat, emphysema, bronchitis, coronary heart disease, etc
(ii)increases CO content in blood and reduces concentration of haem-bound oxygen, thus causing oxygen deficiency in the body when smoked.
(iii) causes cancer of oral cavity due to chewing.
(iv) increases blood pressure and heart rate.

16. **Q. Why do sportsperson often fall a victim to cocaine addiction?**

Ans. Cocaine exerts stimulating action on central nervous system, producing a sense of euphoria and increased energy .This is the reason some sports person misuse it to enhance their performance and with repeated use, gets addicted

17. **Q. Due to undue peer pressure, a group of adolescents started using opioids intra- venously. What are the serious problems they might face in future?[Foreign 2008]**
Ans.Serious problems due to opioids taken intravenously are:
(i) AIDS and hepatitis-B may occur. Because the viruses of these diseases are spread through sharing the infected needles and syringes.

(ii) Due to regular use, tolerance of the receptors increases, so they respond only to higher doses of drugs leading to greater intake and addiction.

18. **Q. Name the blank spaces A, B,C and D in the table given below:**

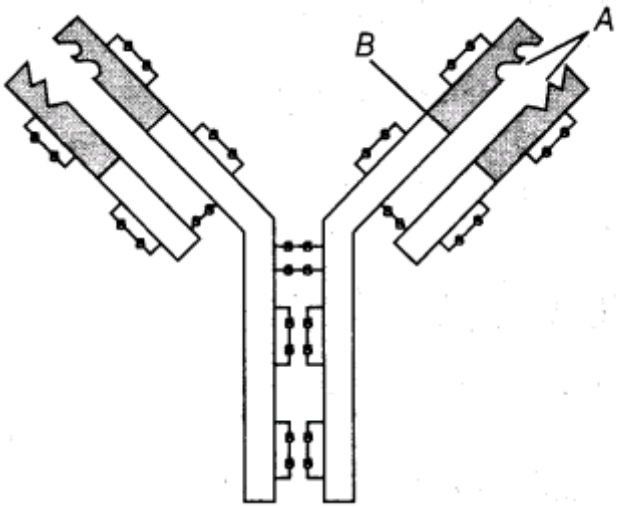
Name of the drug	Plant source	Organ system affected
A	Poppy plant	B
Marijuana	C	D

Ans.A – Morphine
B – Central nervous system
C – Cannabis sativa
D – Cardiovascular system

19. **Q. Write the scientific name of the source plant of the drugs-marijuana and hashish and mention their effect on human body.**
Ans. The scientific names of source plant of drugs Marijuana and Hashish is Cannabis sativa. (l) They usually effect the cardiovascular system of human body.

20. **Q. Name one plant and the addictive drug extracted from its latex. How does this drug affect the human body?**
Ans.Both morphine and heroin are extracted from the latex of plant Papaver somniferum.Heroin is actually obtained from acidulation of morphine. Thus, both are related. Morphine acts as an effective sedative and pain killer while heroin acts as depressant and slows down body functions.

21. **Q. (i) What does the below diagram illustrate?**
(ii)Name the parts labelled A and B
(iii)Name the type of cells that produce this molecule. [Delhi 2009]



Ans.(i)It shows antibody molecule.
(ii) A – Antigen-binding site B – Heavy chain
(iii) B-lymphocytes (B-cells) produce antibodies

22. **Q. State the effect of carcinogens on human body. Name the carcinogenic ionising and non-ionising radiations. Mention their carcinogenic effect.**
Ans. Carcinogens can transform normal cell into cancerous neoplastic cell. Carcinogenic ionising radiations are

X-rays and gamma rays. Carcinogenic non-ionising radiations are UV-rays.These radiations cause damage to DNA, i.e. mutations that leads to transformation of normal cells into cancerous cell

23. **Q. (i) Explain the property that prevents normal cells from becoming cancerous.**
(ii)All normal cells have inherent characteristic of becoming cancerous. Explain.
Ans.(i)Contact inhibition is the property shown by normal cells. Due to contact with other cells, they inhibit their uncontrolled proliferation and growth.
(ii) All normal cells have oncogenes (c-onc) or protooncogenes. When activated under certain conditions, such genes could lead to oncogenic transformation of cells, i.e. they become cancerous,

24. **Q. What is colostrum? Why is it important to be given to the newborn infants?**
Ans. Colostrum is the milk produced by mother during initial days of lactation.Colostrum contains antibody IgA that provides protection against disease, thus protecting the newborn infants

25. **Q. How does spleen act as lymphoid organ? Explain.**
Ans. Spleen is a large, bean-shaped organ, which contain lymphocytes and phagocytes. It act as a filter to trap blood-borne microbes and contain large pool of erythrocytes, thus acts as secondary lymphoid organs.

26. **Q. Name the two special types of lymphocytes in humans. How do they differ in their roles in immune response? [All India 2012]**
Ans.Two types of lymphocytes are:
(i) B-lymphocytes or B-cells (ii) T-lymphocytes or T-cells
B-lymphocytes and T-lymphocytes are

27. **Q. (i) Name the group of virus responsible for causing AIDS in humans. Why are these virus so named?**
(ii)List any two ways of transmission of HIV infection in humans other than sexual contact?
Ans.(i)Retrovirus is the group of virus causing AIDS in humans. They contain RNA as genetic material and with the help of enzyme reverse transcriptase they make DNA on RNA template. Thus, they are called retrovirus.
(ii) (a) By sharing infected needles.
(b) By transfusion of blood contaminated with HIV

28. **Q. Name the different types of cell providing cellular barrier responsible for innate immunity in humans.**
Ans. Cellular barriers are provided by:
(i) Certain types of WBC like polymorphonuclear leukocytes and monocytes in blood.
(ii) Macrophages in tissue

29. **Q. List any two emergent circumstances, when a medical doctor would recommend injection of a pre-formed antibody into the body of a patient and why?**
Ans.(i) In case of snake bite, quick immune response is required and we cannot wait for the body to produce antibodies.
(ii) In tetanus, it is infected with some deadly microbes to which quick immune response is required

30. **41.How is an allergic reaction caused by an allergen? Name the drug that can reduce the symptoms of allergy?**
Ans.Allergens can produce IgE type of antibodies. There is release of histamine and serotonin like chemicals

from mast cells, which cause allergic reactions.The use of drug anti-histamine, adrenalin and steroids quickly reduce the symptoms of allergy.

31. **Q. Name the two types of immunity in a human body. Why are cell mediated and humoral immunities so called?**
Ans.Types of immunity system in human are:
(i) Innate immunity, acquired immunity or humoral immunity system and cell mediated immunity system.
(ii) Cells mediated immunity is so called as it involves specialised cells, the T-lymphocytes. Humoral immunity is so called because it includes antibodies, which are found circulating in body fluid, the blood (humors-body fluids).

32. **Q. Name the host and the site, where the following occur in the life cycle of a malarial parasite**
(i)Formation of gametocytes
(ii)Fusion of gametocytes
Ans.(i)Formation of gametocytes occurs in erythrocytes (RBC) of human beings.
(ii) Fusion of gametocytes occurs in the intestine of mosquito

33. **Q. Identify A, B,C and D in the following table**
Ans.A – Small intestine B – Rhinovirus
C – Nose, respiratory passage D – Alveoli of lungs.
34. **Q. The barriers in the innate immunity are given in the following table. Identify A, B, C and D. [Delhi 2010 c]**

Types of barrier	Barriers
Physical	Skin, *A*
Physiological	*B*, in the eye
C	Interferon
Cellular	WBC, *D*

Ans.A-Lining of epithelium B-Tears C-Cytokine
D-Polymorphonuclear leukocytes

35. **Q. (i) How does a vaccine affect immunity?**
(ii) How can we get immunisation against tetanus?
Ans.(i) In vaccination, a preparation of antigenic proteins of pathogen or inactivated/ weakened pathogen (vaccine) are introduced into the body. The antibodies produced in the body against these antigens would neutralise the pathogenic agents during actual infection. The vaccines also generate memory B and T-cells.
(ii) Preformed antibodies for tetanus are directly injected to acquire quick immune response. This is called passive immunisation.

Human Health and Diseases
5 marks

36. **Q. Do you support 'Dope' test being conducted on sports persons participating in a prestigious athletic meet? Give three reasons in support of your answer.**
Ans.Yes, the 'dope test' should be conducted on sportspersons participating in a prestigious athletic meet. This is done to find out whether any participant had taken any kind of performance enhancing drugs.The use of drugs in sports should be banned as:

(i) they increase muscle strength.
(ii) promote aggressiveness.
(iii) increase athletic performance.
Because of above reasons, use of such drugs, e.g. steroids, analgesics, diuretics should be banned for participants as it would be unfair on the part of other participants (not consuming such drugs).

37. **Q. Write the source and the effect on the human body of the following drugs.**
(i)Morphine
(ii)Cocaine
(iii)Marijuana
Ans.(i)Morphine is obtained from the latex of Papaver somniferum. It is a depressant, which slows down the body functions.
(ii)Cocaine is obtained from Erythroxylum coca. It is a stimulant and produces a sense of euphoria and increased energy.
(iii) Marijuana is obtained from the inflorescence of Cannabis sativa. It affects cardiovascular system of the body.

38. **Q. (i) Name the drug used (a) as an effective sedative and pain killer (b) for helping patients to cope with mental illness like depression but often misused, (ii) How does moderate and high dosage of cocaine affect the human body?**
Ans.(i) (a) Morphine is an effective sedativeand pain killer.
(b) Lysergic acid diethylamides (LSD)
or barbiturates are often misused.
(ii) Moderate dose of cocaine have a stimulating action on central nervous system. It produces a sense of euphoria and increased energy.High dosage of cocaine causes hallucinations

39. **Q. (i) All human beings have cellular oncogenes but only few suffer from cancer disease.Give reasons.**
(ii)How is a malignant tumour different from a benign tumour?
Ans.(i) All cells have cellular oncogenes or proto-oncogene, which code for certain growth factors. Under certain conditions, they get activated and lead to oncogenic transformation causing cancer.
This transformation is induced by physical, chemical and biological factors called carcinogens.
(ii) Differences between benign and malignant tumour are:

Benign tumour	Malignant tumour
These tumours remain limited to their original location.	These tumours have neoplastic cells which separate and move to other sites.
These cause less damage to the body.	These cause more damage to the body.
Metastasis does not occur.	Metastasis is the main feature.

40. **Q. Trace the life cycle of Plasmodium in humans from the stage of entry until it is picked up by the female Anopheles.**
Ans. Life cycle of Plasmodium (malarial parasite)
(i) The infected female Anopheles mosquito transfers the infectious form of Plasmodium, i.e. sporozoites to the human body by biting.

(ii) Sporozoites reach the liver cells, where they multiply.
(iii) This is followed by their attack on red blood cells resulting in the rupture of RBCs.
(iv) Ruptured RBCs release a toxin called haemozoin, responsible for recurring fever, chills and shivering.
(v)The parasite enter female Anopheleswhen they bite an infected person.
(vi)In the body of mosquito, they fertilise and multiply in stomach wall.
(vii)Sporozoites are then again transferred to the human body by mosquito bite.

41. **Q. (i) Name the respective forms in which the malarial parasite gains entry into.**
(a)Human body
(b)Body of female
(ii)Name the hosts where the sexual and asexual reproduction occur respectively.
(iii)Name the toxin responsible for the appearance of symptoms of malaria in human. Why do these symptoms occur periodically?[Delhi 2003]
Ans.(i) (a) Sporozoite
(b) Gametocytes
(ii) Sexual reproduction occurs iri mosquito and asexual reproduction takes place in human body.
(iii)Haemozoin is the toxin. The parasites after entering the fresh RBCs take 48-72 hours to complete the erythrocytic cycle. Then they burst to release toxic substance called haemozoin. So, the symptoms like chill and high fever occur periodically

.

42. **Q. (i)Name the causative organisms for the following diseases.**
(a)Elephantiases
(b)Ringworm
(c)Amoebiasis
(ii)How can public hygiene help control such diseases?
Ans.(i)The causative agent or organism forfollowing diseases are:
(a)Elephantiasis is caused by Wuchereria bancrofti and W. malayi. These affect lower limbs and genital organs.
(b) Ringworm is caused by Microsporum, Trychophyton and Epidermophyton. They affect the skin, nails and scalp.
(c)Entamoeba histolytica is a protozoan parasite in the large intestine of human, which causes amoebiasis (amoebic dysentery).
(ii) Maintenance of public hygiene such as:

keeping body and surroundings clean.

consumption of clean drinking water, fruits and vegetables, etc.

regular cleaning and disinfection of tanks and other water reservoirs, etc.

All the above measures help controlproper disposal of waste and excreta.the increase in vectors of infectious diseases and their breeding places. Thus, there would be reduced chances of transmission of infectious diseases.

43. **Q. Name the cells HIV attacks first when it gains entry into a human body. How does this vims replicate further to cause immunodeficiency in the body?**
or
Trace the events occur in human body to cause immunodeficiency, when HIV gains entry into the body.
Ans. The HIV virus attacks the macrophages cells in human body.
(i) RNA is replicated to form viral DNA by the enzyme reverse transcriptase.
(ii) Viral DNA now gets incorporated into the host cell's DNA and directs the infected cells to produce viruses.
(iii) Macrophages continue to produce virus particles and function as HIV factories.

(iv) The virus particles enter helper T-lymphocytes in the blood, where they continue to replicate and produce viral progenies.
(v)The number of helper T-lymphocytes progressively decreases in the body of the infected person.
(vi) With the decrease in number of T-cells, the immunity also decreases. The person is unable to produce any immune response even against common bacteria like Mycobacterium, parasites like Toxoplasma, viruses and fungi.

44. **Q. (i) Name the causative agent of typhoid in humans.**
(ii) Name the test administered to confirm the disease.
(iii)How does the pathogen gain entry into the human body? Write the diagnostic symptoms and mention the body organ that gets affected in severe cases?
Ans.*(i)* Salmonella typhi.
(ii) Widal test.
(iii) Pathogens enter the human body through contaminated food and water.
Symptoms of typhoid are:
(a) Constant high fever (39-40°C)
(b) Weakness and headache
(c) Stomach pain
(d) Loss of appetite
Intestinal (small intestine) perforation in severe cases which may cause death. Causative agent – Salmonella typhi

Microbes in Human Welfare
2 Marks

45. **Q. BOD of two samples of water A and B were 120 mg/L and 400 mg/L,Which sample is more polluted?**
Ans. Sample B(BOD 400 mg/L) is more polluted as higher the BOD, more is the polluting potential.

46. **Q. Why is sewage water treated until the BOD is reduced? Give a reason.**
47. **Ans.** The greater the BOD of sewage water, more is its polluting potential. So, the sewage water is treated, till its BOD is reduced to reduce the organic matter present in it.

48. **Q. Milk starts to coagulate when Lactic Acid Bacteria (LAB) is added to warm milk as a starter. Mention any other two benefits LAB provides.**
Ans. Two benefits of LAB:
(i) They improve the nutrient quality of curd by increasing the vitamin-B12 content.
(ii) LAB also check the growth of disease-causing microbes in the stomach.

49. **Q. Which of the following is the baker's yeast used in fermentation? Saccharum barberi, Saccharomyces cerevisiae and Sonalika.**
Ans. Saccharomyces cerevisiae is the baker's yeast used in fermentation.

50. **Q. State one reason for adding blue-green algae to the agricultural soil.**
or
Mention two advantages of adding blue-green algae to paddy fields.
Ans. Blue-green algae are added to agricultural soil because they add organic matter to the soil and also increase its fertility.

51. **Q. Name any one symbiont, which serve as biofertilizer. Mention it specific role.**
Ans. Rhizobium is a symbiont bacteria that serve as biofertilizer
The bacteria fix the atmospheric nitrogen into organic forms, which is used by the plants as nutrients.

52. **Q. How is the presence of cyanobacteria in the paddy fields beneficial to rice crop?** **Ans.** In the paddy fields, cyanobacteria such as blue-green algae fix atmospheric nitrogen to enrich the nitrogen content of soil. Therefore, the entire need of nitrogen to rice crop can be supplied by blue-green algae, leading to increase in yield.

53. **Q. Name the group of organisms and the substrate that act on to produce biogas.** **Ans.** Methanogens are the group of organisms that acts on cellulosic materials/cow dung to produce biogas.

Microbes in Human Welfare
3 marks

54. **Q. Why is Rhizobium categorised as a symbiotic bacterium? How does it act as biofertilisers?**
Ans. The nodules on the roots of leguminous plants are formed by Rhizobium bacteria for their survival. These bacteria fix atmospheric nitrogen into organic form, which is used by the plant as nutrients. Since, Rhizobium forms symbiotic association with leguminous plants these are considered as symbiotic bacteria, (l) Rhizobium fixes the atmospheric nitrogen into organic form, i.e. nitrates which can be utilised by the plant as nutrient. So, it is used as biofertilisers.

55. **Q. How do mycorrhizae act as biofertilisers? Explain. Name a genus of fungi that forms a mycorrhizal association with plants.**
Ans. Fungi form symbiotic association with plants, which is called mycorrhiza. The fungal symbiont in these associations absorbs phosphorus from soil and passes itto the plant. Thus, acts as a biofertiliser. The fungi belonging to the genus Glomus form mycorrhizal associations with plants.

56. **Q. What are methanogens? Name the animals in which methanogens occur and the role they play there.**
Ans. Methanogens are groups of anaerobic bacteria, that produces large amount of methane.
Methanogens are found in rumen of cattle and intestine of humans.
The methanogens present in intestine of animals and humans act on cellulosic part of food and digests them, thereby releasing methane along with $C0_2$ and H_2.

57. **Q. How are baculoviruses and Bacillus thuringiensis used as biocontrol agents? Why are they preferred over readily available chemical pesticides?**
Ans. Bacillus thuringiensis as biocontrol agent
(i) Through genetic engineering, the gene coding for the toxic protein is introduced into crop plants, which make them resistant to insect pests.
(ii) When they are eaten by the larvae, the toxin becomes active in the gut of larvae and kills the larvae.
(iii) They are available in sachets as dried spores, which have to be mixed with water and sprayed onto vulnerable plants.
Baculovirus (Nucleopolyhedrovirus) as biocontrol agents:
(i) These are excellent candidates for species-specific, narrow spectrum insecticidal application.
(ii) They show no negative impact on plants, mammals, birds, fish or even non-target insects.
(iii) These are especially desirable when beneficial insects are being conserved to aid in an overall Integrated Pest Management (IPM) programme.

(iv) kills harmful as well as useful organisms indiscriminately.

58. **Q. Why is 'starter' added to set the milk into curd? Explain.**
Ans. When a small amount of curd as starter is added to fresh milk, millions of Lactic Acid Bacteria (LAB) present in the starter grow in milk and convert it to curd. During this process, acids are produced by LAB that coagulate and partially digest the milk proteins (casein). LAB increases vitamin-B_{12} content along with other vitamins in the curd

59. **Q. Name the bacterium responsible for the large holes seen in swiss cheese. What are these holes due to?**
Ans. Swiss cheese is produced by the bacterium Propionibacterium shermanii. The large holes in swiss cheese are due to the large amount of $C0_2$ production

60. **Q. Name the source of streptokinase. How does this bioactive molecule function in our body.**
or
Name the enzyme produced by Streptococcus bacterium. Explain its importance in medical sciences.

Ans. Streptokinase enzyme is produced by the bacterium Streptococcus. It is modified by genetic engineering and is used as a clot buster for removing clots from the blood vessels of patients who have suffered from myocardial infarction.

Microbes in Human Welfare
5 Marks

61. **Q. (i) Why do farmers prefer biofertilisers to chemical fertilisers these days? Explain, (ii) How do Anabaena and mycorrhiza act as biofertilisers?**
Ans. (i) A farmer relies on biofertilisers then chemical fertilisers because
(a) Chemical fertilisers significantly increase the soil pollution and reduce quality of soil, as well as water pollution, when it drains into nearby water bodies, after rain.
(b) Overuse of chemical fertiliser makes the soil infertile.
(ii) Anabaena fix atmospheric nitrogen, thus enriching the nitrogen content of the soil, as well as the organic matter.
In mycorrhiza, the fungal symbiont absorbs phosphorus from the soil and passes it to the plant and provides resistance to root borne diseases. Since, they fulfil the nitrogen and phosphorus requirement they act as biofertilisers.

62. **Q. Name the genus to which baculoviruses belong. Describe their role in the integrated pest management programme. [Delhi 2011; Foreign 2011]**
Ans. Baculoviruses belongs to the genus Nucleopolyhedrovirus.
Baculovirus (Nucleopolyhedrovirus) as biocontrol agents:
(i) These are excellent candidates for species-specific, narrow spectrum insecticidal application.
(ii) They show no negative impact on plants, mammals, birds, fish or even non-target insects.
(iii) These are especially desirable when beneficial insects are being conserved to aid in an overall Integrated Pest Management (IPM) programme.

63. **Q. Why should biological control of pests and pathogens be preferred to the conventional use of chemical pesticides? Explain how the following microbes act as biocontrol agents?**
(i) Bacillus thuringiensis (ii) Nucleopolyhedrovirus.
Ans. Bacillus thuringiensis as biocontrol agent
(i) Through genetic engineering, the gene coding for the toxic protein is introduced into crop plants, which make them resistant to insect pests.
(ii) When they are eaten by the larvae, the toxin becomes active in the gut of larvae and kills the larvae.
(iii) They are available in sachets as dried spores, which have to be mixed with water and sprayed onto vulnerable plants.
Baculovirus (Nucleopolyhedrovirus) as biocontrol agents:
(i) These are excellent candidates for species-specific, narrow spectrum insecticidal application.
(ii) They show no negative impact on plants, mammals, birds, fish or even non-target insects.
(iii) These are especially desirable when beneficial insects are being conserved to aid in an overall Integrated Pest Management (IPM) programme.

64. **Q. Identify A, B, C, D, E and F in the table given below: [Foreign 2014]**

Scientific name of the organism	Product produced	Use in human welfare
Streptococcus	Streptokinase modified	A
B	Cyclosporin-A	C
Monascus purpureus	D	E
Lactobacillus	F	Sets milk into curd

Ans. The codes are identified as
A- Clot buster in patents who underwent myocardial infarction.
B- Trichoderma polysporum
C- Immunosuppressive agent in organ transplantation
D- Statins
E – Blood cholesterol lowering agents
F – Lactic acid

65. **Q. Explain the different steps involved in sewage treatment before it can be released into natural water bodies.**
Ans. Sewage treatment includes following steps:
(i) Primary Treatment

It is a physical process of removal of small and large particles through filtration and sedimentation.

The first step is to remove the floating objects (like polythene bags) by letting the sewage to pass through wire mesh screens of sequential smaller pore sizes.

Sewage is then passed into the grit chamber, where grit is sedimented.

Sewage is then allowed to pass into the settling tank, where the suspended materials settle down to form primary sludge.

Effluent is then taken for the secondary treatment.

(ii)Secondary Treatment

It is a biological process in which bacteria naturally occurring in sewage are used.

Effluent obtained from the primary treatment is passed into large aeration tank. Here, it is constantly agitated and air is pumped into it.

Due to this, rapid growth of aerobic bacteria occur into floes. These consume the organic matter of the sewage and reduce the BOD.

Effluent is passed into settling tank, where the floes are allowed to settle forming the activated sludge.

A small amount of activated sludge is pumped back into aeration tank as inoculum.

The remaining major part of the activated sludge is pumped into anaerobic sludge digesters, where the anaerobic bacteria digest the organic matter and produce methane, hydrogen sulphide and carbon dioxide.

Effluent is then allowed to pass into the water body.

66. **Q. Mention the product and its use produced by each of the microbes listed below:**

Streptococcus

Lactobacillus

Saccharomyces cerevisiae [All India 20101]

Ans.(i) Streptococcus Product is streptokinase. It is used as a clot-buster for removing the clots from the blood vessels of patients suffering from myocardial infarction.
(ii) Lactobacillus Product is lactic acid. It is used to convert milk into curd and improves nutrient quality of curd by enriching it with vitamin-B12.
(iii) Saccharomyces cerevisiae Product is ethanol and also used for bread making and beverages.

67. **Q. (i) How does activated sludge get produced during sewage treatment?**
(ii) Explain how this sludge is used in biogas production?
Ans.(i) (a) The primary effluent is passed into large aeration tanks. Due to the constant agitation floes formation occur, which are masses of bacteria associated with fungal hyphae.
(b) These microbes consumes sufficient quantity of organic matter and there by reduce BOD.
(c) Once, the BOD of sewage water gets reduced significantly, the effluent is passed into a settling tank, where the bacterial floes undergo sedimentation and the sediment is called activated sludge.
(ii) Biogas formation from activated sludge:
(i) A small part of activated sludge is pumped into the aeration tank to serve as inoculum. It grows into floes and consume organic matter to reduce BOD.
(ii) The remaining major part of sludge is pumped into large tanks called anaerobic sludge digesters.
(iii) Here, anaerobic bacteria digest the organic material of the sludge.
(iv) During this digestion, the bacteria produces a mixture of gases like carbon dioxide, methane and hydrogen sulphide which form the biogas.

68. **Q. (i)Expand BOD.**
(ii) At a particular segment of a river near a sugar factory, the BOD is much higher than the normal level. What is it indicative of? What will happen to the living organism in this part of the river?
(iii) Under what conditions will the BOD be lowered in the river? How will it affect the aquatic life?
Ans. (i) Biochemical Oxygen Demand.
(ii) The higher BOD indicates high organic matter in river. Microbes involved in the biodegradation of organic matter in water body consume a lot of oxygen.
Due to this, a sharp decline occur in the amount of dissolved oxygen. This leads to killing of fish and othe microorganisms in that part of river.
(iii) BOD of water body decreases when the amount of organic matter decreases. Thus, microbes do not need oxygen for its decomposition.
Due to the decreased BOD, aquatic life will start flourishing.

Biotechnology – Principles and Processes
2 marks

69. **Q. Name the host cells in which microinjection technique is used to introduce an alien DNA.**
Ans. The microinjection technique to introduce alien DNA is usually carried out in animal cell, i.e. directly into the nucleus.

70. **Q. Name the material used as matrix in gel electrophoresis and mention its role.**
Ans. The material used as matrix in gel electrophoresis is agarose.
This agarose gel acts as a sieve to separate the DNA fragments according to their size.

71. **Q. Write any four ways used to introduce a desired DNA segment into a bacterial cell in recombinant technology experiments.**
Ans. Ways to introduce desired DNA into bacterial cell are:
(i) microinjection (ii) disarmed pathogen vectors
(iii) portion by bivalent cation such as calcium
(iv) bidlistic or gene gun

72. **Q. Name the enzymes that are used for the isolation of DNA from bacterial and fungal cells for recombinant DNA technology.**
Ans. The enzymes used for the isolation of DNA from bacterial cells is lysozyme and fungal cells is chitinase.

73. **Q. What is the host called that produce a foreign gene product? What is this product called? [Foreign 2010]**
Ans. The host cells that produce foreign gene product are called transgenic organisms or Genetically Modified Organisms (GMOs). The product is called recombinant proteins.

Biotechnology – Principles and Processes
3 Marks

74. **Q. How does a restriction nuclease function? Explain.**
Ans. Restriction nucleases function by inspecting the length of DNA sequence, and then binding to specific recognition sequences and cutting the strands at sugar phosphate backbones.
These nucleases are of two types depending on their mode of action.
(i) **Restriction exonucleases** cut sequences at terminal ends of DNA.
(ii) **Restriction endonucleases** cut between the two bases of recognition sequence.

75. **Q. Explain with the help of a suitable example the naming of a restriction endonuclease.**
Ans. Naming of restriction endonuclease are:
(i) The first letter of the name comes from the genus and next two letters from species of the prokaryotic cell from where enzymes are extracted.
(ii) The Roman numbers following the name show the order in which the enzymes, were isolated from the bacterial strain. For example, Eco Rl is derived from Escherichia coli RY 13, Hind II from Haemophilus influenzae Rd, etc.

76. **Q. How are sticky ends formed on a DNA strand? Why are they so called?**
Ans. Sticky ends on DNA are formed by action of enzymes restriction endonucleases. These enzymes cut the strand of DNA a little away from the centre of the palindrome sequence between the same two bases on both the strands. This results in single stranded stretches on both the complementary strands at their ends.

These overhanging stretches are called sticky ends as they form hydrogen bonds with the complementary base pair sequences.

77. **Q.How is insertional inactivation of an enzyme used as a selectable marker to differentiate recombinants from non-recombinants?**

Ans. The insertional activation of J3-galactosidase enzyme, i.e. by inserting the desired gene in the coding region of enzyme, results in inactivation of (3-galactosidase gene in recombinants. The recombinant on transformed hosts are unable to produce any colour when grown on chromogenic substrate, thus acting as a selectable marker to differentiate recombinants from non-recombinants.

78. **Q. Explain palindromic nucleotide sequence with the help of a suitable example.**
Ans. The palindromic nucleotide sequence is the sequence of base pairs in DNA that reads the same on both the complementary strands of DNA, with same orientation of reading.
For example
5′-GAATTC-3′
3′-CTTAAG-5′

79. **Q. Why are molecular scissors so called? Write their use in biotechnology?**
Ans. Molecular scissors are so called because they cut DNA at specific sequences between base pairs.
Since, molecular scissors on restriction enzymes cut DNA at desired sequences and generate sticky ends that facilitate to join with host genome or vector DNA, they play an important role in genetic engineering or biotechnology. It is because with the help of these enzymes we can cut the desired gene and introduce into vectors for expression.

80. **Q. Why is making cells competent essential for biotechnology experiments? List any two ways by which this can be achieved.**

Ans. Since, DNA molecules are hydrophillic, they cannot pass through cell membranes. For recombinant DNA to be integrated into vector or host genome it is necessary for the DNA to be inserted in the cell. Therefore, making the host cells competent is necessary in biotechnology experiments.
The two ways by which cells can be made competent to take up DNA are:
(i) **Chemical action** By increasing concentration of divalent cation, calcium, thereby increasing the efficiency of DNA entering through pores in cell, wall.
(ii) Heat shock treatment Incubating the cells with recombinant DNA on ice, followed by brief treatment of heat at 42 °C and again putting them back on ice.

81. **Q. Explain the contribution of Thermus aquaticus in the amplification of a gene of interest.**
Ans. Thermus aquaticus provides thermostable DNA polymerase. It can withstand the high temperature used in denaturation and separation of DNA strands during Polymerase Chain Reaction (PCR). Hence, can be used for repeated amplification of DNA.

82. **Q. Mention the three steps involved in each cycle of Polymerase Chain Reaction (PCR). How is repeated amplification of DNA made possible using PCR?**
Ans. (i) A-Denaturation of the double stranded DNA.
(ii) B-Primers
(iii) C-DNA polymerase or Taq polymerase.
Importance in PCR
It extends the primers using the nucleotides provided in the reaction medium and the genomic DNA as the

template. Taq polymerase is thermostable and withstands the high temperature used in denaturation process. Repeated amplification of DNA in PCR is made possible by using thermostable DNA polymerase, which remain active during high temperature.

Biotechnology – Principles and Processes

5 Marks

83. **Q. How is the amplification of a gene sample of interest carried out using Polymerase Chain Reaction (PCR)?**
or
Describe the process of gene amplification for rDNA technology experiments.
Ans. Amplification of gene is done using polymerase Chain Reaction (PCR). it is carried out in the following steps:
(i) Denaturation The double stranded DNA is denatured by applying high temperature of 95°C for 15 seconds. Each separated strand acts as a template.
(ii) Annealing Two sets of primers are added, which anneal to the 3′ end of each separated strand.
(iii) Extension DNA polymerase extends the primers by adding nucleotides complementary to the template provided in the reaction. Taq polymerase is used in the reaction, which can tolerate heat. All these steps are repeated many times to get several copies of the desired DNA.

Q. How is the bacterium Thermus aquaticus employed in recombinant DNA technology?
Ans. Thermus aquaticus, a bacterium yields DNA polymerase used in PCR in recombinant DNA technology.
(i) This enzyme remains active during the high temperature applied in the denaturation of double stranded DNA.
(ii) It extends the primers using the nucleotides provided in the reaction and the genomic DNA as template.
(iii) Repeated amplification is achieved by this enzyme. The amplified fragments, if desired can be used to ligate with a vector for further cloning.

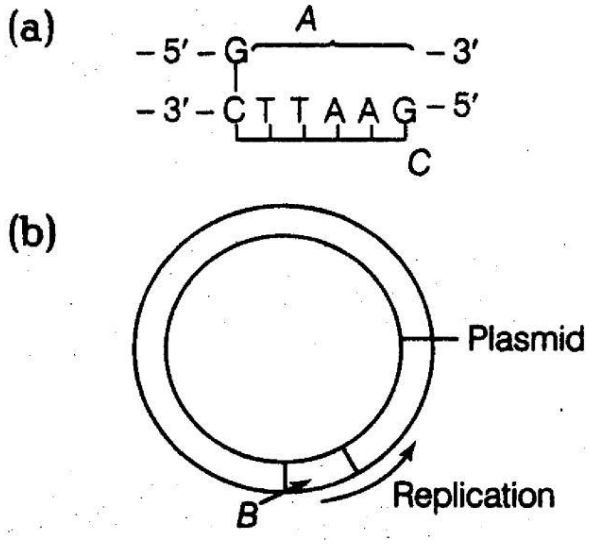
84. **Q. What are bioreactors? List five growth conditions that a bioreactor provides for obtaining the desired product.**
Ans. (i) Bioreactors are large vessels in which raw materials are biologically converted into specific products by microbes, plant and animal cells or human cells.
The bioreactors work by providing optimal conditions to process the culture as well as the production of desired product by maintaining optimum pH, temperature, oxygen and other growth conditions required.
Growth conditions that a bioreactor provides for obtaining desired product are:
(i) Optimum temperature
(ii) Suitable pH
(iii) Salt
(iv) Vitamins
(v) Oxygen

85. **Q.Explain the basis on which the gel electrophoresis technique works. Write any two ways the products obtained through this technique can be utilised.**
Ans. Gel electrophoresis technique works on the principle of separation of DNA fragment on the basis of electric charge.
Since, DNA is negatively charged molecule so, they can be forced to separate out according to their size towards anode under an electric field through a medium or matrix (commonly used is agarose). Shorter molecule moves faster and migrate further than the lohger one.
The products obtained through this technique can be utilised as follows:

(i) Construction of recombinant DNA by joining with cloning vectors.
(ii) Used in making multiple copies of same DNA by using PCR (Polymerase Chain Reaction).

86. **Q. How can the following be made possible for biotechnology experiments?**
(i) Isolation of DNA from bacterial cell.
(ii) Reintroduction of the recombinant DNA into a bacterial cell.
Ans. (i) Isolation of DNA from bacterial cell can be done by:
(a) treating the bacterial cells with enzymes such as lysozyme to remove cell wall.
(b) the RNA associated with DNA can be removed by treatment with ribonuclease, whereas protein can be removed by treatment with protease. Similarly other molecules (if any) are removed by appropriate treatment.
(ii) Reintroduction of the recombinant DNA into bacterial cell can be done by the following methods:
(a) The recipient bacterial cell is made 'competent' to take up the recombinant DNA by treatment with a specific increase in concentration of calcium ions.
(b) the recombinant DNA is forced into the cells by heat shock treatment, i.e. by incubating the cells with rDNA followed by placing them at 42°C (heat shock) and then putting them back on ice. This enables bacteria to take up rDNA.

87. **Q. (i) Identify A and B illustrations in the following:**



(ii) Write the term given to A and C and why?
(iii) Expand PCR. Mention its importance in biotechnology.
Ans. (i) (a) A is recognition or restriction site (AATTC), which is recognised by restriction enzyme Eco
(b) B is rop gene protein involved in the replication of plasmid coded by this gene.
(ii) A and C are called palindromes. These are sequence of base pairs that reads same on the two strands of DNA, when orientation of reading is kept same.
(iii) PCR is polymerase chain reaction, multiple copies of the gene of interest can be synthesised in vitro by this technique. Thus, PCR can be utilised to amplify a single gene or fragment into thousands of copies to be used in cloning experiments.

Biotechnology and its Application

2 Marks

88. **Q. Name the source organism of the gene cry IAc and its target pest.**
Ans. Source of gene crylAc is Bacillus thuringiensis and its target pest-cotton bollworms.

89. **Q. How does silencing of specific mRNA in RNA interference prevent parasitic infection?**
Ans. Parasitic infection can be prevented by using RNA interference (RNAi) process, as the nematode cannot live in the transgenic host that expresses the specific interfering RNA thus, making it double stranded and unable to translate the protein or product.

90. **Q. How are tobacco plants benefited when nematode specific genes are introduced into them using certain vectors? Name the vectors used. Ans**. Nematode specific genes when introduced into the host plants, initiate the process of RNAi and hence, silenced the specific mRNA of nematode. The parasite cannot survive in transgenic host, so prevent the plants from pests. Vector used is Agrobacterium.

Biotechnology and its Application
3 Marks

91. **Q. State how was Agrobacterium tumefaciens been made as a useful cloning vector to transfer DNA to plant Cells**
Ans. The bacterium Agrobacterium tumefaciens is known to be natural vector capable of passing its DNA to plants and induce tumour by integrating its DNA with host genome. The tumour causing gene in the plasmid of this bacteria is replaced by gene of interest and is now used as a cloning vector to transfer the DNA into plant cells.

92. **Q. What is gene therapy? Name the first clinical case in which it was used.**
Ans. Gene therapy is a corrective therapy or technique of genetic engineering to replace a faulty or non-functional gene with a normal healthy functional gene,
The first clinical gene therapy was given to a 4 years old girl with ADA (Adenosine Deaminase) deficiency in 1900, due to the deletion of the gene coding for ADA

93. **Q. Human insulin when synthesised in the body needs to be processed before it can act. Explain giving reasons.**
Ans. Human insulin when initially synthesised in human body consists of three peptide chains- A, B and C. The C-peptide is an extra stretch of amino acids joining the A and B-chains. This is called proinsulin or prohormone. It undergoes processing or splicing to release the functional mature insulin that can carry out its normal functions. During processing, the C-peptide is removed. Only A and B-chains contribute to form the functional insulin.

94. **Q. Write any two ways how genetically modified plants are found to be useful?**
Ans. Then genetically modified plants are found to be useful as, they :
(i) reduce or minimise the use of chemicals,fertilisers, insecticides, herbicides, etc.
(ii) reduce post-harvest losses and enhance nutritional value of crop.

95. **Q. Name the disease that was first to get the gene therapy treatment. Write the cause of the disease and the effect it has on the patient.**
Ans. The ADA (Adenosine Deaminase) deficiency disease was the first to get the gene therapy treatment. The disease is caused due to the deletion of gene that codes for Adenine Deaminase (ADA) enzyme. The deficiency of the ADA enzyme effects the functioning of immune system.

96. **Q. (i) State the role of DNA ligase in biotechnology.**
(ii) What happens when Meloidogyne incognita consumes cells with RNAi gene?
Ans. (i) DNA ligase enzyme is used to join two DNA fragments from their ends.
(ii) When Meloidogyne incognita (parasite) consumes cells with RNAi gene, parasite cannot survive and this prevents infection. The introduced DNA forms both sense and anti-sense RNA. These two strands being complementary to each other form ofsRNA, leading to RNAi. Thus, the mRNA of nematode is silenced and the parasite cannot survive there. This produces Meloidogyne incognita resistant tobacco plants.

97. **Q. (i) Mention the cause and the body system affected by ADA deficiency in humans.**
(ii) Name the vector used for transferring ADA-DNA into the recipient cells in humans. Name the recipient cells.
Ans. (i) ADA is caused due to deletion of gene for adenosine deaminase. Immune system of body is affected due to this.
(ii) Retroviral vector is used to transfer ADA-DNA into the recipient cells of human.
Recipient cells-Lymphocyte.

98. **Q. How is 'Rosie' considered different from a normal cow? Explain.**
Ans. The transgenic cow, Rosie, produced human protein-enriched milk (2.4 gm/L). It contained the human a-l actalbumin and was nutritionally more balanced product for human babies than natural cow's milk.

Biotechnology and its Application
5 Marks

99. **Q. Name the host plant and its part that Meloidogyne incognita infects. Explain the role of Agrobacterium in the production of dsRNA in the host plant. [**
Ans. The nematode Meloidogyne incognita infects the roots of tobacco plants.
The Agrobacterium are used as vectors carrying nematode specific genes to be introduced in host plant. These genes when expressed inside host plant produces sense and anti-sense RNA strands, complementary to nematode's functional mRNA. This binding results in formation of double stranded RNA and inhibiting or silencing the translation of RNA specified. This process is called RNA interference.

100. **Q. Name the pest that destroys the cotton bolls. Explain the role of Bacillus thuringiensis in protecting the cotton crop against the pest to increase the yield.**
or
How is the Btcotton plant created as a GM plant? How is it protected against bollworm infestation?
Ans. The pest that destroys the cotton balls are cotton boll worms and cotton borer. Bt cotton is created by using some strains of a bacterium, Bacillus thuringiensis (Btis short form).
(i) This bacterium produces protein that kill certain insects such as lepidopterans (tobacco budworm and armyworm), coleopterans (beetles) and dipterans (flies and mosquitoes).
(ii) Bacillus thuringiensis forms protein crystals during a particular phase of their growth. These crystals contain a toxic insecticidal protein.
(iii) Bt toxin protein exist as inactive protoxins, but once an insect ingests the inactive toxin, it is converted

into an active form due to the alkaline pH of the gut which solubilise the crystals.
(iv) The activated toxin binds to the surface of midgut epithelial cells and create pores that cause cell swelling and lysis leading to death of insect.
(v) Specific Bttoxin genes were isolatedfrom Bacillus thuringiensis and incorporated into several crop plants.
(vi) Most Bttoxins are insect-group specific.Hence, the toxin is coded by a gene named cry. For example, the proteins encoded by the genes cry I Ac and cry lAb control the cotton boll worms and cry lAb controls corn borer.

101. **Q. (i) Tobacco plants are damaged severely when infested with Meloidogyne incognita. Name and explain the strategy that is adopted to stop this infestation,**
(ii) Name the vector used for introducing the nematode specific gene in tobacco plant. [
or
How does RNA interference help in developing resistance in tobacco plant agamst nematode infection?

Ans. (i)Infestation of tobacco plant can be stopped by using RNA interference (RNAi) process.
Process of RNAi
Process of RNA interference (RNAi) is related with silencing of a specific mRNA. It is a method of cellular defence in all eukaryotes.
(i) A complementary RNA binds to the mRNA making it double stranded and prevent its translation.
(ii) This complementary RNA could be from an infection by viruses having RNA genomes or mobile genetic elements (transposons) that replicate via an RNA intermediate.
(iii) Using Agrobacterium vectors, nematode specific genes were introduced into the host plants.
(iv) It produces both sense and anti-sense RNA in the host cells.
(v) These two RNAs being complementary to each other form a double stranded RNA (dsRNA) that initiated RNAi, silencing the specific mRNA of the nematode.
(vii) Due to this, parasite could not survive in a transgenic host expressing interfering RNA. So, transgenic plant is protected.
(ii) Vector used for introducing the nematode specific gene in tobacco plant *is* Agrobacterium.

102. **Q. Expand the name of the enzyme ADA. Why is the enzyme essential in the human body? Suggest a gene therapy for its deficiency.**
Ans. ADA-Adenosine Deaminase. It is required for the proper functioning of immune system.
Gene therapy for ADA deficiency are:
Gene therapy is helpful in case of ADA deficiency.
Hereditary disease can be corrected by gene therapy. It is a collection of methods that allows correction or replacement of defective gene. The first gene therapy was given in 1990 to a 4 years old girl with Adenosine Deaminase (ADA) deficiency. It is caused due to the deletion of gene for adenosine deaminase.
The treatment involves following steps:

(i) Lymphocytes from the blood of patient are grown on culture outside the body.
(ii) A functional ADA, cDNA (using a Retro viral vector) is then introduced into these lymphocytes.
(iii) Such genetically engineered lymphocytes are returned to the blood of patient.
(iv) Periodic infusion of such genetically engineered lymphocyte is required by the patient.

Organisms and Populations
2 marks

103. **Q.Why are some organisms called as eurythermals and some other as stenohaline?**
Ans.Organisms, which can tolerate and thrive in a wide range of temperatures are called as eurythermal while organisms, which can tolerate and thrive in a narrow range of salinities are stenohaline

104. **Q.Mention any two activities of animals, which get cues from diurnal and seasonal variations in light intensity, [Delhi 2011 c]**
Ans.The two activities of animals which get cues from diurnal and seasonal variations in light intensity are:
(i) Timing their foraging
(ii) Migratory activities
(iii) Reproduction (any two)

105. **Q. How do animals like fishs and snails avoid summer related unfavourable conditions? [Delhi 2010]**
Ans. Fish migrate and snails go into aestivation or summer sleep to avoid summer-related problems.

106. **Q. How do prickles help cactus survive in desert? Give two methods.**

Ans.The two methods by which prickles help cactus survive in desert are:
(i) By reducing and altering outer surface to reduce evaporation of water.
(ii) By providing defense against grazing animals.

107. **Q.Which one of the two, stenothermals or eurythermals shows wide range of distribution on earth and why?**
Ans.Eurythermals show a wide range of distribution on earth, as they can tolerate and thrive in a wide range of temperatures

108. **Q.When and why do some animals like snails go into aestivation?[All India 2008]**
Ans. During stressful conditions of the habitat and inability to migrate, animals like snails undergo aestivation and protect themselves

109. **Q.When and why do some animals go into hibernation?**
Ans. When unfavourable conditions are for a short time and if the animals could not migrate, they undergo hibernation to avoid stressful winter conditions.

110. **Q.List any two physiological responses that help you to gradually get acclimatised to high altitudes when you go from the plains.**
Ans.The physiological condition or responses in order to get accl imatised to high attitudes are:
(i) To compensate low oxygen, the production of red blood cells is increased.
(ii) High haemoglobin content and its decreased binding capacity.
(iii) Faster breathing rate (any two).

111. **Q. How do herbs and shrubs survive under the shadow of big canopied trees in forests?**
Ans. The herbs and shrubs are adapted to perform photosynthesis optimally under very low light conditions due to growing in the forests under the shadow' of big canopied trees

112. **Q. Why many of the freshwater animals cannot live for long in seawater or vice versa?**

113. **Ans**.Seawater contains high quantity of salt that is not favourable for freshwater animals. They face osmotic problems, hence they cannot survive in seawater for long.

114. **Q. Why do predators avoid eating Monarch butterfly? How does the butterfly develop this protective feature? [**
Ans. Predators avoid the monarch butterfly as it is highly distasteful to its predators (birds) because of a special chemical present in its body. It acquires this chemical during the caterpillar stage by feeding on a poisonous weed

115. **Q. Comment on the interaction between a clown fish living among the tentacles of a sea anemone.**
Ans.The interaction between a clown fish living among the tentacles of sea anemone is called commensalism.

116. **Q. Comment on the interaction between certain species of fig trees and Wasps.**
Ans. The relation between fig trees and wasps is of mutualism.

117. **Q. Name the type of interaction seen between whale and barnacles growing on its back.**
Ans. The type of interaction observed between whale and barnacles growing on its back is commensalism.

118. **Q. How does camouflage help an insect? [All India 2009 C]**
Ans. Camouflage is a prey defence mechanism to avoid being detected easily by the predators.

119. **Q. Mention any two significant roles predation plays in nature.[All India 2008]**
Ans.Significant roles played by predators are predators keep prey population under control. They help in maintaining species diversity in a community by reducing the intensity of competition

120. **Q. List two advantages that a mycorrhizal association provides to the plant.**
Ans. Mycorrhizal association helps plants in
(i) Providing resistance to root borne pathogens.
(ii) Absorbing nutrients.

Organisms and Populations
3 Marks

121. **Q.Some organisms suspend their metabolic activities to survive in unfavourable condition. Explain with the help of any four examples**
Ans. Examples of organisms that suspend their metabolic activities in unfavourable condition.
(i) Bacteria, fungi and lower plants They form thick-walled spores, which help them to survive in unfavourable conditions. Spores germinate on return of favourable conditions.
(ii) Higher plants Seeds and some other vegetative reproductive structures serve as means to tide over periods of stress. They reduce their metabolic activity and undergo dormancy.
(iii) Animals They undergo hibernation or aestivation, if unable to migrate. For example, some snails and fishes.
(iv) Zooplanktons They enter diapause (suspended development) under unfavourable conditions.

122. **Q.How does our body adapt to low oxygen availability at high altitudes**
Ans. Body adaptations at high altitudes are:

The physiological condition or responses in order to get accl imatised to high attitudes are:
(i) To compensate low oxygen, the production of red blood cells is increased.
(ii) High haemoglobin content and its decreased binding capacity.
(iii) Faster breathing rate (any two).

123. **Q.Why are small animals rarely found in the polar regions? Explain.**
Ans.Small animals have a large surface area relative to their volume. So, they tend to lose body heat very fast during cold conditions. They need to spend more energy to generate body heat. Due to this smaller animals are rarely found in polar regions.

124. **Q.How do seals adapt to their natural habitat? Explain.**
Ans.Seals adapt to the natural habitat (cold climate) by developing a thick layer of fat (blubber) below their skin that acts as an insulator and reduce excess loss of body heat.

125. **Q.How does human body maintain constant temperature both in summers and winters? Explain.**
126. **Ans**.Human body maintains constant body temperature (37°C) as follows:
In summers, the outside temperature is very high than our body temperature. Due to this, profuse sweating occurs. This causes evaporation and cooling effect on the body.
In winters, the outside temperature is much lower than our body temperature. This causes shivering, a kind of exercise that produces heat and raises the body temperature.

127. **Q.Differentiate between commensalism arid mutualism by taking one example each from plants Only.**
Ans. Commensalism is the kind of interaction between species in which one is benefitted and other is neither benefitted nor-harmed. Example of such association is orchid growing as an epiphyte on a mango tree, which remains unaffected by its growth.
Whereas mutualism is the type of interaction in which both the species involved are benefitted. e.g. lichen representing mutual ' association between algae and fungi, in which algae is protected by fungi, which also provides nutrients for synthesis of food, while algae provides food to fungi, as they are incapable of synthesising their own food.

128. **Q.Explain mutualism with the help of an example.**
Ans. The type of interaction where both the species involved are benefitted is called mutualism. For the relationship between fig and wasp is mutualism. The wasp while in search of egg laying sites pollinate the fig's inflorescence, while the fig offers fruit or ovary for oviposition (egg laying). It also offers its seeds to the developing larva

129. **Q.How does Monarch butterfly defend itself from predators? Explain.**
Ans. Predators avoid the monarch butterfly as it is highly distasteful to its predators (birds) because of a special chemical present in its body. It acquires this chemical during the caterpillar stage by feeding on a poisonous weed

130. **Q.Why do clown fish and sea anemone pair up? What is this relationship called ?**
Ans.Clown fish maintains commensalism with the sea anemone. In this interaction, one species is benefitted and the other is neither harmed nor-benefitted. Sea anemone has stinging tentacles that provide protection to clown fish from predators. The anemone does not appear to derive any benefit from the clown fish

131. **Q.Explain brood parasitism with the help of an example.**

Ans.The phenomenon in which one organism(parasite) lays its eggs in the nest of another organism is called brood parasitism. e.g. cuckoo (parasite) lay eggs which resemble the host's (crow) egg in size and colour in crow's nest and let it incubate them.

Organisms and Populations
5 Marks

132. **Q.(i)State how the constant internal environment is beneficial to organisms.**
(ii)Explain any two alternatives by which orgnaisms can overcome stressful external conditions.

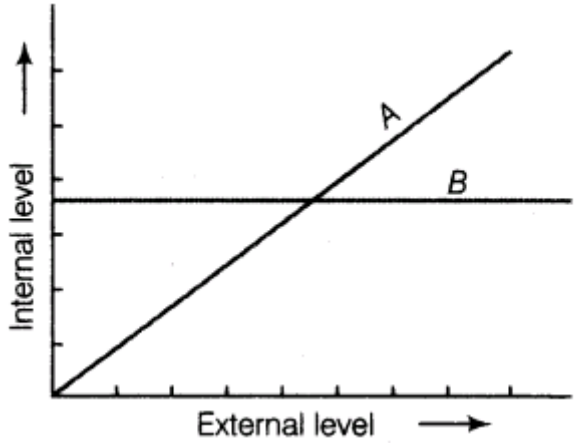
Ans.(i)Constant internal environment is beneficial to organisms as it permits all biochemical reactions and physiological functions to proceed with maximal efficiency, thereby enhancing the overall efficiency of organism.

(ii) The two alternatives by which organisms can overcome stressful external conditions are

Migration-organisms move temporarily to a favourable area under stressful conditions and return back when the period is over.

Hibernation and aestivation are ways to escape the stress during winters and summers respectively.

133. **Q.The following graph represents the organismic response to certain environmental condition (e.g. temperature)**



(i)Which one of these A or B depicts conformers?
(ii)What does the other line graph depict?
(iii)How do these organisms differ from each other with reference to homeostasis?
(iv)Mention the category to which human belong. [All India 2009]

Ans.(i)A depicts conformers.

(ii) The other line B depicts regulators.

(iii) Differences between conformer and regulator are:

Conformer	Regulator
These cannot maintain a constant internal environment and change according to the ambient atmospheric conditions.	These organisms maintain a constant internal environment despite changes in the environment.
They show a narrow range of distribution.	They show a much wider range of distribution.

(iv) Humans are regulators.

134. **Q.Name the type of interaction seen in each of the following examples**

(i)Ascaris worm living in the intestine of human.

(ii)Wasp pollinating fig's inflorescence.

(iii)Clown fish living among the tentacles of sea anemone.

(iv)Mycorrhizae living on the roots of higher plants.

(v)Orchid growing on a branch of mango tree.

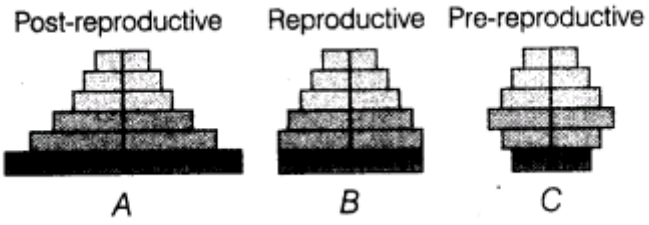
(vi)Disappearance of smaller barnacles when Balanus dominated in the coast of Scotland. [Delhi 2011]

Ans.(i) Parasitism (ii) Mutualism

(iii) Commensalism (iv) Mutualism

(v)Commensalism (vi) Competition

135. **Q.Study the three different age pyramids, for human population given below and answer the questions that follow**



(i)Write the names given to each of these age pyramids.

(ii)Mention the one which is ideal for human population and why?[Foreign 2011]

Ans.(i) A – Expanding, B – Stable,C -Declining

(ii) Stable population is preferred.It is beneficial for survival and better living of the human population. It is helpful for planning welfare activities.

136. **Q.Why is predation required in a community of different organisms?**

Ans.Requirement of predation:

(i) Acts as a conduit for energy transfer across trophic levels.

(ii) Keep the prey population under control.

(iii) Helps in maintaining species diversity in a community by reducing the intensity of competition.

(iv) Biological control of pests is based on predation.

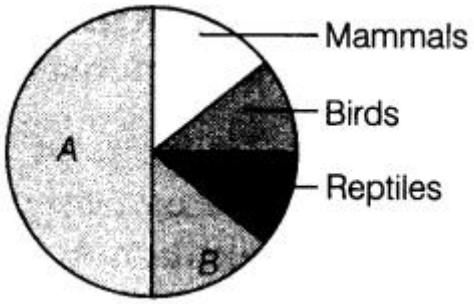
Biodiversity and its Conservation
2 marks

137. **Q. Why is tropical environment able to support greater species diversity? [Delhi 2011C]**
Ans. Tropical latitudes have remained undisturbed for millions of years and had a long evolutionary time for species diversification. Thus, it supports greater species diversity.

138. **Q. Eichhornia crassipes is an alien hydrophyte introduced in India. Mention the problem posed by this plant.**
139. **Ans**. Water hyacinth (Eichhornia) introduced in India is threatening the existing aquatic life in ponds and lakes, etc., as it clogs the stagnant water bodies very fast, thus, the native species are endangered.

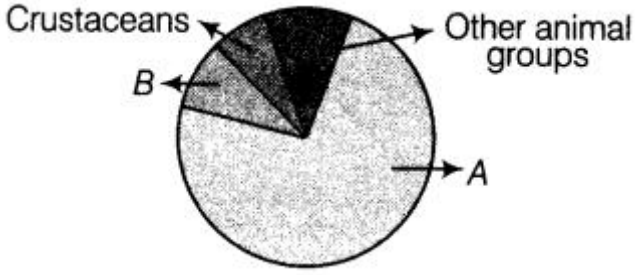
140. **Q. The Amazon rainforest is referred to as the lungs of planet. Mention any one human activity which causes loss of biodiversity in this region.**
Ans. Human activity causing loss of biodiversity are:
(i) Many plants are cut in Amazon rainforest
(ii) Forests are converted to grasslands for raising beef cattle.

141. **Q. Name the unlabelled areas A and B of the pie chart representing biodiversity of vertebrates showing the proportionate number of species of major taxa. [Foreign 2009]**



Ans. A- Fishes
B– Amphibians

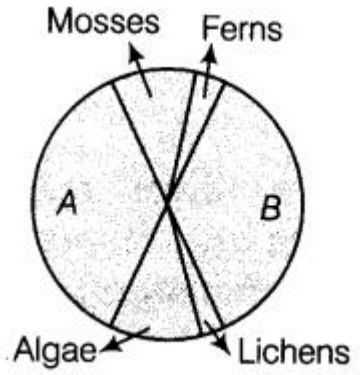
90. Name the unlabelled areas A and B of the pie chart representing the global biodiversity of invertebrates showing their proportionate number of species of major taxa. [Delhi 2009]



Ans. A- Insects
B– Molluscs

91. Name the unlabelled areas A and B of the pie chart representing the biodiversity of plants showing their

proportionate number of species of major taxa. [All India 2009]



Ans. A- Fungi
B– Angiosperms

92. Q. About 200 species of cichlid fish became extinct when a particular fish was introduced in Lake Victoria of Africa. Name the invasive fish.

Ans. Nile perch is the invasive fish introduced in Lake Victoria.

Biodiversity and its Conservation
3 marks

142. **Q.List four causes of biodiversity loss.**

Ans. (i) Habitat loss and fragmentation **(ii)** Over-exploitation **(iii)** Alien species invasions

143. **Q. Justify with the help of an example where a deliberate attempt by humans has led to the extinction of a particular species.**

Ans. Over-exploitation of natural resources or over hunting of animals has led to extinction of particular species,
e.g. Steller's sea cow and passenger pigeon.

144. **Q.With the help of an example, explain how alien species invasion causes biodiversity loss?**

or

Alien species are a threat to native species. Justify taking examples of an animal and a plant alien species.

or

Sometimes alien species affect the indigenous organisms leading to their extinction. Substantiate this statement with the help of any two examples.

Ans. Alien species become invasive, compete with the native species and cause extinction of indigenous species.

(i) Introduction of Nile perch into Lake Victoria lead to extinction of more than 200 species of cichlid fish in that lake.

(ii) Carrot grass (Parthenium and Lantana) introduced in our country have become invasive and cause environmental damage. They pose a threat to the native species of plants in our forests.

145. **Q.Giving two reasons explain why there is more species biodiversity in tropical latitudes than in temperate ones.**

Ans. Biodiversity is more in tropical latitudes than in temperate ones. The reasons are:

(i) Speciation is a function of time. The temperate regions were subjected to frequent glaciation in the past, while the tropics have remained undisturbed and so had longer time to evolve more species diversity.

(ii) More solar radiation is available in tropical region. This leads directly to more productivity and indirectly to greater species diversity.

(iii) The environment of tropics is less seasonal and relatively more constant and predictable, which encourages niche specialisation and species diversity.

Biodiversity and its Conservation
5 marks

146. **Q. Explain by giving example, how co-extinction is one of the causes of loss of biodiversity? List the three causes also (without description).**

Ans. Co-extinction is one of the cause of loss of biodiversity as when a species become extinct, the plant and animal species associated with it in an obligatory manner, also become extinct.

For example,

(i) In plant pollinator mutualism, extinction of one results in the extinction of other.

(ii) If a host fish become extinct, the unique , parasites depending on it would also become extinct.

The other causes of loss of biodiversity are:

Habitat loss fragmentation

Over-exploitation

Invasion of alien species.

147. **Q. (i) Why is there a need to conserve biodiversity?**

(ii) Name and explain any two ways that are responsible for the loss of biodiversity.

Ans.(i) The biodiversity needs to be conserved because of three categories:

Narrow utilarian includes most of the resources required for our day-io-day life, e.g. food, oil, clothes, firewood, drugs and medicines, industrial products all are derived from nature, thus needs to be conserved to reap more benefits.

Broadly utilarian includes most of the ecosystem services provided to us by nature. Such as release of oxygen and fixation of $C0_2$ by photosynthesis in plants, pollination and dispersal of seeds, etc. Therefore, for the continuation of these services biodiversity needs to be conserved.

Ethical reasons as it becomes our moral duty to take care of all living species in our surroundings irrespective of their economic importance and pass this biological legacy to our future generations.

(ii) The two ways that are responsible for the loss of biodiversity are:

Habitat loss and fragmentation of natural habitats due to the natural reasons or human activities and pollution results in degradation of habitats, thereby threatening the survival of many species concerned.

Co-extinction also leads to loss of biodiversity as when a species becomes extinct, the plant and animal species associated with it in obligatory way also become extinct, e.g. when a host organism (fish) becomes extinct, the parasites exclusive to it also becomes extinct

Sample Question Paper - 2
Biology (044)
Class- XII, Session: 2021-22
TERM II

Time allowed : 2 hours ***Maximum marks : 35***

General Instructions :

(i) All questions are compulsory.

(ii) The question paper has three sections and 13 questions. All questions are compulsory.

(iii) Section–A has 6 questions of 2 marks each; Section–B has 6 questions of 3 marks each; and Section–C has a case-based question of 5 marks.

(iv) There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.

(v) Wherever necessary, neat and properly labeled diagrams should be drawn.

SECTION - A

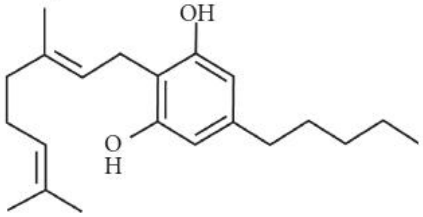
1. A patient showed symptoms of sustained high fever, stomach pain and constipation, but no blood clot in stools. Name the disease and its pathogen. Write the diagnostic test for the disease. How does the disease get transmitted?

2. Why are some molecules called bioactive molecules? Give two examples of such molecules.

OR

Name a genus of baculovirus. Why are they considered good biocontrol agents?

3. Write the scientific name of the source plant of the given structure and mention their effect on the human body.



4. Name two groups of organisms which constitute 'flocs'. Write their influence on the level of BOD during biological treatment of sewage.

5. Age pyramid is the graphic representation of different age groups found in a population. Construct an age pyramid which reflects a stable growth status of human population.

6. How do mammals differ from amphibians in context of equilibrium maintenance between organism and external environment ?

OR

How diapause differs from hibernation ?

SECTION - B

7. Cancer is one of the most dreaded disease. Explain 'contact inhibition' and 'metastasis' with respect to the disease.

OR

Name a human disease, its causal organism, symptoms (any three) and vector, spread by intake of water and food contaminated by human faecal matter.

8. Principle of vaccination is based on the property of "memory" of the immune system. Justify the statement by taking one suitable example.

9. State how has *Agrobacterium tumefaciens* been made a useful cloning vector to transfer DNA to plant cells.

10. There are many animals that have become extinct in the wild but continue to be maintained in zoological parks.

(a) What type of biodiversity conservation is observed in this case?

(b) Explain any other two ways which help in this type of conservation.

11. The following graph shows the species-area relationship. Answer the following questions as directed.

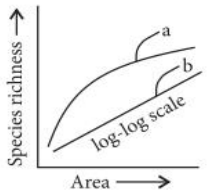
(a) Name the naturalist who studied the kind of relationship shown in the graph. Write the observation made by him.

(b) Write the situation as discovered by the ecologists when the value of 'Z' (slope of the line) lies between

(i) 0.1 and 0.2 (ii) 0.6 and 1.2.

What does 'Z' stand for?

(c) When would the slope of the line 'b' become steeper?



12. A foreign DNA can be ligated at the *Bam*HI site of tetracycline resistance gene in the vector pBR322. Draw pBR322 cloning vector. Label 'ori', 'rop' and tetracycline resistance site on it and state their functions.

SECTION - C

13. Genetic engineering helps in developing new combinations of genetic material. It involves various tools, such as restriction enzymes, vectors, etc. Restriction enzymes in bacteria have two components. One component enables *E.coli* to protect itself from attack of bacteriophages with help of defence mechanism called restriction-modification system. Restriction enzymes are nucleases which recognise palindromic DNA sequence and cut the same.

(a) How does *E.coli* protect itself from attack of bacteriophage?

(b) DNA sequences from two different sources are provided.

I. 5′–ATCAGAATTCGCCGGG–3′
3′–TAGTCTTAAGCGGCCC–5′

II. 5′–TGATACGAATTCGG–3′
3′–ACTATGCTTAAGCC–5′

How *Eco*RI would help to obtain *r*DNA from the given DNA sources?

(c) Why restriction endonucleases are also called molecular scissors?

OR

In order to increase crop production, scientists have altered the genetic composition of plants and produced transgenic plants. GM crops express one or more transgenes and are more advantageous than conventional crops. Nematodes are common parasites in number of plants, resulting in drastic reduction in yield.

(a) Name the nematode which causes root knot disease in tobacco. How it affects the plant?

(b) Discuss the phenomenon which help in developing pest resistant plants.

Sample Question Paper - 3
Biology (044)
Class- XII, Session: 2021-22
TERM II

Time allowed : 2 hours ***Maximum marks : 35***

General Instructions :

(i) All questions are compulsory.

(ii) The question paper has three sections and 13 questions. All questions are compulsory.

(iii) Section–A has 6 questions of 2 marks each; Section–B has 6 questions of 3 marks each; and Section–C has a case-based question of 5 marks.

(iv) There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.

(v) Wherever necessary, neat and properly labeled diagrams should be drawn.

SECTION - A

1. Mention any two human diseases caused by helminths. Name their causative agents and their mode of transmission into the human body.

2. During the production of curd, a small amount of curd is added as a starter to the fresh milk at a suitable temperature. Explain the changes the milk undergoes when it sets into curd.

OR

Name the bioactive molecules produced by *Streptococcus, Monascus* and *Trichoderma.* State their medicinal value.

3. A student on a school picnic to a park on a windy day started sneezing and having difficulty in breathing. The teacher enquired whether the student was allergic to something.

(a) What is an allergy?

(b) Write two unique characteristics of the system involved in the response observed in the student.

4. "Secondary treatment of the sewage is also called biological treatment". Justify this statement and explain the process.

5. Bear hibernates whereas some species of zooplanktons enter diapause to avoid stressful external conditions. How are these two ways different from each other?

6. When an organism is called a 'conformer'? Explain with the help of an example.

OR

Why do clown fish and sea anemone pair up? What is this relationship called?

SECTION - B

7. Name the cells HIV attacks first when it gains entry into a human body. How does this virus replicate further to cause immunodeficiency in the body?

OR

"Prevention is better than cure" is an apt slogan to safeguard adolescents from drug abuse. List any six steps that could be taken in this regard.

8. List the two types of immunity a human baby is born with. Explain the differences between the two types.

9. Many copies of a specific gene of interest are required to study the detailed sequencing of bases in it. Name and explain the process that can help in developing large number of copies of this gene of interest.

10. In *Ex-situ* conservation, threatened animals and plants are taken out from their natural habitat and placed in a species setting for protection and special care. List any four techniques where the principle of *ex-situ* conservation of biodiversity has been employed.

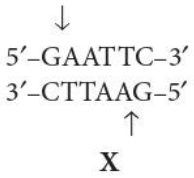
11. Since the origin of life on Earth, there were five episodes of mass extinction of species.

(a) How is the 'Sixth Extinction', presently in progress, different from the previous episodes?

(b) Who is mainly responsible for the 'Sixth Extinction'?

(c) List any four points that can help to overcome this disaster.

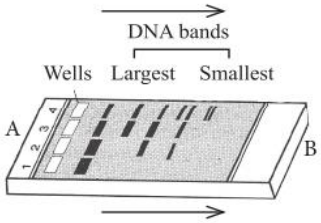
12. (a) Write the term given to X and what do arrows represent?



(b) Draw *E. coli* cloning vector pBR322 and label various restriction sites and *rop* gene. Mention their functions.

SECTION - C

13. Given below is the diagram representing the observations made for separating DNA fragments by gel electrophoresis technique. Observe the illustration and answer the questions that follow.



(a) Why are the DNA fragments seen to be moving in the direction A → B?

(b) Write the medium used in which DNA fragments separate.

(c) Mention how the separated DNA fragments can be visualised for further technical use.

(d) Write down the steps after separation of DNA on the agarose gel.

OR

Two children, A and B aged 4 and 5 years respectively visited a hospital with a similar genetic disorder. The girl A was provided enzyme replacement therapy and was advised to revisit periodically for further treatment. The girl B was, however, given a therapy that did not require revisit for further treatment.

(a) Name the ailments the two girls were suffering from.

(b) Why did the treatment provided to girl A required repeated visits?

(c) How was the girl B cured permanently?

Sample Question Paper - 4
Biology (044)
Class- XII, Session: 2021-22
TERM II

Time allowed : 2 hours ***Maximum marks : 35***

General Instructions :

(i) All questions are compulsory.

(ii) The question paper has three sections and 13 questions. All questions are compulsory.

(iii) Section–A has 6 questions of 2 marks each; Section–B has 6 questions of 3 marks each; and Section–C has a case-based question of 5 marks.

(iv) There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.

(v) Wherever necessary, neat and properly labeled diagrams should be drawn.

SECTION - A

1. Malaria, typhoid, pneumonia and amoebiasis are some of the human infectious diseases. Which one of these are transmitted through mechanical carriers?

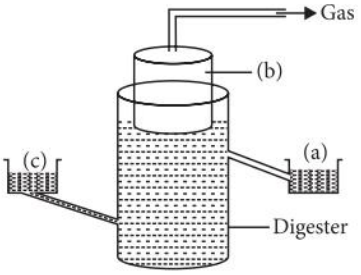
2. Name the bacterium responsible for the large holes seen in "Swiss Cheese". What are these holes due to?

OR

Explain the role of flocs in sewage treatment.

3. Differentiate between the roles of B-lymphocytes and T-lymphocytes in generating immune responses.

4.



The diagram above is that of a typical biogas plant. Explain the sequence of events occurring in a biogas plant. Identify a, b and c.

5. How do organisms cope with stressful external environmental conditions which are localised or of short duration?

OR

Differentiate between parasitism and competition, giving one example of each. State the common characteristic they share.

6. Differentiate between commensalism and mutualism by taking one example each from plants only.

SECTION - B

7. How does a vaccine for a particular disease immunise the human body against that disease?

OR

Write the scientific names of the causal organisms of elephantiasis and ringworm in humans. Mention the body parts affected by them.

8. Name the cells that act as HIV factory in humans when infected by HIV. Explain the events that occur in the infected cell.

9. **(a)** How is an exonuclease functionally different from an endonuclease?

(b) Give an example of any two endonucleases other than *Sal* I.

10. How does over-exploitation of beneficial species affect biodiversity? Explain with the help of one example.

11. Biodiversity is required for maintaining and sustaining supply of goods and services from various species as well as ecosystem. Discuss broadly utilitarian services of biodiversity to nature.

12. **(a)** Write the palindromic nucleotide sequence *Eco*RI recognises.

(b) Name the enzymes that help in forming recombinant DNA.

SECTION - C

13. Unless the vector and source DNA are cut, fragments separated and joined, the desired recombinant vector molecule cannot be created.

(a) How are the desirable DNA sequences cut?

(b) Explain the technique used to separate the cut fragments.

(c) How are the resultant fragments joined to the vector DNA molecule?

OR

(a) Name the source from which insulin was extracted earlier. Why is this insulin no more used by diabetic people?

(b) Explain the process of synthesis of insulin by Eli Lilly company. Name the techniques used by the company.

(c) How is the insulin produced by human body different from the insulin produced by the above mentioned company?

SAMPLE QUESTION PAPER

ECONOMICS (030)

Class XII (TERM II) 2021-22

Q.NO.	QUESTIONS	MARKS
1	Distinguish between stock and flow variables. **OR** Distinguish between Factor income and transfer income. स्टॉक और प्रवाह चर के बीच अंतर स्पष्ट कीजिए। अथवा कारक आय और हस्तांतरण आय के बीच अंतर कीजिए।	2
2	State and discuss any two factors which are responsible to the environmental crises in India. **OR** Keeping in view your locality, describe any two strategies of sustainable development. भारत में पर्यावरण संकट के लिए उत्तरदायी किन्हीं दो कारकों का उल्लेख कीजिए तथा उन पर चर्चा कीजिए। अथवा अपने अवस्थिति को ध्यान में रखते हुए सतत विकास की किन्हीं दो रणनीतियों का वर्णन कीजिए ।	2
3	Distinguish between average propensity toconsume and average propensity to save. What isthe relation between the two? औसत उपभोग प्रवृत्ति एवंऔसत बचत प्रवृत्ति में अंतर स्पष्ट कीजिए। दोनों के बीच क्या संबंध है?	2
4	'India has abundant natural resources'. Justify the statement. 'भारत के पास प्रचुर मात्रा में प्राकृतिक संसाधन हैं'। कथन का औचित्य सिद्ध कीजिए।	2
5	What is meant by aggregate demand? State itscomponents. **OR** An economy is in equilibrium. Find 'autonomousconsumption' from the following : National Income= 1,000 Marginal Propensity to Consume = 0.8 Investment Expenditure= 100 समग्र माँग से क्या तात्पर्य है ? इसके घटकों का उल्लेख कीजिए। अथवा निम्नलिखित कीसूचनाओंसे 'स्वायत्त उपभोग' ज्ञात कीजिए , यदि अर्थव्यवस्था संतुलन की स्थिति में है। राष्ट्रीय आय = 1,000 सीमांत उपभोग प्रवृत्ति = 0.8 निवेश व्यय = 100	2
6	Giving reasons, classify the following intointermediate products and final products. (i) Furniture purchased by a school. (ii) Chalks, dusters, etc. Purchased by school. **OR** If Nominal Income is Rs. 500 and Price Index is 125,calculate Real Income. कारण देते हुए, निम्नलिखित को मध्यवर्ती उत्पादों और अंतिम उत्पादों में वर्गीकृत करें। (i) एक स्कूल द्वारा खरीदा गया फर्नीचर। (ii) स्कूल द्वारा खरीदे गए चाक, डस्टर आदि।	3

	अथवा यदि मौद्रिक आय रु. 500 और मूल्य सूचकांक 125 है, वास्तविक आय की गणना करें।	
7	Study the following information and compare the Economies of India and USA on thegrounds of 'Investment in health spending as a percentage of GDP' निम्नलिखित जानकारी का अध्ययन करें और 'सकल घरेलू उत्पाद के प्रतिशत के रूप में स्वास्थ्य खर्च में निवेश' के आधार पर भारत और अमेरिका की अर्थव्यवस्थाओं की तुलना करें।	3

Indicators of Health in India in comparison with other Countries, 2016-2018

Indicators	*India*	*China*	*USA*	*Sri Lanka*
Infant Mortality Rate/ 1,000 live births (2018)	30	7.4	5.6	6.4
Under-5 mortality / 1,000 live-births (2016)	37	8.6	6.5	7.4
Birth by skilled attendants (% of total) (2016)	81	81	99	99
Infants immunised (DTP) (%) (2016)	89	89	94	99
Government health spending as a % of GDP (%) (2016)	3.7	5.7	17	3.9
Out of pocket expenditure as a % of current health expenditure (2016)	65	36	11.1	50

Sources: *World Development Indicators 2019, World Bank, Washington.*

Read the following text carefully and answer question number 8 and 9 given below:

China traditionally has struggled to feed its large population. Even in the twentieth century, famines periodically ravaged China's population. Great emphasis has always been put on agricultural production, but weather, wars, and politics often mitigated good intentions. With the onset of reforms in the late 1970s, the relative share of agriculture in the gross domestic product (GDP) began to increase annually. Driven by sharp rises in prices paid for crops and a trend toward privatization in agriculture, agricultural output increased from 30 percent of GDP in 1980 to 33 percent of GDP by 1983. Since then, however, agriculture has decreased its share in the economy at the same time that the services sector has increased. By 2004 agriculture (including forestry and fishing) produced only 15.2 percent of China's GDP but still is huge by any measure. Some 46.9 percent of the total national workforce was engaged in agriculture, forestry, and fishing in 2004.

In 1950, Pakistan's per person GDP was US$1268, which was almost 50 per cent greater than India that year. However, in the backdrop of sustained political uncertainty and upheaval, Pakistan stagnated throughout the 1950s while a politically stable India grew. As a result, by 1960, India had almost caught up with Pakistan in per capita GDP terms with the per capita income gap having shrunk to 15 per cent. Unfortunately, from 1964, India went into two decades of economic stagnation while Pakistan, under the military rule of Ayub Khan, opened up to foreign capital which funded a period of rapid industrialization and economic growth, albeit at the cost of worsening inequality. By 1984, Pakistan's per capita income was more than double that of India's. Pakistan's slowdown began in the 1980s during the military regime of Zia-u-Haq. Zia enabled and institutionalized Islamic nationalism in Pakistan.

निम्नलिखित पाठ को ध्यान से पढ़ें और नीचे दिए गए प्रश्न संख्या 8 और 9 का उत्तर दें:

चीन पारंपरिक रूप से अपनी बड़ी आबादी का पेट भरने के लिए संघर्ष करता रहा है। बीसवीं सदी में भी, अकाल ने समय-समय पर चीन की आबादी को तबाह कर दिया। कृषि उत्पादन पर हमेशा बहुत जोर दिया गया है, लेकिन मौसम, युद्ध और राजनीति ने अक्सर अच्छे इरादों को कम कर दिया। 1970 के दशक के उत्तरार्ध में सुधारों की शुरुआत के साथ, सकल घरेलू उत्पाद (जीडीपी) में कृषि की सापेक्ष हिस्सेदारी सालाना बढ़ने लगी। फसलों के लिए भुगतान की गई कीमतों में तेज वृद्धि और कृषि में निजीकरण की ओर रुझान से प्रेरित, कृषि उत्पादन 1980में सकल घरेलू उत्पाद के 30

	प्रतिशत से बढ़कर 1983 तक सकल घरेलू उत्पाद का 33 प्रतिशत हो गया। तब से, हालांकि, कृषि ने अर्थव्यवस्था में अपना हिस्सा घटा दिया है। उसी समय सेवा क्षेत्र में वृद्धि हुई है। 2004 तक कृषि (वानिकी और मछली पकड़ने सहित) ने चीन के सकल घरेलू उत्पाद का केवल 15.2 प्रतिशत उत्पादन किया लेकिन फिर भी किसी भी उपाय से बहुत बड़ा है। 2004 में कुल राष्ट्रीय कार्यबल का लगभग 46.9 प्रतिशत कृषि, वानिकी और मछली पकड़ने में लगा हुआ था। 1950 में, पाकिस्तान का प्रति व्यक्ति सकल घरेलू उत्पाद 1268 अमेरिकी डॉलर था, जो उस वर्ष भारत से लगभग 50 प्रतिशत अधिक था। हालाँकि, निरंतर राजनीतिक अनिश्चितता और उथल-पुथल की पृष्ठभूमि में, पाकिस्तान 1950 के दशक में स्थिर रहा, जबकि राजनीतिक रूप से स्थिर भारत का विकास हुआ। परिणामस्वरूप, 1960 तक, भारत ने प्रति व्यक्ति सकल घरेलू उत्पाद के मामले में पाकिस्तान के साथ लगभग पकड़ लिया था, जिसमें प्रति व्यक्ति आय का अंतर 15 प्रतिशत तक कम हो गया था। दुर्भाग्य से, 1964 से, भारत दो दशकों के आर्थिक ठहराव में चला गया, जबकि पाकिस्तान, अयूब खान के सैन्य शासन के तहत, विदेशी पूंजी के लिए खुल गया, जिसने तेजी से औद्योगिकीकरण और आर्थिक विकास की अवधि को वित्त पोषित किया, हालांकि बढ़ती असमानता की कीमत पर। 1984 तक, पाकिस्तान की प्रति व्यक्ति आय भारत की तुलना में दोगुनी से अधिक थी। 1980 के दशक में जिया-उ-हक के सैन्य शासन के दौरान पाकिस्तान की मंदी शुरू हुई। ज़िया ने पाकिस्तान में इस्लामी राष्ट्रवाद को सक्षम और संस्थागत बनाया।	
8	Outline and discuss the role of agriculture in China's economy. चीन की अर्थव्यवस्था में कृषि की भूमिका की रूपरेखा तैयार कीजिए और उसकी चर्चा कीजिए।	3
9	Analyze and explain the trend of Pakistan's Economy. पाकिस्तान की अर्थव्यवस्था की प्रवृत्ति का विश्लेषण और व्याख्या करें।	3
10	Explain how the level of effective demand isattained in an economy if, Aggregate Demand is more than Aggregate supply? समझाइए कि किसी अर्थव्यवस्था में प्रभावी माँग का स्तर कैसे प्राप्त होता है, यदि समग्र माँग, समग्र पूर्ति से अधिक है?	3
11	(A) Calculate "Gross National Product at Factor Cost" by Income Method, from the following data : ए) निम्नलिखित आंकडों के माध्यम से आय विधि द्वारा "कारक लागत पर सकल राष्ट्रीय उत्पाद" की गणना करें:	3

S.No.	Items / मदें	Rs. in crore
i	Private Final Consumption Expenditure निजी अंतिम उपभोग व्यय	800
ii	Government Final Consumption Expenditure सरकारी अंतिम उपभोग व्यय	300
iii	Compensation of Employees कर्मचारियों का मुआवजा	600
iv	Net Imports शुद्ध आयात	50
V	Gross Domestic Capital Formation सकल घरेलू पूंजी निर्माण	150
Vi	Consumption of Fixed Capital अचल पूंजी का उपभोग	20
vii	Net Indirect Taxes शुद्ध अप्रत्यक्ष कर	100
viii	Net Factor Income from Abroad विदेश से प्राप्त शुद्ध कारक आय	(-)70
ix	Dividend लाभांश	150

x	Rent किराया	120
xi	Interest ब्याज	80
xii	Undistributed Profits अवितरित लाभ	80
xiii	Social Security Contribution by Employers नियोक्ताओं द्वारा सामाजिक सुरक्षा योगदान	60
xiv	Corporate Tax निगमकर	50

2

(B) Distinguish between Nominal Grosse National Product and Real Grosse National Product.
ब) मौद्रिक सकल राष्ट्रीय उत्पाद और वास्तविक सकल राष्ट्रीय उत्पाद के बीच अंतर स्पष्ट कीजिए

OR

(A) Calculate "Net Value Added at Factor Cost" fromthe following data :
निम्नलिखित आंकडों के माध्यम से कारक आय पर निवल वर्धित मूल्य ज्ञान्त किजिये

S.No.	Items मदें	Rs. in crore
i	Intermediate consumption मध्यवर्ती उपभोग	300
ii	Change in stock स्टॉक में परिवर्तन	50
iii	Net indirect taxes शुद्ध अप्रत्यक्ष कर	70
iv	Sales बिक्री	500
v	Consumption of fixed capital अचल पूंजी का उपभोग	20
vi	Imports आयात	40

(B)Giving reasons, state how the following aretreated in the estimation of national income.
(i) Payment of interest by banks to its depositors.
(ii) Expenditure on engine oil by car service station.
ब) कारण देते हुए बताएं कि राष्ट्रीय आय के अनुमान में निम्नलिखित के साथ क्या व्यवहार किया जाता है।
(i) बैंकों द्वारा अपने जमाकर्ताओं को ब्याज का भुगतान।
(ii) कार सर्विस स्टेशन द्वारा इंजन ऑयल पर व्यय।

12	You are residing in a village. If you are asked to advice the villagepanchayat, what kinds of activities would you suggest for theimprovement of your village which would also generate employment. आप एक गांव में रह रहे हैं, यदि आपसे ग्राम पंचायत को सलाह देने के लिए कहा जाए तो आप अपने गाँव के सुधार के लिए किस प्रकार की गतिविधियों का सुझाव देंगे जिससे रोजगार भी पैदा होगा।	5
13	(A)Explain the role of taxation in reducing excessdemand. (B) Explain the meaning of Inflationary Gap andDeflationary Gap. (अ) अधिमांग को कम करने में कराधान की भूमिका की व्याख्या करें। (ब) स्फीतिक अंतराल और अस्फीतिक अंतराल का अर्थ स्पष्ट करें।	3 2

SAMPLE QUESTION PAPER (TERM II)

Q.NO.	QUESTIONS	MARKS
1	**Stock** -The economic variables that are measured at a particular point oftime are called stock variables. Stock is static concept. It has no time dimensions. **E.g.**wealth, assets, money, inventory, etc. **Flow-**The economic variables that are measured during a period of time arecalled flow variables. Flow is a dynamic concept. It has time dimensions. **E.g.**national income, change in stock, etc. OR **Factor incomes** are the rewards of the factor of production, (viz. compensation of employees, rent, interest and profit) for rendering productive services. **Transfer incomes** are unearned incomes which are received without rendering any productive service. These include gifts in cash, scholarships to the students, old-age pensions to the seniors etc.	1 1 1 1
2	**(i) Rising Population :** India supports approx. 16% of the world's human and 20% of livestock population on a mere 2.5% of the world's geographical area, The high density of population and livestock and the competing uses of land for forestry, agriculture, pastures,human settlement and industries exert an enormous pressure on the country's finite land resources. **(ii) Air Pollution:**In India, air pollution is widespread in urban areas because of vehicles, factories and other reasons. Air pollution is a greatconcern because it has serious harmful effects onthe general population. For example, the numberof motor vehicles has increased from about 3 lakhin 1957 to 230 million to 2016. This growth directly contributes to air pollution. **(Students may take any other concerned factors also:** Water contamination, Affluent consumption standard, Illiteracy, Industrialisation, Urbanisation, Global warming, Poaching, Reduction of forest coverage, etc.) **OR** **(i)** No degradation of resources; **(ii)** Check on pollution; **(iii)** Integrated policy between economic developmentand environment; **(iv)** Establishment of industries as per environmental norms.**(Any two)**	1 1 2
3	APC equals to total consumption expendituredivided by total income whereas, APS equals totalsavings divided by total income. APC + APS = 1	1½ ½
4	India has abundant natural resources in the terms of rich quality of soil, hundreds of rivers and tributaries, lush green forests, plenty of mineral deposits, vast stretch of Indian Ocean, ranges of mountains, etc. The black soil of the Deccan Plateau is suitable for cultivation of cotton. The Indo-Gangetic plains are the most fertile regionsin the world. India's forests provide green coverfor its population and wild life. Large depositsof iron-ore, coal and natural gas are found in thecountry.	2
5	Aggregate Demand refers to the value of finalgoods and services which all sectors of aneconomy are planning to buy during a year. Components : (i) Private consumption expenditure (ii) Government consumption expenditure (iii) Investment expenditure (iv) Net exports. **OR** Given, Y = 1,000, MPC = 0.8, I = 100 C =? We know, Y = C + b(Y) + I	1 1 ½

	or 1,000 = C + 0.8(1,000) + 100 or 1,000 = C + 800 + 100 or C = 1,000 – 900 or C = 100	½ ½ ½
6	(i) Furniture purchased by school: Final Product. Reason: Schools buy furniture for long – term use and it is considered as an investment. (ii) Chalks, Dusters, etc., purchased by school:Intermediate product. Reason: These are taken up to be used up completely during the same year. **OR** Real Income = Nominal Income/Price Index×100 Real Income =500* 100/125 = Rs. 400	 1½ 1½ 1 1½ ½
7	'Investment in infrastructure as a percentage of GDP' is that proportion of Gross Domestic Product which is invested for the development of infrastructural facilities in acountry. According to the given data it is evident that India is contributing 3.7% of its total GDPon health infrastructural progress, which is just a notch above the corresponding figure of 17%for USA. Considering the vast geography of India this is a relatively lower proportion in thisdirection. If India wants to grow at a faster rate, she must concentrate on higher judiciousinvestment on development of health infrastructure.	3
8	1. With the reforms in the late 1970s, the relative share of agriculture in the gross domestic product (GDP) began to increase annually. Driven by sharp rises in prices paid for crops and a trend toward privatization in agriculture, agricultural output increased from 30 percent of GDP in 1980 to 33 percent of GDP by 1983. 2. By 2004 agriculture (including forestry and fishing) produced only 15.2 percent of China's GDP but still is huge by any measure. Some 46.9 percent of the total national workforce was engaged in agriculture, forestry, and fishing in 2004.	1½ 1½
9	1. In 1950, Pakistan's per person GDP was US$1268, which was almost 50 per cent greater than India that year. 2. By 1984, Pakistan's per capita income was more than double that of India's. Pakistan's slowdown began in the 1980s during the military regime of Zia-u-Haq. Zia enabled and institutionalized Islamic nationalism in Pakistan.	3
10	Effective demand refers to that level of outputwhere Aggregate demand is equal to theAggregate supply. If Aggregate Demand exceeds Aggregate Supply,it means buyers are planning to buy more goodsand services than producers are planning toproduce. Thus, the inventories in hand with theproducers will start falling. As a result, producerswill plan to raise the production. This will increasethe level of income upto the level AggregateDemand is equal to Aggregate Supply.	3
11	(A)GNPFC = Compensation for Employees +Dividend + Rent + Interest + UndistributedProfits + Corporate Tax + Consumption of FixedCapital + Net Factor Income From Abroad. = 600 + 150 + 120+ 80 + 80 + 50 + 20 + (–) 70 = 1,100 – 70 GNPFC = Rs.1030 crore.	1½ 1 ½

	(B) Nominal GNP is measured at current prices. Since this aggregate measures the value ofgoods and services at current year prices, GNP will change when volume of product changes or price changes or when both changes. Real GNP is computed at the constant prices. Under real GNP, value is expressed in terms ofprices prevailing in the base year. This measure takes only quantity changes. Real GNP is theindicator of real income level in the economy. **OR** (A) NVAFC = (iv) + (ii) – (i) – (iii) – (v). or = Sales + Change in stock – Intermediate consumption – Net direct taxes – Consumptionof fixed capital = 500 + 50 – 300 – 70 – 20 = 550 – 390 NVAFC = ` 160 lakh. (B)(i) Payment of interest by banks to its depositors is included in national income because it is factor income paid by a production unit. (ii) Expenditure on engine oil by car service station is not included because it is an intermediate cost.	1 1 1½ 1 ½ 1 1
12	The following are the suggestions that can generate employment opportunities in village : (i) Increase production (ii) Increase productivity (iii) Control over population (iv) Creating non-agricultural employment (v) Easy credit and finance (vi) Education and health facilities (Explain any Five)	5
13	(A)By raising taxes, government can reduce PersonalDisposable Income of the people. This in turn will reduce private final consumption expenditure depending upon Marginal Propensity toConsume. This will reduce Aggregate Demand. (B) Inflationary Gap: When Aggregate Demand isgreater than Aggregate Supply at full employment level, it is a situation of Inflationary Gap. Deflationary Gap: When Aggregate Demand isless than Aggregate Supply at full employment level. It is a situation of Deflationary Gap.	3 1 1

EMPLOYMENT

Q.1."Since the late 1970s, many developing countries, including India started paying attention to enterprises and workers in the informal sector." Comment.

Ans. The given statement is correct. The reason is that employment in the formal sector is not growing. The percentage of people employed in the formal sectors in India is only 6 per cent. The rest 94 per cent are in the informal sector. However, workers and enterprises in the informal sector do not get regular income; they do not have any protection from the Government.

Workers are dismissed without any compensation. Technology used in the informal sector enterprises is outdated. Workers of the informal sector live in slums and are squatters.
Of late, owing to the efforts of the International Labour organisation (ILO), the Indian government has initiated the modernisation of informal sector enterprises and provision of social security measures to informal sector workers.

Q.2. Define unemployment, its types and reason behind the unemployment in India.

Ans. Unemployment refers to a situation in which a person is willing and able to work but fail to find work at the existing wage rate.

Types of Unemployment in India: 1.**Open unemployment** – In many cities, people look for jobs in factories and offices, give their bio-data and ask for any vacancy in their factory or office. Many people standing in some select areas look for people to employ them for that day's work. Such type of unemployment is called 'open unemployment'.

2**. Disguised unemployment** – It is kinds of unemployment prevailing in Indian farms, where more labour are working on a farm than actually required. Thus, Marginal product gained by employing one additional unit of labour is zero.

3. Seasonal unemployment – Work in agriculture is seasonal: there is no employment opportunities in the village for all months in the year. When there is no work to do on farms, people go to urban areas and look for jobs. This kind of unemployment is known as seasonal unemployment.

Reasons behind unemployment

i) Rapid increase in population ii) Slow pace of economic growth iii) Inequality in income and wealth iv) Seasonal nature of agricultural v) Paucity of entrepreneur vi) Shortage of capital vii) Low level of savings and low capital formation viii) Orthodox social factors ix) lack of education

Q.3.What measures/steps have been taken by the government of India in generating employment or creating opportunities for employment generation in India?

Ans. The Union and State governments have played an important role in generating employment or creating opportunities for employment generation in India. Their efforts can be broadly categorised into two — direct and indirect.

• Direct employment generation – The government employs people in various departments for administrative purposes. It also runs industries, hotels and transport companies, and hence provides employment directly to workers.

• Indirect employment generation opportunities – When the output of goods and services from government enterprises increases, the private enterprises will also raise their output and hence increase the number of employment opportunities in the country.

For example, when a government owned steel company increases its output, it will result in direct increase in employment in that government company. Simultaneously, private companies, which purchase steel from it will also increase their output and thus employment. This is the indirect generation of employment opportunities by the government in the country.

Moreover, many programmes that the governments implement, aimed at alleviating poverty, are through employment generation. They are also known as employment generation programmes. For example, Mahatma Gandhi National Rural Employment Guarantee Act 2005,

Pradhan Mantri Jan-Dhan Yojna 2014, Swarna Jayanti Gram Swarozgar Yojna (SGSY), Pradhan Mantri Gramodaya Yojna, Valmiki Ambedkar Awas Yojna etc. All these programmes aimed at providing not only employment but also services in areas such as primary health, primary education, rural drinking water, nutrition, assistance for people to buy income and employment generating assets, construction of houses and sanitation, assistance for constructing houses, etc.

Q 4: Why are less women found in regular salaried employment?

Answer: There are many reasons for low representation of women in regular salaried employment.

i) Division of work: Deep rooted social beliefs are the main reason which segregate women's work as homemakers who are not supposed to venture out of their homes. Even though women are educated they prefer work at fewer wage.

ii) Low female literacy: Female literacy level is still below the male literacy level which means a less number of women are properly qualified and skilled to get a regular salaried job.

Q5. Is it necessary to generate employment in the formal sector rather than in the informal sector? Why?

Answer: The formal sector not only provides employment but also several social security benefits. A worker in the formal sector gets higher salary and social security benefits. Various social security benefits that the worker can be assured of better quality of life when he becomes old or physically disabled. After the life of a worker, his family members can be assured of a decent life. The situation is totally opposite in the informal sector where even regular salary is a dream for most of the workers.

Hence, it is necessary to generate employment in the formal sector rather than in the informal sector.

Q6. Concept of Labour force and workforce .

Labour force includes all those who are working and those not working but is seeking work. In other words it includes employed and unemployed workers.

The labour force includes all persons in the age group between 15 to 60 years who are employed or available to work.

Workforce includes all those who are employed at a particular point of time. In other words this refers to those persons who are working.

It includes all persons who are engaged in economy activities so,

Labour force = Workforce + Unemployed persons

Workforce = No. of persons working

Q7. Explain the various types of workers .

The workers can be classified as

a) Self employed workers –An arrangement in which a worker uses his own resources to make a living is known as self employed. He owns and operates an enterprise to earn his livelihood.

b) Hired workers – Those people who are hired by others on paid wages or salaries as a reward for their services are called as hired workers they are of two types:-

i) Regular worker- These are hired on permanent basis by their employers who get all social security

benefits by the employers.

ii) Causal worker- These are not hired on regular basis by the employers. They do not get any social security benefits by the employers.

Q8. Explain the following :

a) Casualisation of Work force b) Jobless growth c) Formal sector and informal sector

d) Informalisation of workforce.

a) Casualisation of Work force- It refers to a situation when the percentage of casual fired workers in the total workforce tends to rise over time.

b) Jobless growth- If economic growth is driven by better technology but it fails to improve the rate of participation in economy, such a growth is called 'Jobless Growth'. It leads to chronic unemployment even when GDP is rising.

c) Formal sector – It includes all government departments, public enterprises and private enterprises which hire 10 or more workers.

Informal Sector- It includes such private enterprises which hire less than 10 workers.

d) Informalisation of workforce – A situation when percentage of workforce in the formal sector tends to decline and that in informal sector tends to rise.

Q9. What are the measures that can be taken to eradicate the unemployment problem.

Measures that can be taken to eradicate the problem of unemployment are

(i) By controlling population ii) Creating alternative source of employment for agricultural workers / farmers iii) Development of villages and small scale industries iv)By introducing social reforms and bringing modernisation v) Employment oriented education and planning vi) Developing institutional credit facilities vi) Increase in investment and capital formation

INFRASTRUCTURE

Q1. a) Define Infrastructure

b) Explain social infrastructure and economic infrastructure

a) It refers to such core elements of economic & social change which serve as a support system to production activity in the economy.

Economic infrastructure	Social Infrastructure
It refers to all such elements of economic change like- power, transport, communication etc. which serve as a support system to the process of economic growth. It fosters economic growth which results in increase in the standards of living of the people.	It refers to core elements of social change like- schools, colleges, hospitals, banking etc. which serve as a support system to the process of social development of a country. Social infrastructure focuses on human resource development, implying the development of skilled personal as well as healthy & efficient human beings. It accelerates the process of human

Q2. Explain about healthcare system / health infrastructure of India.

India's Health Infrastructure and Healthcare is made up of a three tier system:-

1. Primary Healthcare:- At the village level, a variety of hospitals known as Primary Health Centres(PHCs) have been set up. Auxiliary Nursing Midwife (ANM) is the first person who provides primary healthcare. It includes:**•Maternal and child health care •Promotion of health and provision of essential drugs •Immunisation •Educating the people about identifying, preventing and controlling diseases.**

2. Secondary Healthcare:- Health care institutions having better facilities for surgery, x-ray, ECG are called Secondary Healthcare institutions. Patients are referred here when their condition is not managed by PHC.

3. Tertiary Healthcare:- In this sector, there are the hospitals which have advanced level equipments and medicines and undertake all the complicated health problems, which could not be managed by primary and secondary hospitals.

Q3. what is health? Mention the development of health services in India after independence.

It is a state of complete physical, mental & social well-being. A person's ability to work depends

largely on his good health. It enhances the quality of life.

Development of Health services in India after Independence:-

1. Decline in death rate from 27.4 per thousand in 1951to 7.2 per thousand in 2018.
2. Reduction in Infant mortality rate from 146 per thousand in1951 to 30 per thousand in 2018.
3. Rise in expectancy of life from 32 years in 1951 to 69.4 years in 2018.
4. Deadly diseases like malaria, TB, cholera & small pox have been brought under control.
5. Decline in under- five mortality rate from 248 per thousand in 1960 to 37 per thousand in2018.

ENVIRONMENT AND SUSTAINABLE DEVELOPMENT

Q1. Meaning of environment and its functions.

Environment is defined as all those conditions and their effects which influence human life It includes

a) The physical (or abiotic) as well as living (or biotic) elements of environment

b) Physical elements includes land, water, air , soil , climate , mountains , minerals and all other resources which nature has provided to us a free gift

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c) Living elements includes all kinds of living creatures like plants and animals which impact human life.

Functions of Environment

i) It supplies renewable and non renewable resources ii) It assimilates waste

iii) It sustain life by providing genetic and bio diversity

iv) It also provide aesthetic services like scenery etc

Q2. Define the following a) Carrying capacity b) Absorptive capacity c) Global warming d) Ozone depletion.

a) Carrying capacity of the environment implies that the resources extraction is not above the rate of regeneration of the resources and the wastes generated are within the assimilating capacity of the environment.

b) Absorptive capacity means the ability of the environment to absorb degradation**.**

c) The Global warming is due to increase in the Green-house gas concentrations, like water vapour, carbon-dioxide, methane and ozone in the atmosphere.

d) It refers to destruction of ozone in the ozone layer, due to presence of chlorine from manmade chlorofluorocarbons and other forces

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Q 3. What are basic problems related to environment?

Problem related to environment are: -

i) Problem of pollution – Pollution refers to those activities of production and consumption which change purity of air and water and thereby pollute the environment like air pollution, Water pollution, And Noise pollution etc

ii) Excessive exploitation of natural resources –Due to human activities the natural resources like forests, minerals , soil etc are used in excess of their regeneration rate which result in imbalance in environment and may lead to extinction of such resources in future. **Q43 what are the causes of environment degradation**

Causes of Environment degradation are:-

i) Population explosion ii) Widespread poverty iii) Increasing urbanisation iv) Excess use of insecticides and pesticides v) Rapid industrialisation vi) Disregard for civic norms

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Q4. Compare and contrast the concept of Economic growth, Economic development and Sustainable Development.

Economic Growth	Economic Development	Sustainable Development
i) It refers to long term increase in real per capita income	i) It refers to long term increase in real per capita income along with equitable distribution for the present generation	i) It refers to increase in real per capita income along with equitable distribution , both for the present and future generation
ii) This concept is generally used with reference to developed	ii) It is generally used in the context of underdeveloped economies	**ii)** It is used for both developed and underdeveloped economies
iii) It ignores distribution of income	**iii)** It accounts for the distribution of income	**iii)** It accounts for the distribution of income
iv) It ignores protection of environment	iv) It lays no special emphasis on environmental protection	iv) It lays special emphasis on environmental protection
v) It does not account for the exploitation of natural capital	**v)** It does not account for the exploitation of natural capital	v) It emphasizes rational utilization of natural capital to safeguard the interest of future generations.

IMPORTANT QUESTION OF COMPUTER SCIENCE TERM 2 BOARD EXAM

PYTHON

1. Write a program in Python to create a stack name StackVow, which takes the elements as vowels and implement all oprations (Push, POP and Traversal) on stack StackVow

Ans.
```
stack=[]
v=['A','E','I','O','U','a','e','i','o','u']
def push():
    for i in v:
        stack.append(i)
    print(stack)
push()

def pop():
    if stack==[]:
        print('stack is empty')
    else:
        print(stack.pop())
pop()
```

SQL

1. Consider the following tables and answer the following Table :

Table: Library

Book_Id	Book_Name	Author_Name	Publisher	Price	Type	Quantity
C0001	Fast Cook	LataKapoor	EPB	355	Cookery	5
F0001	The Tears	William Hopkins	First Pub	650	Fiction	20
T0001	My First C++	Brain & Brooke	EPB	350	Text	10
T0002	C++ Brain works	A.W. Rossaine	TDH	350	Text	15
F0002	Thunderbolts	Anna Roberts	First Pub	750	Fiction	50

```
mysql> select Book_Id,Book_Name, Author_Name, Price from Library where Publishers = 'First Publ.';
+---------+-----------+-----------------+-------+
| Book_Id | Book_Name | Author_Name     | Price |
+---------+-----------+-----------------+-------+
| F0001   | The tears | Willian Hopkins |   650 |
+---------+-----------+-----------------+-------+
```

Table : Issued

1 To show Book id, Book name, Author name and price of books of First Pub Publisher

Book_Id	Issuedto	Quantity_Issued
T0001	Kamal	4
C0001	Arvind	5
F0001	Suresh	2

2. To display the names and price of books in ascending order of their prices.

```
mysql> select Book_Name, Price from Library order by Price;
+-----------------+-------+
| Book_Name       | Price |
+-----------------+-------+
| My First C++    |   350 |
| C++ Brain works |   350 |
| Fast Cook       |   355 |
| The tears       |   650 |
| Thunderbolts    |   750 |
+-----------------+-------+
```

3. Display the price of book which has price between 300 to 500.

```
mysql> select price from library where price>300 and price<500;
+-------+
| price |
+-------+
|   405 |
|   400 |
|   350 |
+-------+
```

```
mysql> update library set price= price+50 where publishers = 'EPB';
Query OK, 2 rows affected (0.12 sec)
Rows matched: 2  Changed: 2  Warnings: 0
```

4.

Charu has to create a database named **MYEARTH** in MYSQL.
She now needs to create a table named **CITY** in the database to store the records of various cities across the globe. The table **CITY** has the following structure:

Table: CITY

FIELD NAME	DATA TYPE	REMARKS
CITYCODE	CHAR(5)	Primary Key
CITYNAME	CHAR(30)	
SIZE	INTEGER	

AVGTEMP	INTEGER	
POLLUTIONRATE	INTEGER	
POPULATION	INTEGER	

Help her to complete the task by suggesting appropriate SQL commands.

Ans.

```
CREATE DATABASE MYEARTH;

CREATE TABLE CITY
(
  CITYCODE CHAR(5)PRIMARY KEY,
  CITYNAME CHAR(30),
  SIZE INT,
  AVGTEMP INT,
  POPULATIONRATE INT,
  POPULATION INT,
);
```

What is function in SQL?
Ans. A function is a set of SQL statements that perform a specific task.

How many types of function in SQL?
Ans. 2 types 1. Single Row and 2. Multirow Function

What is Single Row Function?
Ans. Single row functions are applied on a single value and return a single value.

How Many types of Single row function?
Ans. 3 types – 1.Numeric 2. String 3. Date and Time functions

Explain important Numeric functions.
Ans. Three commonly used numeric functions are POWER(), ROUND() and MOD(). Their usage along with syntax is given in Table

Function	Description	Example with output
POWER(X,Y) can also be written as POW(X,Y)	Calculates X to the power Y.	mysql> SELECT POWER(2,3); Output: 8

ROUND(N,D)	Rounds off number N to D number of decimal places.
	Note: If D=0, then it rounds off the number to the nearest integer.
		mysql>SELECT ROUND(2912.564, 1);
		Output:
		2912.6
		mysql> SELECT ROUND(283.2);
		Output:
		283

MOD(A, B)	Returns the remainder after dividing number A by number B.	mysql> SELECT MOD(21, 2); Output: 1

Explain important string functions.
Ans .String functions and their usage are shown in Table

Function	Description	Example with output
UCASE(string) OR UPPER(string)	Converts string into uppercase.	mysql> SELECT UCASE("Informatics Practices"); Output: INFORMATICS PRACTICES
LOWER(string) OR LCASE(string)	Converts string into lowercase.	mysql> SELECT LOWER("Informatics Practices"); Output: informatics practices

MID(string, pos, n)
OR
SUBSTRING(string, pos, n)
OR
SUBSTR(string, pos, n)
	Returns a substring of size n starting from the specified position (pos) of the string. If n is not specified, it returns the substring from the position pos till end of the string.	mysql> SELECT MID("Informatics", 3, 4);
		Output:
		form
		
		mysql> SELECT MID('Informatics',7);
		Output:
		atics

LENGTH(string)	Return the number of characters in the specified string.	mysql> SELECT LENGTH("Informatics"); Output: 11

LEFT(string, N)	Returns N number of characters from the left side of the string.	mysql> SELECT LEFT("Computer", 4); Output: Comp
RIGHT(string, N)	Returns N number of characters from the right side of the string.	mysql> SELECT RIGHT("SCIENCE", 3); Output: NCE
INSTR(string, substring)	Returns the position of the first occurrence of the substring in the given string. Returns 0, if the substring is not present in the string.	mysql> SELECT INSTR("Informatics", "ma"); Output: 6
LTRIM(string)	Returns the given string after removing leading white space characters.	mysql> SELECT LENGTH(" DELHI"), LENGTH(LTRIM(" DELHI")); Output: +--------+--------+ | 7 | 5 | +--------+--------+ 1 row in set (0.00 sec)
RTRIM(string)	Returns the given string after removing trailing white space characters.	mysql>SELECT LENGTH("PEN ") LENGTH(RTRIM("PEN ")); Output: +--------+--------+ | 5 | 3 | +--------+--------+ 1 row in set (0.00 sec)
TRIM(string)	Returns the given string after removing both leading and trailing white space characters.	mysql> SELECT LENGTH(" MADAM "),LENGTH(TRIM(" MADAM ")); Output: +--------+--------+ | 9 | 5 | +--------+--------+ 1 row in set (0.00 sec)

5.Explain important Date functions.

Ans. Given Table explains various date and time functions.

Function	Description	Example with output
NOW()	It returns the current system date and time.	mysql> SELECT NOW(); Output: 2019-07-11 19:41:17
DATE()	It returns the date part from the given date/ time expression.	mysql> SELECT DATE(NOW()); Output: 2019-07-11
MONTH(date)	It returns the month in numeric form from the date.	mysql> SELECT MONTH(NOW()); Output: 7
MONTHNAME(date)	It returns the month name from the specified date.	mysql> SELECT MONTHNAME("2003-11-28"); Output: November
YEAR(date)	It returns the year from the date.	mysql> SELECT YEAR("2003-10-03"); Output: 2003
DAY(date)	It returns the day part from the date.	mysql> SELECT DAY("2003-03-24"); Output: 24
DAYNAME(date)	It returns the name of the day from the date.	mysql> SELECT DAYNAME("2019-07-11"); Output: Thursday

6.What is aggregate or multi row function?
Ans. Aggregate functions are also called multiple row functions. These functions work on a set of records as a whole, and return a single value for each column of the records on which the function is applied.

Activity 1.3
Explain all aggregate function

Table 1.9 Aggregate Functions in SQL

Function	Description	Example with output
MAX(column)	Returns the largest value from the specified column.	mysql> SELECT MAX(Price) FROM INVENTORY; Output: 673112.00
MIN(column)	Returns the smallest value from the specified column.	mysql> SELECT MIN(Price) FROM INVENTORY; Output: 355205.00
AVG(column)	Returns the average of the values in the specified column.	mysql> SELECT AVG(Price) FROM INVENTORY; Output: 576091.625000

SUM(column)	Returns the sum of the values for the specified column.	mysql> SELECT SUM(Price) FROM INVENTORY; Output: 4608733.00
COUNT(column)	Returns the number of values in the specified column ignoring the NULL values. Note: In this example, let us consider a MANAGER table having two attributes and four records.	mysql> SELECT * from MANAGER; Output: +------+---------+ | MNO | MEMNAME | +------+---------+ | 1 | AMIT | | 2 | KAVREET | | 3 | KAVITA | | 4 | NULL | +------+---------+ 4 rows in set (0.00 sec) mysql> SELECT COUNT(MEMNAME) FROM MANAGER; Output: +----------------+ | COUNT(MEMNAME) | +----------------+ | 3 | +----------------+
COUNT(*)	Returns the number of records in a table. Note: In order to display the number of records that matches a particular criteria in the table, we have to use COUNT(*) with WHERE clause.	mysql> SELECT COUNT(*) from MANAGER; Output: +----------+ | count(*) | +----------+ | 4 | +----------+ 1 row in set (0.00 sec)

Explain the types of Network?

Ans. **LAN (Local Area Network)** - It is a network that connects computers, mobile phones, tablet, mouse, printer, etc., placed at a limited distance. The geographical area covered by a LAN can range from a single room, a floor, an office having one or more buildings in the same premise, laboratory, a school, college, or university campus

MAN (Metropolitan Area Network) - Metropolitan Area Network (MAN) is an extended form of LAN which covers a larger geographical area like a city or a town.

WAN (Wide Area network) - Wide Area Network (WAN) connects computers and others LANs and MANs, which are spread across different geographical locations of a country or in different countries or continents.

PAN (Personal Area Network) - Personal Area Network (PAN): It is an interconnection of personal technology devices to communicate over a short distance, which is less than 33 feet or 10 meters or within the range of an individual person, typically using some form of wireless technologies.

Explain important Network Devices.
Ans. There are following important Network devices.
Modem - Modem stands for 'MOdulator DEMolulator'. It refers to a device used for conversion between analog signals and digital bits.
Ethernet card - Ethernet card, also known as Network Interface Card (NIC card in short) is a network adaptor used to set up a wired network. It acts as an interface between computerand the network. It is a circuit board mounted on the motherboard of a computer
Repeater - A repeater is an analog device that works with signals on the cables to which it is connected. The weakened signal appearing on the cable is regenerated and put back on the cable by a repeater.
Hub - An Ethernet hub (Figure 5.8) is a network device used to connect different devices through wires.
Switch - Like a hub, a network switch is used to connect multiple computers or communicating devices.
Router - Like a hub, a network switch is used to connect multiple computers orcommunicating devices.
Gateway or Firewall - As the term "Gateway" suggests, it is a key access point that acts as a "gate" between an organisation's network and the outside world of the Internet. A gateway can be implemented as software, hardware, or a combination of both.

Explain all the types of Topology.
Bus Topology - Bus topology, also known as line topology, is a type of network topology in which all devices in the network are connected by one central RJ-45 network cable or coaxial cable.
Ring -In ring topology, each node is connected to two otherdevices, one each on either side
Star -In star topology, each communicating device is connectedto a central node, which is a networking device like ahub or a switch.
Mesh Topology -In this networking topology, each communicating device is connected with every other device in the network

What is VoIP?
Ans. -Voice over Internet Protocol or VoIP, allows us to have voice call (telephone service) over the Internet, i.e., the voice transmission over a computer network rather than through the regular telephone network.

What is cookie?
Ans . A cookie is a text file, containing a string of information, which is transferred by the website to the browser when we browse it.

A School in Delhi uses database management system to store student details. The School maintains a database 'school_record' under which there are two tables.
Student Table Maintains general details about every student enrolled in school.
Stu Library Table To store details of issued books.Book ID is the unique identification number issued to each book. Minimum issue duration of a book is one day.**[CBSEQuestionBank2021]**

Student	
Field	**Type**
StuID	numeric
StuName	varchar(20)
StuAddress	varchar(50)
StuFatherName	varchar(20)
StuContact	numeric
StuAadhar	numeric
	varchar(5)
StuSection	varchar(1)

StuLibrary	
Field	**Type**
BookID	numbric
StuID	numbric
Issued_date	Date
Return_date	Date

IdentifytheSQLquerywhichdisplaysthedataof StuLibrarytableinascendingorderofstudentID.
SELECT*FROM StuLibraryORDERBYBookID;
SELECT*FROMStuLibraryORDERBYStuID;
SELECT*FROM StuLibraryORDERBYStuID ASC;
SELECT * FROM StuLibrary ORDER BY StuID DESC; Choose the correct option, which displays the desired data.
(a)Both I and IV (b)Both I and II
(c)Both III and IV (d)Both II and III
Ans.(*d*)SincethedefaultorderofsortingisASCorascending,thereforeifitisnotmentionedinthequerytheq uerywilltakethedefaultorder.

TheprimarykeyforStuLibrarytableis/are…….
(a)BookID (b) Book ID,StuID
(c)BookID, Issued_date (d) Issued_date
Ans.(*a*)BecauseBookIDwillhaveuniqueandNOTNULL values.

WhichofthefollowingSQLquerywilldisplaydatesonwhichnumberofissuedbooksisgreaterthan5?
SELECTIssued_dateFROMStuLibraryGROUPBYIssued_dateWHERECOUNT(*)>5;
SELECTIssued_dateFROMStuLibraryGROUPBYReturn_dateHAVINGCOUNT(*)>5;
SELECTIssued_dateFROMStuLibrary GROUPBYIssued_dateHAVINGCOUNT(*)>5;
SELECTIssued_dateFROM StuLibraryGROUPBYReturn_dateWHERECOUNT(*)>5;
Ans.(*c*)SELECTIssued_dateFROMStuLibrary GROUPBYIssued_dateHAVINGCOUNT(*)>5;
What is the differences between HAVING clause and Group By clause?

S.No.	Having Clause	Group By Clause
1.	It is used for applying some extra condition to the query.	The group by clause is used to group the data according to particular column or row.
2.	Having can be used without group by clause, in aggregate function, in that case it behaves like where clause.	group by can be used without having clause with the select statement.
3.	The having clause can contain aggregate functions.	It cannot contain aggregate functions.
4.	It restrict the query output by using some conditions	It groups the output on basis of some rows or columns.

What is the difference between WHERE clause and HAVING clause?
Ans. A HAVING clause is like a WHERE clause, but applies only to groups as a whole (that is, to therows in the result set representing groups), whereas the WHERE clause **applies to individual**

rows.AquerycancontainboththeWHEREclauseandaHAVING clause.

Consider the table DOCTOR given below. Write commands in SQL for (i) to (ii) and output for (iii) to (v).

Table : DOCTOR

ID	DOCName	Department	DOJ	Gender	Salary
1	Amit Kumar	Orthopaedics	1993-02-12	M	35000
2	Anita Hans	Paediatrics	1998-10-16	F	30000
3	Sunita Maini	Gynaecology	1991-08-23	F	40000
4	Joe Thomas	Surgery	1994-10-20	M	55000
5	Gurpreet	Paediatrics	1999-11-24	F	52000
6	Anandini	Oncology	1994-03-16	F	31000

(i) Displaythenamesandsalariesofdoctorsin descending order ofsalaries.

(ii) Displaynamesofeachdepartmentalongwithtotal salary being given to doctorsof thatdepartment.

(iii) SELECT SUM(Salary) FROM DOCTOR WHERE Department=='Surgery';

(iv) SELECT Department, COUNT(*) FROM DOCTOR GROUP BY Department;

(v) SELECT DOCName FROM DOCTOR WHERE Department LIKE '%gery%';

Ans. (i) SELECT DOCName, Salary FROM DOCTOR ORDER BY Salary DESC;

(ii) SELECT Department, SUM(Salary) FROM DOCTOR GROUP BY Department;

(iii)

SUM(Salary)
102000

(iv)

Department	COUNT(*)
Orthopaedics	1
Paediatrics	2
Gynaecology	1
Surgery	2
Oncology	2

(v)

DOCName
Joe Thomas
Siddharth Dang

19) Writetheoutputforthefollowing SQL command:
Selectround(15.193, -1);

Ans:- 10

20-Writetheoutputforthefollowingsqlcommand:
SelectSUBSTR('ABCDEFG',-5,3)
UBS
21.Write the output of the following SQL command.selectround(19.88,1);
a.19.88 b. 19.8 c.19.9 d.20.0
Ans:- c.19.9
22.
Atable'Student'contains5rowsand4columnsinitially.2morerowsareadd edand1
More column is added. What will be the degree and cardinality of the table student after adding these rows andcolumns?
i) 7,5
5,7
5,5
None of the above
ii)5,7
23Write the output of the following SQL statement:
SELECT TRUNCATE(15.79,-1) , TRUNCATE(15.79,0),
TRUNCATE(15.79,1);
a. 15 15 15.7
b. 10 15.7 15.9
c. 10 15 15.7
d. 10 10 15.9
Ans .c. 10 15 15.7
24 .Write the output of the following SQL command.
select substr("COMPUTER",3,4);
MPUT
PUTE
PU
MP
AnsMPUT
25 What will be the output of the following code?

SELECT MOD(14,3);
26. Givetheoutput of:
Selectround(123.93);
Selectround(123.93,1);
Ans
i)124
ii)123.9
27.

A relation Vehicles is given below :

V_no	Type	Company	Price	Qty
AW125	Wagon	Maruti	250000	25
J0083	Jeep	Mahindra	4000000	15
S9090	SUV	Mitsubishi	2500000	18
M0892	Mini van	Datsun	1500000	26
W9760	SUV	Maruti	2500000	18
R2409	Mini van	Mahindra	350000	15

Write SQL commands to:

Displaytheaveragepriceofeachtypeofvehiclehavingquantitymoret han20.
Countthetypeofvehiclesmanufacturedbyeachcompany.
Displaythetotalpriceofallthetypesofvehicles.
Ans

selectType,avg(Price)fromVehiclegroupbyTypehavingQty>20;
selectCompany,count(distinctType)fromVehiclegroupbyCompany;
SelectType,sum(Price*Qty)fromVehiclegroupbyType;

28.

Consider the table Garment and write the query:

Table: GARMENT

G CODE	G NAME	SIZE	COLOUR	PRICE
111	T Shirt	XL	Red	1400.00
112	Jeans	L	Blue	1600.00
113	Skirt	M	Black	1100.00
114	Ladies Jacket	XL	Blue	4000.00
115	Trousers	L	Brown	1500.00
116	Ladies Toop	L	Pink	1200.00

i. Display the Minimum price of the Garment.

ii. Count and display the number of GARMENT from each SIZE where number of GARMENTS are more than 1

iii. Display the sum of price of each color garment

i. SELECT MIN(PRICE) FROM GARMENT;
ii. SELECT SIZE,COUNT(*) FROM GARMENT
GROUP BY SIZE
HAVING COUNT(*)>1;

29. What is the difference between Static and Dynamic webpage?
Ans:

StaticWebpage	DynamicWebpage
The static web pages display the same content each time when someone visit sit.	In the dynamic Web pages, the page content changes according to the user.
It takes less time to load over internet.	Dynamic web pages take more time whileloading.
No Data base used.	A data base is used in at the server end in a dynamic web page.
Changes rarely.	Changes frequently.

30. ABC Pvt. Ltd. Is setting up the network in the Bengaluru. There are four departments named as Market, Finance, Legal and Sales.
Distance between various Departments building is as follows:

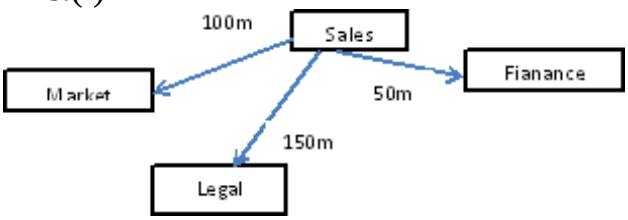
From	To	Distance
Market	Finance	80mt
Market	Legal	180mt
Market	Sales	100mt
Legal	Sales	150mt
Legal	Finance	100mt
Fianance	Sales	50mt

Numberofcomputersinthe buildings:

Building	No.ofComputers
Market	20
Legal	10
Finance	08
Sales	42

Suggest a cable layout of connections between the departments building and specify thetopology.
Suggest the most suitable building top lace server by giving suitable reason.
Suggest the placement of (i) modem (ii) hub/switch in the network.
The organization is planning to link its sales counter situated in various part of the same city, which type of network out of LAN, WAN, MAN will be formed? Justify your answer.

Ans.(i)



Star topology should be used.
Sales is the most suitable building to place the server because it has maximum number ofcomputers.
EachBuildingshouldhavehub/switchandmodem incase internalconnectionisrequired.
MAN (MetropolianArea Network) as this network canbecarriedoutin acity network.

30. Delhi Public School in Meerut is starting up the network between its different wings. Therearefourbuildingnamed asS,J, AandH.Thedistancebetween variousbuildings isas follows:

From	To	Distance
A	S	200m
A	J	150m
A	H	50m
S	J	250m
S	H	350m
J	H	350m

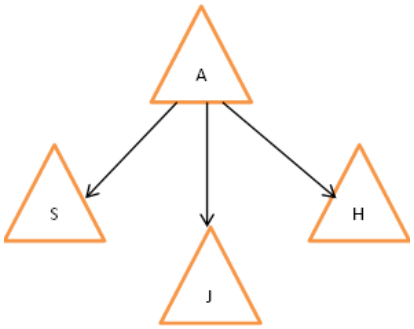
Number of computers in the buildings:

Building	No.of Computers
S	130
J	80
A	160
H	50

Suggest the cable layout of connections between the buildings.
Suggest the most suitable place (i.e. building) to house the server of this school, provide a suitable reason.
Suggest the placement of the following devices with justification
Repeater
Hub/Switch
The organization also has enquiry office in another city about 50-60 km away inhilly region.
Suggest the suitable transmission media to inter-connect school and enquiryofficeoutofthefollowing:
Fibre opticcable.
Microwave.
Radiowave.

Ans.

(i) Star topology



(ii) ServercanbeplacedintheAbuildingas ithasthemaximumnumberofcomputers
(iii)Repeatercanbe placed betweenAandSbuildings asthedistanceismorethan100m, Hub/Switch in each building
(iv)Radiowavescanbe used inhilly regionastheycantravelthroughobstacles.

IMPORTANT QUESTION OF INFORMATICS PRACTICES TERM 2 BOARD EXAM

2. What is function in SQL?

Ans. A function is a set of SQL statements that perform a specific task.

3. How many types of function in SQL?

Ans. 2 types 1. Single Row and 2. Multirow Function

4. What is Single Row Function?

Ans. Single row functions are applied on a single value and return a single value.

5. How Many types of Single row function?

Ans. 3 types – 1. Numeric 2.String 3. Date and Time functions

6. Explain important Numeric functions.

Ans. Three commonly used numeric functions are POWER(), ROUND() and MOD(). Their usage along with syntax is given in Table

Function	Description	Example with output
POWER(X,Y) can also be written as POW(X,Y)	Calculates X to the power Y.	mysql> SELECT POWER(2,3); Output: 8

ROUND(N,D)	Rounds off number N to D number of decimal places. Note: If D=0, then it rounds off the number to the nearest integer.	mysql>SELECT ROUND(2912.564, 1);
		Output:
		2912.6
		mysql> SELECT ROUND(283.2);
		Output:
		283

MOD(A, B)	Returns the remainder after dividing number A by number B.	mysql> SELECT MOD(21, 2); Output: 1

7. Explain important string functions.

Ans. String functions and their usage are shown in Table

Function	Description	Example with output
UCASE(string) OR UPPER(string)	Converts string into uppercase.	mysql> SELECT UCASE("Informatics Practices"); Output: INFORMATICS PRACTICES
LOWER(string) OR LCASE(string)	Converts string into lowercase.	mysql> SELECT LOWER("Informatics Practices"); Output: informatics practices

MID(string, pos, n)
OR
SUBSTRING(string, pos, n)
OR
SUBSTR(string, pos, n)
	Returns a substring of size n starting from the specified position (pos) of the string. If n is not specified, it returns the substring from the position pos till end of the string.	mysql> SELECT MID("Informatics", 3, 4);
		Output:
		form
		
		mysql> SELECT MID('Informatics',7);
		Output:
		atics

LENGTH(string)	Return the number of characters in the specified string.	mysql> SELECT LENGTH("Informatics"); Output: 11

LEFT(string, N)	Returns N number of characters from the left side of the string.	mysql> SELECT LEFT("Computer", 4); Output: Comp
RIGHT(string, N)	Returns N number of characters from the right side of the string.	mysql> SELECT RIGHT("SCIENCE", 3); Output: NCE
INSTR(string, substring)	Returns the position of the first occurrence of the substring in the given string. Returns 0, if the substring is not present in the string.	mysql> SELECT INSTR("Informatics", "ma"); Output: 6
LTRIM(string)	Returns the given string after removing leading white space characters.	mysql> SELECT LENGTH(" DELHI"), LENGTH(LTRIM(" DELHI")); Output: +--------+--------+ | 7 | 5 | +--------+--------+ 1 row in set (0.00 sec)
RTRIM(string)	Returns the given string after removing trailing white space characters.	mysql>SELECT LENGTH("PEN ") LENGTH(RTRIM("PEN ")); Output: +--------+--------+ | 5 | 3 | +--------+--------+ 1 row in set (0.00 sec)
TRIM(string)	Returns the given string after removing both leading and trailing white space characters.	mysql> SELECT LENGTH(" MADAM "),LENGTH(TRIM(" MADAM ")); Output: +--------+--------+ | 9 | 5 | +--------+--------+ 1 row in set (0.00 sec)

8. Explain important Date functions.

Ans. Given Table explains various date and time functions.

Function	Description	Example with output
NOW()	It returns the current system date and time.	mysql> SELECT NOW(); Output: 2019-07-11 19:41:17
DATE()	It returns the date part from the given date/ time expression.	mysql> SELECT DATE(NOW()); Output: 2019-07-11
MONTH(date)	It returns the month in numeric form from the date.	mysql> SELECT MONTH(NOW()); Output: 7
MONTHNAME(date)	It returns the month name from the specified date.	mysql> SELECT MONTHNAME("2003-11-28"); Output: November
YEAR(date)	It returns the year from the date.	mysql> SELECT YEAR("2003-10-03"); Output: 2003
DAY(date)	It returns the day part from the date.	mysql> SELECT DAY("2003-03-24"); Output: 24
DAYNAME(date)	It returns the name of the day from the date.	mysql> SELECT DAYNAME("2019-07-11"); Output: Thursday

9. What is aggregate or multi row function?

Ans. Aggregate functions are also called multiple row functions. These functions work on a set of records as a whole, and return a single value for each column of the records on which the function is applied.

10. Explain all aggregate function

Table 1.9 Aggregate Functions in SQL

Function	Description	Example with output
MAX(column)	Returns the largest value from the specified column.	mysql> SELECT MAX(Price) FROM INVENTORY; Output: 673112.00
MIN(column)	Returns the smallest value from the specified column.	mysql> SELECT MIN(Price) FROM INVENTORY; Output: 355205.00
AVG(column)	Returns the average of the values in the specified column.	mysql> SELECT AVG(Price) FROM INVENTORY; Output: 576091.625000

SUM(column)	Returns the sum of the values for the specified column.	mysql> SELECT SUM(Price) FROM INVENTORY; Output: 4608733.00
COUNT(column)	Returns the number of values in the specified column ignoring the NULL values. Note: In this example, let us consider a MANAGER table having two attributes and four records.	mysql> SELECT * from MANAGER; Output: +------+---------+ | MNO | MEMNAME | +------+---------+ | 1 | AMIT | | 2 | KAVREET | | 3 | KAVITA | | 4 | NULL | +------+---------+ 4 rows in set (0.00 sec) mysql> SELECT COUNT(MEMNAME) FROM MANAGER; Output: +----------------+ | COUNT(MEMNAME) | +----------------+ | 3 | +----------------+
COUNT(*)	Returns the number of records in a table. Note: In order to display the number of records that matches a particular criteria in the table, we have to use COUNT(*) with WHERE clause.	mysql> SELECT COUNT(*) from MANAGER; Output: +----------+ | count(*) | +----------+ | 4 | +----------+ 1 row in set (0.00 sec)

11. Explain the types of Network?

Ans. LAN (Local Area Network) - It is a network that connects computers, mobile phones, tablet, mouse, printer, etc., placed at a limited distance. The geographical area covered by a LAN can range from a single room, a floor, an office having one or more buildings in the same premise, laboratory, a school, college, or university campus

MAN (Metropolitan Area Network) - Metropolitan Area Network (MAN) is an extended form of LAN which covers a larger geographical area like a city or a town.

WAN (Wide Area network) - Wide Area Network (WAN) connects computers and others LANs and MANs, which are spread across different geographical locations of a country or in different countries or continents.

PAN (Personal Area Network) - Personal Area Network (PAN): It is an interconnection of personal technology devices to communicate over a short distance, which is less than 33 feet or 10 meters or within the range of an individual person, typically using some form of wireless technologies.

12. Explain important Network Devices.

Ans. There are following important Network devices.

a. Modem - Modem stands for 'MOdulator DEMolulator'. It refers to a device used for conversion between analog signals and digital bits.

b. Ethernet card - Ethernet card, also known as Network Interface Card (NIC card in short) is a network adaptor used to set up a wired network. It acts as an interface between computer and the network. It is a circuit board mounted on the motherboard of a computer
c. Repeater - A repeater is an analog device that works with signals on the cables to which it is connected. The weakened signal appearing on the cable is regenerated and put back on the cable by a repeater.
d. Hub - An Ethernet hub (Figure 5.8) is a network device used to connect different devices through wires.
e. Switch - Like a hub, a network switch is used to connect multiple computers or communicating devices.
f. Router - Like a hub, a network switch is used to connect multiple computers or communicating devices.
g. Gateway or Firewall - As the term "Gateway" suggests, it is a key access point that acts as a "gate" between an organisation's network and the outside world of the Internet. A gateway can be implemented as software, hardware, or a combination of both.

13. Explain all the types of Topology.
    a. **Bus Topology -** Bus topology, also known as line topology, is **a type of network topology in which all devices in the network are connected by one central RJ-45 network cable or coaxial cable**.
    b. **Ring -** In ring topology, each node is connected to two otherdevices, one each on either side
    c. **Star -** In star topology, each communicating device is connectedto a central node, which is a networking device like ahub or a switch.
    d. **Mesh Topology -**In this networking topology, each communicating device is connected with every other device in the network
14. What is VoIP?

Ans. -Voice over Internet Protocol or VoIP, allows us to have voice call (telephone service) over the Internet, i.e., the voice transmission over a computer network rather than through the regular telephone network.

15. What is cookies?

Ans . A cookie is a text file, containing a string of information, which is transferred by the website to the browser when we browse it.

16. A School in Delhi uses database management system to store student details. Theschool maintains a database 'school_record' under which there are two tables.

Student Table Maintains general details about every student enrolled in school.

StuLibrary Table Tostore detailsofissuedbooks. BookID is the unique identificationnumber issued toeach book. Minimum issue durationof a book is oneday.**[CBSE Question Bank 2021]**

Student	
Field	**Type**
StuID	numeric
StuName	varchar(20)
StuAddress	varchar(50)
StuFatherName	varchar(20)
StuContact	numeric
StuAadhar	numeric
	varchar(5)
StuSection	varchar(1)

StuLibrary	
Field	**Type**
BookID	numbric
StuID	numbric
Issued_date	Date
Return_date	Date

(i) Identify the SQL query which displays the data of StuLibrary table in ascending orderof student ID.

I. SELECT * FROM StuLibrary ORDER BY BookID;
II. SELECT * FROM StuLibrary ORDER BY StuID;
III. SELECT * FROM StuLibrary ORDER BY StuID ASC;
IV. SELECT * FROM StuLibrary ORDER BY StuID DESC;

Choosethecorrectoption,whichdisplaysthe desired data.

(a) Both Iand IV (b) Both Iand II
(c) Both III and IV (d) Both IIand III

Ans. (*d*) Since the default order of sorting is ASC or ascending, therefore if it is notmentioned in the query the query will take the default order.

(ii) The primary key for StuLibrary table is/are .....

(a) BookID (b) BookID,StuID
(c) BookID,Issued_date (d) Issued_date

Ans. (*a*) Because BookID will have unique and NOT NULL values.

(iii) Which of the following SQL query will display datesonwhichnumberofissuedbooksisgreater than 5?

(a) SELECT Issued_date FROM StuLibrary GROUPBY Issued_date WHERE COUNT(*)>5;
(b) SELECT Issued_date FROM StuLibrary GROUPBY Return_date HAVING COUNT(*)>5;
(c) SELECT Issued_date FROM StuLibrary GROUP BY Issued_date HAVING COUNT(*)>5;
(d) SELECT Issued_date FROM StuLibrary GROUPBY Return_date WHERE COUNT(*)>5;

Ans. (*c*) SELECT Issued_date FROM StuLibrary GROUPBY Issued_date HAVING COUNT(*)>5;

17. Whatisthedifferences between HAVING clause and Group By clause?

S.No.	Having Clause	Group By Clause
1.	It is used for applying some extra condition to the query.	The group by clause is used to group the data according to particular column or row.
2.	Having can be used without group by clause, in aggregate function, in that case it behaves like where clause.	group by can be used without having clause with the select statement.
3.	The having clause can contain aggregate functions.	It cannot contain aggregate functions.
4.	It restrict the query output by using some conditions	It groups the output on basis of some rows or columns.

18. What is the difference between WHERE clause and HAVING clause?

Ans. A HAVING clause is like a WHERE clause, but applies only to groups as a whole (that is, to the rows in the result set representing groups), whereas the WHERE clause **applies to individualrows**. A query can contain both a WHERE clause and a HAVING clause.

19. Consider the table DOCTOR given below. Write commands in SQL for (i) to (ii) and output for (iii) to (v).

Table : DOCTOR

ID	DOCName	Department	DOJ	Gender	Salary
1	Amit Kumar	Orthopaedics	1993-02-12	M	35000
2	Anita Hans	Paediatrics	1998-10-16	F	30000
3	Sunita Maini	Gynaecology	1991-08-23	F	40000
4	Joe Thomas	Surgery	1994-10-20	M	55000
5	Gurpreet	Paediatrics	1999-11-24	F	52000
6	Anandini	Oncology	1994-03-16	F	31000

(i) Displaythenamesandsalariesofdoctorsin descending order ofsalaries.

(ii) Displaynamesofeachdepartmentalongwithtotal salary being given to doctorsof thatdepartment.

(iii) SELECT SUM(Salary) FROM DOCTOR WHERE Department=='Surgery';

(iv) SELECT Department, COUNT(*) FROM DOCTOR GROUP BY Department;

(v) SELECT DOCName FROM DOCTOR WHERE Department LIKE '%gery%';

Ans. (i) SELECT DOCName, Salary FROM DOCTOR ORDER BY Salary DESC;

(ii) SELECT Department, SUM(Salary) FROM DOCTOR GROUP BY Department;

(iii)

SUM(Salary)
102000

(iv)

Department	COUNT(*)
Orthopaedics	1
Paediatrics	2
Gynaecology	1
Surgery	2
Oncology	2

(v)

DOCName
Joe Thomas
Siddharth Dang

19) Write the output for the following SQL command:
Select round(15.193 , -1);

Ans:- 10

20-Write the output for the following sql command:

Select SUBSTR('ABCDEFG', -5 ,3)

UBS

21.Write the output of the following SQL command.

select round (19.88,1);

a. 19.88 b. 19.8 c. 19.9 d. 20.0

Ans:- c. 19.9

22. A table 'Student' contains 5 rows and 4 columns initially. 2 more rows are added and 1 more column is added . What will be the degree and cardinality of the table student after adding these rows and columns?

i) 7, 5
ii) 5,7
iii) 5,5
iv) None of the above

ii) 5,7

23Write the output of the following SQL statement:

SELECT TRUNCATE(15.79,-1) , TRUNCATE(15.79,0), TRUNCATE(15.79,1);

a. 15 15 15.7
b. 10 15.7 15.9
c. 10 15 15.7
d. 10 10 15.9

Ans .c. 10 15 15.7

24 .Write the output of the following SQL command.

select substr("COMPUTER",3,4);

a. MPUT

b. PUTE

c. PU

d. MP

ansMPUT

25 What will be the output of the following code?

SELECT MOD(14,3);

26. Give the output of :

i) Select round(123.93);
ii) Select round(123.93,1);

Ans

i) 124

ii) 123.9

27.

A relation Vehicles is given below :

V_no	Type	Company	Price	Qty
AW125	Wagon	Maruti	250000	25
J0083	Jeep	Mahindra	4000000	15
S9090	SUV	Mitsubishi	2500000	18
M0892	Mini van	Datsun	1500000	26
W9760	SUV	Maruti	2500000	18
R2409	Mini van	Mahindra	350000	15

Write SQL commands to:

a. Display the average price of each type of vehicle having quantity more than 20.
b. Count the type of vehicles manufactured by each company.
c. Display the total price of all the types of vehicles.
Ans

a. select Type, avg(Price) from Vehicle group by Type having Qty>20;
b. select Company, count(distinct Type) from Vehicle group by Company;
c. Select Type, sum(Price* Qty) from Vehicle group by Type;

28.

Consider the table Garment and write the query:

Table: GARMENT

G CODE	G NAME	SIZE	COLOUR	PRICE
111	T Shirt	XL	Red	1400.00
112	Jeans	L	Blue	1600.00
113	Skirt	M	Black	1100.00
114	Ladies Jacket	XL	Blue	4000.00
115	Trousers	L	Brown	1500.00
116	Ladies Toop	L	Pink	1200.00

i. Display the Minimum price of the Garment.

ii. Count and display the number of GARMENT from each SIZE where number of GARMENTS are more than 1

iii. Display the sum of price of each color garment

i. SELECT MIN(PRICE) FROM GARMENT;
ii. SELECT SIZE,COUNT(*) FROM GARMENT
GROUP BY SIZE
HAVING COUNT(*)>1;

29. What is the difference between Static and Dynamic webpage?

Ans:

Static Webpage	**Dynamic Webpage**
The static web pages display the same content each time when someone visits it.	In the dynamic Web pages, the page content changes according to the user.

It takes less time to load over internet.	Dynamic web pages take more time while loading.
No Database used.	A database is used in at the server end in a dynamic web page.
Changes rarely.	Changes frequently.

30. ABC Pvt. Ltd. Is setting up the network in the Bengaluru. There are four departments namedas Market, Finance, Legal and Sales.

Distance between various Departments building is as follows :

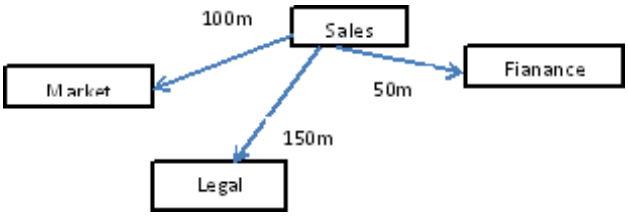
From	To	Distance
Market	Finance	80 mt
Market	Legal	180 mt
Market	Sales	100 mt
Legal	Sales	150 mt
Legal	Finance	100 mt
Fianance	Sales	50 mt

Number of computers in the buildings :

Building	No. of Computers
Market	20
Legal	10
Finance	08
Sales	42

(i) Suggest a cable layout of connections between the departments building and specify thetopology.
(ii) Suggest the most suitable building to place server by giving suitable reason.
(iii) Suggest the placement of (i) modem (ii) hub/switch in the network.
(iv) The organization is planning to link its sales counter situated in various part of the same city,which type of network out of LAN, WAN, MAN will be formed? Justify your answer.

Ans. (i)



Star topology should be used.

(ii) Sales is the most suitable building to place the server because it has maximum number ofcomputers.
(iii) Each Building should have hub/switch and modem in case internal connection is required.
(iv) MAN (Metropolian Area Network) as this network can be carried out in a city network.

30. Delhi Public School in Meerut is starting up the network between its different wings. Thereare four building named as S, J, A and H. The distance between various buildings is as follows :

From	To	Distance
A	S	200 m
A	J	150 m
A	H	50 m
S	J	250 m
S	H	350 m
J	H	350 m

Number of computers in the buildings :

Building	No. of Computers
S	130
J	80
A	160
H	50

ACCOUNTANCY
Not-for-Profit organization

1. Give two main sources of income of a 'Not for profit organisation'.
2. State any two characteristics of Receipt and Payment Account.
3. Tournament fund appears in the books Rs. 15,000 and expenses on tournament during the year were Rs. 18000. How will you show this while preparing financial statement of a not-for-profit organization?
4. As per Receipt and Payments account for the year ended on March 31, 2008, the subscription received were Rs. 2,50,000. Addition information given is as follows:-

   (i) Subscriptions outstanding on 01-04-2007 Rs. 50,000.

   (ii) Subscription outstanding on 31-03-2008 Rs. 35,000.

   (iii)Subscription Received in advance as on 31-03-2008 Rs. 30000.

Ascertain the amount of income from subscription for the year 2007-08.

5. From the following particulars of a club, calculate the amount of salaries to be shown in Income and expenditure account for the year ended 31 March, 2008:-

Total salaries paid during the year 2007-08	Rs. 87,000
Outstanding salaries on 01-04-2007	Rs. 17,000
Prepaid salaries on 01-04-2007	Rs. 19,000
Outstanding salaries on 31-03-2008	Rs. 32,000
Prepaid salaries on 31-03-2008	Rs 20,000

6. Calculate the amount to be debited to Income and Expenditure account under the heading sports items for the year 2006-07 in respect of the Osmosis club:-

Stock of sports items on 01-04-2006	Rs. 44,700
Stock of sports items on 31-03-2007	Rs. 24,500
Paid for sports items during the year	Rs. 97,900

Creditors for supplies of sports items on 31-03-2007 Rs.26,500.

7. Distinguish between Receipts and Payments A/C and Income and expenditure A/C.

8. Calculate the amount medicines to be debited in the Income and Expenditure Account of a Hospital on the basis of the following information:-

	01-04-2006 **Rs.**	**31-03-2007** **Rs.**
Stock of Medicines	90,000	1,24,000
Creditors for Medicines	2,40,000	2,04,000

Amount paid for medicines during the year was Rs. 6,79000.

9. **From the following R/P acc. Prepare I/E acc. & B/S of R.K.Suman Club club for the year ending 31-03-2011:**

Dr. **R/P A/C(31-03-2011)** **Cr.**

Receipts	**AMt.**	**Payments**	**Amt.**
To B/d	**7130**	**By medicines**	**30590**
To subscrptions	**47996**	**By Doctors Honorarium**	**9000**
To Donations	14500	**By salaries**	**27500**
To int.on investment @ 7% pa for full year	**7000**	**By petty exp.**	**461**
To proceeds from charity show	**10450**	**By Equipment**	**15000**
		By exp. On Charity show	**750**
		By b/c/d	**3775**
	87076		**87076**

Additional Inf:

		01-04-2010	**31-03-2011**
1	**subscrptions due**	**240**	**280**
2	**SUBSCRIPTIONS RECEIVED IN ADVANCE**	**64**	**100**
3	**Medicine Stock**	**8810**	**9740**
4	**Equipment**	**21200**	**31600**
5	**Building**	**40000**	**38000**

Answer Key

1. (i) Subscription (ii) Donation.

2. (i) Receipts and Payments Account is a summary of Cash Book.

(ii) Non- cash expenses such as depreciation and outstanding expenses are not shown in Receipts and Payments Account.

3. Income and Expenditure A/C

For the year ended ……

Expenditure		**Rs.**	**Income**	**Rs.**
To Tournament Expenses	18000			
Less Tournament Fund	15000	3000		

4. Calculation of current year subscription to be shown in Income and Expenditure A/C for the year ended March 31, 2008 :-

Total subscription received during the year			250000
Add:-			
Outstanding subscription on 31-03-2008	35000		
Advance subscription on 01-04-2007	NIL		
			285000
Less :- Outstanding subscription on 01-04-07		50000	
Advance subscription on 31-03-2008		30000	(80000)
Current year subscription	**205000**		

5. Total Salaries paid during the year 87,000

Add:-

Outstanding salaries on 31-03-2008	32,000		
Prepaid salaries on 01-04-2007	19,000	51,000	
		138,000	
Less:-			
Outstanding Salaries on 01-04-2007	17,000		
Prepaid salaries on 31-03-2008	2,000	(37,000)	
Salaries to be shown in Income and Expenditure A/C		101000	

6. Amount paid for sports items during the year 97900

Add:-

Stock of sports items as on 01-04-2006	44700		
Creditors for sports as on 31-03-2007	26500		16910
Less :-			
Stock of sports items as on 31-03-2007		24500	
Sports items to be debited in the Income and expenditure A/C		144600	

7. Difference between Receipts and Payments and Income and Expenditure.

Basis	**Income and Expenditure**	**Receipts and Payments**
(i) Nature	It is a kin to profit and loss A/C	It is the summary of Cash book.
(ii) Nature of Items	It records income and expenditure of revenue nature only	It records receipts and payments of both capital and revenue nature.
(iii) Result	The result of Income and expenditure A/C is surplus or deficit.	The result of Receipt and Payments is closing balance of cash and Bank.

8. Amount paid for medicine during the year 6,79000

Add:-

Stock of medicine on 01-04-2006		90,000	
Creditors for medicine on 31-03-2007	204,000	294,000	
			9,73,000
Less:-			
Stock of medicine on 31-03-2007	124,000		
Creditors for medicine as on 01-04-2006	240,000	364,000	
Medicine to be debited in Income and Expenditure A/C.		609000	

9.

B/S(01-04-2010)

Liab.	**Amt.**	**Assets**	**Amt.**

SUBSCRIPTIONS RECEIVED IN ADVANCE	**64**	**Cash in Hand**	**7130**
Capital Fund(Bal.)	**177316**	**Investments(7000*100/7)**	**100000**
		subscrptions due	**240**
		Medicine Stock	**8810**
		Equipment	**21200**
		Building	**40000**
	177380		**177380**

Dr. **Income and Expenditure A/C(31-03-2011)** **Cr.**

Expenditure	Amount	Income	Amount
To Medicine Consumed:		**By subscriptions:**	
Purchased		**Add;**	
30590		**Clg.outstanding/Receivable 280**	
Add:Opng. Stock		**Opg.Advance64**	
240	**9740**		
Total	**9000**	**_____**	
_____	**27500**	**920**	
Less: Clng. Stock	**461**	**Less:**	
9740	**750**	**Opg.outstanding 240**	
ToDoctors Honorarium		**Clg. Advance 100**	**48000**
Salaries			**14500**
petty exp.		**_____**	**7000**
exp. On Charity show	**6600**	**By Donations**	**10450**
To Dep.	**5979**	**By int. on Inv.**	
Equipment4600		**By proceeds from charity show**	
Building 2000			
_____			
To Surplus			
	79950		**79950**

B/S(01-04-2011)

Liab.	Amt.	Assets	Amt.
SUBSCRIPTIONS RECEIVED IN ADVANCE	**100**	**Cash in Hand**	**3775**
		Investments(7000*100/7)	**100000**
Capital Fund 177316		**subscrptions due**	**280**
Add:		**Medicine Stock**	**9740**
Surplus 5979		**Equipment21200**	
_____	**183295**	**Add. Purchased**	
		15000	
		_____	
		36200	**31600**
		Less:	
		Dep. 4600	
		_____	**38000**
		Building 40000	
		Less:	
		Dep. 2000	
		_____	
	183395		**183395**

RECONSTITUTION OF APARTNERSHIP FIRM

RETIREMENT /DEATH OF A PARTNER

Q.1 Distinguish between Sacrificing Ratio and Gaining Ratio.

Q.2 Kamal, Kishore and Kunal are partners in a firm sharing profits equally. Kishore retires from the firm. Kamal and Kunal decide to share the profits in future in the ratio 4:3. Calculate the Gaining Ratio.

Q.3 A, B and C are partners in a firm sharing profits in the ration of 2:2:1. B retires and his share is acquired by A and C equally. Calculate new profit sharing ratio of A and C.

Q.4 X, Y and Z are partners sharing profits in the ratio of 4/9, 1/3 and 2/9. X retires and surrenders $2/3^{rd}$ of his share in favour of Y and remaining in favour of Z. Calculate new profit sharing ratio and gaining ratio.

Q.5 Mayank, Harshit and Rohit were partners in a firm sharing profits in the ratio of 5:3:2. Harshit retired and goodwill is valued at Rs 60000. Mayank and Rohit decided to share future profits in the ratio 2:3. Pass necessary journal entry for treatment of goodwill.

Q.6 Ramesh, Naresh and Suresh were partners in a firm sharing profits in the ratio of 5:3:2. Naresh retired and the new profit sharing ratio between Ramesh and Suresh was 2:3. On Naresh retirement the goodwill of the firm was valued at Rs. 120000. Pass necessary journal entry for the treat.

Q.7 X, Y and Z were partners in a firm sharing profits and losses in the ratio of 3:2:1. The profit of the firm for the year ended 31^{st} March, 2007 was Rs.3,00000. Y dies on 1^{st} July 2007. Calculate Y's share of profit up to date of death assuming that profits in the year 2007- 2008 have been accured on the same scale as in the year 2006-07 and pass necessary journal entry.

Answer Key

Ans. 1

Basis	Sacrificing Ratio	Gaining Ratio
(i) Meaning	Proportion in which old partners sacrifice their share in favour of new partner.	Proportion in which continuing partner gain the share of outgoing partner on his retirement.
(ii) Occasion	Sacrificing ratio is calculated at the time of admission of new partner.	Gaining ratio is calculated at the time of retirement or death of a partner.
(iii) Formula	Sacrificing ratio = Old ratio – New ratio	Gaining ratio – Old ratio

Ans. 2 Gaining Ratio = New ratio – Old ratio

Kamal's Gain = 4/7 – 1/3 = 5/21

Kunal's Gain = 3/7 – 1/3 = 2/21

Gaining Ratio = 5:2

Ans. 3. A's gaining share = 2/5 X ½ = 1/5

A's new share = 2/5 + 1/5 = 3/5

C's gaining share = 2/5 X ½ = 1/5

C's New share = 1/5 + 1/5 = 2/5

New ratio of A and C = 3:2

Ans. 4

Y's gaining share = 4/9 X 2/3 = 8/27

Z's gaining share = 4/9 – 8/27 = 4/27

Y's new share = Old share + gain

= 1/3 + 8/27 = 17/27

Z's new share = 2/9 + 4/27 = 10/27

New Ratio = 17:10

Gaining ratio = 8/27 : 4/27 or 2:1

Ans. 5	Rohit's capital A/C	Dr. 24000	
	To Mayank's capital A/C		6000
	To harshit's Capital A/C		18000

(Adjustment Entry for treatment of goodwill in gaining ratio.)

Ans. 6.	Suresh capital A/C	Dr. 48000	
	To Ramesh's capital A/C		12000
	To Naresh capital A/C	36000	

(Goodwill adjusted among the gaining partner in gaining ratio.)

Ans. 7. Total profit for the year ended 31st March 2007 = Rs 300000

Y's share of profit up to date of death = 300000 X 2/6 X 3/12

= 25000

Profit and Loss suspense A/C Dr. 25000

To Y's capital A/C 25000

(Y's share of profit transferred to Y's capital A/C)

DISSOLUTION OF PARTNERSHIP FIRM

Q.1 Distinguish between dissolution of partnership and dissolution of partnership firm on the basis of continuation of business.

Q.2 Why is Realisation Account prepared on dissolution of partnership firm?

Q.3 State any one point of difference between Realisation Account and Revaluation Account.

Q.5 On a firms dissolution debtors as shown in the Balance sheet were Rs. 17000 out of these Rs. 2000 became bad. One debtor of Rs. 6000 became insolvent and 40% could be recovered from him. Full recovery was made from the balance debtors. Calculate the amount received from debtors and pass necessary journal entry.

Q.6 On dissolution of a firm, Kamal's capital account shows a debit balance of Rs. 16000. His share of profit on realization is Rs. 11000. He has taken over firms creditors at Rs. 9000. Calculate the final payment due to /from him and pass journal entry.

Q.7 A and B were partners in a firm sharing profits and losses equally. Their firm was dissolved on 15th March, 2004, which resulted in a loss of Rs. 30,000. On that date the capital A/C of A showed a credit balance of Rs. 20,000 and that of B a credit balance of Rs. 30000. The cash account has a balance of Rs. 20000. You are required to pass the necessary journal entries for the (i) Transfer of loss to the capital accounts and (ii) making final payment to the partners.

Q.8 What journal entries would be passed in the books of A and B who are partners in a firm, sharing profits in the ratio of 5:2, for the following transactions on the dissolution of the firm after various assets (other than cash) and third party liabilities have been transferred to Realisation Account?

(a) Bank loan Rs. 12,000 is paid.
(b) Stock worth Rs. 6000 is taken over by B.
(c) Loss on Realisation Rs. 14,000.
(d) Realisation expenses amounted to Rs. 2,000, B has to bear these expenses.
(e) Deferred Revenue Advertising Expenditure appeared at Rs. 28,000.
(f) A typewriter completely written off in the books of the firm was sold for Rs. 200.

Answer Key

DISSOLUTION OF PARTNERSHIP FIRM

Ans. 1 In case of dissolution of partnership, the firm may continue its business operation but in case of dissolution of partnership firm, the business operations are discontinued.

Ans. 2 Realisation account is prepared to ascertain profit or loss on sale of assets and payment of liabilities.

Ans. 3 Realisation Account is prepared on dissolution of partnership firm and Revaluation account is prepared on reconstitution of partnership firm.

Ans. 4. Cash A/C Dr. 11400

To Realisation A/C 11400

(For debtors realized on dissolution of firm)

Ans. 5. Kamal's capital A/C Dr. 4000

To cash A/C 4000

(for final payment to Kamal)

Ans. 6. (i) A's capital A/C Dr. 15000

B's capital A/C Dr. 15000

To realization A/C 30000

(For transfer of loss on dissolution)

(ii) A's capital A/C Dr. 5000

B's capital A/C Dr. 15000

To cash A/C 20000

(For final payment to partners)

Ans. 7.

	JOURNAL		

		Dr. (Rs)	Cr. (Rs.)
(a)	Realisation A/C Dr. To Bank A/C	12000	 12000
(b)	B's capital A/C Dr. To realisation A/C	6,000	 6,000
(c)	A's capital A/C Dr. B's capital A/C Dr. To Realisation A/C	10,000 4,000	 14000
(d)	B's capital A/C Dr. To bank A/C	2,000	 2,000
(e)	A's capital A/C Dr. B's capital A/C Dr. To deferred revenue advertising expenditure A/C	20,000 8,000	 28,000
(f)	Bank A/C Dr. To realisation A/C	200	 200

Issue of Debentures

1. Pass journal entries for the following at the time of issue of debentures:

(a) B Ltd. issues 30,000, 12% Debentures of Rs. 100 each at a discount of 5 % to be repaid at par at the end of 5 years.

(b) E Ltd. issues Rs. 60,000, 12% Debentures of Rs. 100 each at a discount of 5 % repayable at a premium of 10% at the end of 5 years.

(c) F Ltd. issues Rs. 70,000, 12% Debentures of Rs. 100 each at a premium of 5 % redeemable at 110%.

2. Star Ltd. Issued Rs80,000, 11% debentures of Rs100 each at par ,redeemable at 6% premium. Pass the journal entries in the books of the company for the issue of Debentures.

Answer Key

1. Journal of B Ltd.

(a)

(i) Bank A/C	Dr. 28,50,000	
To. Deb. Application & Allotment A/C		28,50,000
(ii) Deb. Application & allotment A/C	Dr. 28,50,000	
Discount on issue of Debentures	Dr. 1,50,000	
To 12 % debentures A/C		30,00,000

(b)

(i) Bank A/C	Dr. 57,000		
To. Deb. Application & Allotment A/C		57,000	
(ii) Deb. Application & allotment A/C	Dr. 57,000		
Loss on issue of Debentures A/C	Dr. 9,000		
To 12 % debentures A/C		60,000	
To Debenture Redemption Premium A/C			6000

(c) Journal of F Ltd.

(i) Bank A/C	Dr. 73,500		
To. Deb. Application & Allotment A/C		73,500	
(ii) Deb. Application & allotment A/C	Dr. 73,500		
Loss on issue of Debentures A/C	Dr. 7,000		
To 12 % debentures A/C		70,000	
To Securities premium A/C			3,500
To Debenture Redemption Premium A/C			7,000

2. Bank A/C Dr. 80000
To Debenture Application and Allotment A/C 80000
( )
Debenture Application and Allotment A/C Dr.80000
Loss on issue of debentures A/C Dr. 4800
To 11% Debentures A/C 80000
To premium on Redemption of Debenture A/C 4800

Comparative and Common Size Statements

1. Name two tools of Financial Analysis?

2. Which item is assumed to be 100 in the case of common size Income statement?

3. Prepare a 'Comparative Statement of Profit and Loss' from the following information for the years ended March 31, 2021 and 2022.

Particulars	**2021(Rs.)**	**2022(Rs.)**

1.Net Revenue from operation	8,00,000	10,00,000
2.Cost of revenue from operation	4,80,000	6,00,000
3.Profit before tax	3,20,000	4,00,000
4.Income Tax	1,60,000	1,60,000
5. Profit after tax	1,60,000	2,40,000

4.

Prepare a common size Balance Sheet of KJ Ltd. from the following information :

	Particulars	Note No.	31.3.2017 ₹	31.3.2016 ₹
I – Equity and Liabilities :				
1.	Shareholder's Funds		8,00,000	4,00,000
2.	Non-Current Liabilities		5,00,000	2,00,000
3.	Current Liabilities		3,00,000	2,00,000
	Total		16,00,000	8,00,000
II – Assets :				
1.	Non-Current Assets		10,00,000	5,00,000
2.	Current Assets		6,00,000	3,00,000
	Total		16,00,000	8,00,000

Answer Key

Ans:1 (i) Comparative Financial Statements.
(ii) Ratio Analysis etc.

Ans:2 Revenue from Operations/Sales.

Ans:3 Percentage of Change –
Net Revenue from operation 25%
Cost of revenue from operation 25%

Profit before Tax 25%

Income Tax 0%

Profit after Tax 50%

Ans.4.

	2016	2017
Shareholders Fund	50%	50%
Non-current liabilities	25	31.25
Current liabilities	25	18.75
Non-current Assets	62.5	62.5
Current Assets	37.5	37.5

Cash Flow Statement

1. Why is the cash flow statement not a suitable judge of profitability?

2. Under which accounting standard, cash flow statement is prepared?

3. Why do we add back depreciation to net profit while calculating cash flow from operating activities?

4. How will you classify loans given by Birla Finance Ltd. While preparing cash flow statement.
5. How will you classify deposits by customers in HDFC Bank while preparing cash flow statement?

6. Where will you show purchase of computer in cash flow statement?
7. Give two examples of 'Significant non cash transactions'.
8. How will you classify loans given by Tata Manufacturing Company?
9. A company receives a dividend of Rs. 2 Lakhs on its investment in other company's share will it be Cash inflow from operating or investing activities in case of
a.Finance Company.
b.Non-Finance Company.

10. How are various activities classified as per AS-3 (Revised) ?
11. Cash flow from operating Activities + Cash flow from Investing Activities + Cash flow from Financing Activities =……
12. What are the two methods which can be employed to calculate net cash flow from operating activities?
13. Following is the Balance sheet of Gagan Ltd. as at 31.3.2011 and 31.3.2012:

Particulars	Note no.	31.3.2011	31.3.2012
I EQUITY AND LIABILITIES			
Shareholders fund			
Share capital		3,00,000	4,00,000
Reserve and surplus	1	50,000	3,20,000
Noncurrent liabilities			
Long term borrowings:			
10% Debentures		2,00,000	60,000
Current liabilities			
Trade payables		1,00,000	1,20,000
Short term Provisions	2	20,000	50,000
TOTAL		**6,70,000**	**9,50,000**
II ASSETS			
Non-current assets			
Fixed assets	3	5,00,000	6,40,000
Current assets			
Inventory		50,000	1,00,000
Trade receivable		1,00,000	1,70,000
Cash and cash equivalents		20,000	40,000
TOTAL		**6,70,000**	**9,50,000**

Notes to Accounts

Particulars	**31-3-2011**	**31-3-2012**
1.Reserve and surplus:		
Surplus,i.e Balance in statement ofProfit & loss	50,000	3,20,000
2.Short-Term Provisions:		
Prov. For Tax	20,000	50,000
3.Fixed assets		
Machinery	5,80,000	7,60,000
Less: Accumulated depreciation	(80,000)	(1,20,000)

Additional information:-
During the year machine costing Rs 3,00,000(acc. Dep. Rs. 50,000) was sold for Rs. 2,40,000 .

Prepare a cash flow statement

Answer Key

Ans:1 Cash Flow statement is prepared on cash basis of accounting but profit is calculated on accrual basis. So cash flow statement is not a judge of profitability.
Ans:2 Under accounting standard-3(Revised).
Ans:3 Depreciation reduces the net profit without reducing the cash balance as it is a non-cash item.
Ans:4 As Operating Activities.
Ans:5 Operating Activities.
Ans:6 As Outflow under Investing Activities.
Ans:7 Give any two examples-
Acquisition of fixed asset by issue of debentures or shares.
Conversion of debentures into shares.
Ans:8 Classified as Financing Activities.
Ans:9 It will be operating activities in case of a finance company and investing activities in case of
Non-Financing Company.
Ans:10 (i) Operating Activities.
(ii)Investing Activities.
(iii)Financing Activities.
Ans:11 …= Net Increase /Decrease in cash and Cash Equivalents.
Ans:12 Direct Method and Indirect Method.
Ans. 13. Cash Flow from Operating activities Rs 3,20,000.
Cash used in Investing activities Rs 2,40,000.
Cash used in Financing activities Rs 60,000

SAMPLEQUESTIONPAPER

Class-XII

Term-II(2021-22)

Subject:Accountancy(055)

Time Allowed:2Hours **Max.Marks:40**

General Instructions:

This question paper comprises two Parts – A and B. There are 12 questions in the question paper. All questions are compulsory.
Part- A is compulsory for all candidates.
Part- B has two options i.e. (i)Analysis of Financial Statements and (ii)Computerized Accounting. Students must attempt only one of the given options.
Question nos. 1 to 3 and 10 are short answer type–I questions carrying 2 marks each.
Questionnos. 4 to 6 and 11 are short answer type–II questions carrying 3 marks each.
Question nos. 7 to 9 and 12 are long answer type questions carrying 5 marks each.

There is no overall choice. However, an internal choice has been provided in 3 questions of three marks and 1 question of five marks.

PartA

(**Accounting for Not-for-Profit organizations**, **Partnership firms and Companies)**

Following information has been provided by M/s Achyut Health Care.You are required to calculate the amount of medicines consumed during the year 2020-21:

Particulars	**Amount(₹)**
Stock of medicines as on April 1, 2020Creditors for medicines as on April 1,2020Stock of medicines as on March 31,2021Creditors for medicines as on March31, 2021Cash purchases of medicines during the year 2020-21 Credit purchases of medicines during the year 2020-21	15,00,000 3,50,000 10,00,000 4,20,000 2,00,000 6,00,000

(2)

Distinguish between 'Dissolution of Partnership' and 'Dissolution of Partnership Firm' based on:
Settlement of assets and liabilities
Economic relationship

Suresh, Ramesh and Tushar were partner of a firm sharing profits in the ratio of 6:5:4. Ramesh retired and his capital after making adjustments on account of reserves, revaluation of assets and reassessment of liabilities stood at ₹2,50,400. Suresh and Tushar agreed to pay him₹2,90,000 in full settlement of his claim.

Pass necessary journal entry for the treatment of goodwill. Show working clearly. (2)

From the following information given by Modern Dance Academy, calculate the amount of Subscription received during the year 2020-21.

Subscription credited to Income & Expenditure A/c for the yearending31stMarch,2021 amounted to ₹3,00,000 and each member is required to pay annual subscriptionof₹3,000.
Subscription in arrearsas on1stApril2020 amounted to ₹16,000.
During the year 2020-21, 10 members made partial payment of
₹26,000 towards subscription, 8 members failed to pay the subscription amount and 5 member paid the subscription amount for the year 2021-22.
During the year 2019-20, 12 members paid the subscriptionamountfor the year 2020-21.

OR

Following information is given by Alchemy Medical College, Library department for the year 2020-21.

Particulars	**Amount(₹)**
Books and Journals Fund as on 1.4.2020	4,50,000
7% Books and Journals Fund Investments as on 1.4.2020	4,00,000
Interest on Books and Journals Fund Investments	13,000
Donations for Books and Journals Books Purchased	20,000
General Fund as on 1.4.2020	70,000
	10,00,000

Show the accounting treatment of the above-mentioned items in the Balance Sheet of the Alchemy Medical College as at 31st March,2021.
(3)

Harihar, Hemang and Harit were partner switch fixed capitals of ₹3,00,000,₹2,00,000 & ₹1,00,000 respectively.They shared profits in the ratio of their fixed capitals. Harit died on 31stMay, 2020, whereas the firm closes its books of accounts on 31stMarch every year. According to their partnership deed, Harit's representatives would been titled to get share in the in term profits of the firm on the basis of sales. Sales and profit for the year 2019-20 amounted to ₹8,00,000 and ₹2,40,000 respectively and sales from 1st April, 2020to 31st May 2020 amounted to ₹ 1,50,000. The rate of profit to sales remained constant during these two years. You are required to:

(i) Calculate Harit's share in profit.

(ii) Pass journal entry to record Harit's share in profit.

(3)

2. Vedesh Ltd. purchased a running business of Vibhu Enterprises for a sum of ₹12,00,000. Vedesh Ltd. Paid ₹60,000 by drawing a promissory note in favour of Vibhu Enterprises., ₹1,90,000 through bank draft and balance by issue of 8% debentures of ₹100 each at a discount of 5%. The assets and liabilities of Vibhu Enterprises consisted of Fixed Assets valued at ₹ 17,30,000 and Trade Payablesat₹ 3,20,000.

You are required to pass necessary journal entries in the books of VedeshLtd.

OR

Youth Ltd. Took a loan of ₹15,00,000 from State Bank of India against the security of tangible assets. In addition to principal security, it issued 10,00011% debentures of ₹100 each as collateral security.

Pass necessary journal entries for the above transactions, if the company decided to record the issue of 11% debentures as collateral security and show the presentation in the Balance Sheet of Youth Ltd. (3)

3. Madhav, Madhusudan and Mukund were partners in Jaganath Associates. They decided to dissolve the firm on 31stMarch 2021. Pass necessary journal entries for the following transactions after various assets (other than cash) and third-party liabilities have been transferred to realization account:

(i) Old machine fully written off was sold for ₹ 42,000 while a payment of ₹6,000 is made to bank for a bill discounted being dishonoured.

(ii) Madhusudan accepted a nun recorded asset of ₹80,000 at ₹75,000 and the balance through cheque, against the payment of his loan to the firm of ₹1,00,000.

(iii) Stock of book value of ₹30,000 was taken by Madhav, Madhusudan and Mukund in theirprofit sharing ratio.

(iv) The firm had paid realization expenses amounting to ₹5,000 on behalf of Mukund.

(v) There was a vehicle loan of ₹ 2,00,000 which was paid by surrender of asset to the bank at an agreed value of ₹1,40,000 and the short fall was met from firm's bank account.

OR

Gini, Bini and Mini were in partnership sharing profits and losses in the ratio of 5:2:2. Their Balance Sheet as at 31st March, 2021was as follows:

Balance Sheet as at 31st March,2021

Liabilities	Amount (₹)	Assets	Amount (₹)
Sun dry Creditors	56,500	Cash	1,17,300
Bank Overdraft	61,500	Debtors 38,000 Less: Provision For Doubtful Debts	
Workmen's Compensation Reserve	32,000	(2,300)	35,700
Capitals:		Inventories	1,34,000
Gini 4,60,000		Machinery	1,00,000
Bini 3,00,000		Furniture	1,80,000
Mini 2,90,000	10,50,000	Building	5,70,000
		Goodwill	63,000
	12,00,000		12,00,000

On 31st March, 2021, Gini retired from the firm. All the partners agreed to revalue the assets and liabilities on the following basis:

(i) Bad debts amounted to ₹ 5,000. A provision for doubtful debts wastobe maintained at 10% on debtors.

(ii) Partnershave decided to write off existing good will.

(iii) Goodwill of the firm was valued at ₹ 54,000 and be adjusted into the Capital Accounts of Bini and Mini, who will share profits in future in the ratio of 5:4.

(iv) The assets and liabilities valued as: Inventories ₹1,30,000; Machinery ₹82,000; Furniture ₹1,95,000 and Building ₹6,00,000.

(v) Liability of ₹23,000 is to be created on account of Claim for Workmen Compensation.

(vi) There was an unrecorded investment in shares of ₹ 25,000. It wasdecided to pay off Gini by giving her unrecorded investment in full settlement of her part payment of ₹ 28,000 and remaining amount after two months.

Prepare Revaluation Account and Partners' Capital Accounts as on 31stMarch,2021. (5)

4. Yogadatra Ltd. (pharmaceutical company) appointed marketing expert, Mr.Kartikay as the CEO of the company, with at argettopenetrate their roots in the rural regions. Mr. Kartikay discussed the ways and means toachieve target of the company with financial, production and marketing departmental heads and asked the finance manager to prepare the budget. After reviewing the suggestions given by all the departmental heads, the finance manager proposed requirement of an additional fund of ₹52,50,000.

Yogadatra Ltd. is a zero-debt company. To avail the benefits of financial leverage, the finance manager proposed to include debt in the capital structure. After deliberations, on April1, 2020, the board of directors had decided to issue 6% Debentures of ₹100 each to the public at a premium of 5%, redeemable after 5 years at ₹110 pershare.

You are required to answer the following questions:

(i) Calculate the number of debentures to be issued to raise additional funds.
(ii) Pass Journal entry for the allotment of debentures.
(iii) Pass Journal entry to write off loss on issue of debentures.
(iv) Calculate the amount of annual fixed obligation associated with debentures.
(v) Prepare Loss on Issue of Debentures Account. (5)

5. From the following Receipts and Payments Account and additional information provided by Ramanath Club, Prepare Income and Expenditure Account for the year ending on 31stMarch 2021.

Receipts and Payments Account for the year ending 31st March 2021

Receipts	Amount(₹)	Payments	Amount(₹)
ToBalanceb/d	48,000	BySalariesandWages:2019-20	
ToSubscription	95,000	10,600	
ToEntranceFee	1,56,000	2020-21 1,03,200	1,13,800
ToLockerrent	50,000	BySundryexpenses	47,000
To Interest on 8% govt. Securities	5,400	ByRefreshmentexpenses	60,400
ToRevenuefromrefreshment	52,000	ByTelephonebillBy	5,000
ToSaleofoldnewspapers	4,600	Rent &	24,000
ToSaleoffurniture		RatesByLibraryBook	25,000
(Bookvalue:₹11,000)	12,000	By8%Govt.SecuritiesByHonorarium	30,000
		toSecretaryByBalance c/d	5,000
			1,12,800
	4,23,000		4,23,000

Additional Information:

(i) Subscription received during the year includes ₹25,000 as donation for Building.
(ii) Telephone bill unpaid as on March31, 2020 was ₹4,000 and on March31, 2021 ₹2,600.
(iii) Value of 8% Government Securities on March31, 2020 was ₹80,000.
(iv) Additional Government Securities worth ₹30,000 were purchased on March31, 2021.
(5)

Part-B

Option-I

(Analysis of Financial Statements)

6. State whether the following transactions will result in inflow, outflow ornoflow ofcash while preparing cash flow statement**:**
(i) Decrease in outstanding employees benefits by ₹3000
(ii) Increase in Current Investment by ₹6,000. (2)

7. From the following details provided by Kumud Ltd., prepare Comparative Statement of Profit & Loss for the year ended 31st March2021:

Particulars	31.03.20 (₹)	31.03.21 (₹)
Revenue from operations	30,00,000	35,00,000
Other Income	3,00,000	4,50,000
Cost of materials Consumed Other	20,00,000	23,00,000
Expenses	1,00,000	1,20,000
Tax rate	40%	40%

OR

From the following Balance Sheets of Vinayak Ltd. As at 31stMarch, 2021, Prepare a Common-size Balance Sheet.

Vinayak Ltd.
Balance Sheet as on 31st March, 2021

Particulars	Note no.	31.3.2021 (₹)	31.3.2020 (₹)
IEQUITY AND LIABILITIES			
1.Shareholder's Funds:			
a.Share Capital		30,50,000	20,00,000
b.Reserve and Surplus		2,80,000	6,00,000
2.Current Liabilities:			
a.Trade Payable		6,70,000	4,00,000

Total		40,00,000	30,00,000
IIASSETS			
1.Non-Current Assets:			
a.Fixed Assets:			
i.Tangible Assets		16,00,000	12,00,000
ii.Intangible Assets		2,00,000	3,00,000
2.Current Assets			
a.Inventories		8,00,000	3,00,000
b.Trade Receivables		12,00,000	10,00,000
c.Cash and Cash Equivalents		2,00,000	2,00,000
Total		40,00,000	30,00,000

(3)

8. On the basis of information given by Aradhana Ltd., prepare Cash Flow Statement for the year ending31stMarch, 2021:

Aradhana Ltd.

Balance Sheet as on 31st March, 2021

Particulars	Note No.	31stMarch,2020	31stMarch,2021
I. Equity and Liabilities			
1. Shareholder's Funds			
(a) Share Capital		5,00,000	7,30,000
(b) Reserves and Surplus	1	3,50,000	3,70,000
2. Non-current Liabilities			
Long-term Borrowings	2	4,00,000	2,00,000
3. Current Liabilities			
(a) Trade Payables	3	3,60,000	4,60,000
(b) Short Term provisions	4	3,25,000	3,20,000
Total		19,35,000	20,80,000
II. Assets			
1. Non-currentAssets(a)			
Fixed Assets			
(i) Tangible Assets	5	4,50,000	5,00,000
(ii) Intangible Assets	6	3,10,000	3,02,000
(b)Long-term Loans and Advances		4,00,000	4,30,000
2. Current Assets			
(a) Inventories		2,70,000	2,90,000
(b) Trade Receivables		2,40,000	2,60,000
(c) Cashand Cash Equivalents		2,65,000	2,98,000
Total		19,35,000	20,80,000

Note to Accounts

Particulars	31st March 2020	31stMarch2021

1.	Reserves and Surplus Statement of Profit and loss	3,50,000	3,70,000
2.	Long-term Borrowings 10% Debentures	4,00,000	2,00,000
3.	Trade Payables		
	Creditors	2,40,000	2,60,000
	BillsPayable	1,20,000	2,00,000
		3,60,000	4,60,000
4.	Short-Term Provisions		
	Provision for Tax	3,25,000	3,20,000
5.	Tangible Fixed Assets		
	Machinery	5,50,000	6,60,000
	Less: Provision for Depreciation	1,00,000	1,60,000
		4,50,000	5,00,000
6.	Intangible Fixed Assets		
	Patents	3,10,000	3,02,000

Additional Information:

1. Debentures were redeemed on1st April, 2020.
2. Tax paid during the year ₹2,80,000. (5)

(Computerized Accounting)

10. What do you understand by terms 'primary key' and 'secondary key' in a database? (2)

11. State any three features of computerized accounting system.

Or

State any three advantages of computerized accounting system. (3)

12. Name and explain the function which returns the future value of an investment which has constant payment and interest. (5)

BUSINESS STUDIES

UNIT 6: STAFFING

1. What is Job description?
2. What does the Aptitude test measure?
3. It helps the staffing personnel to state whether the organization is over, under or optimally staffed. Identify the concept.
4. Ramesh is working under the guidance of Harish, a carpenter. For the last three years to learn the different skills of this job. Name the method of training Ramesh is undergoing?
5. What is meant by recruitment?
6. Which functions of management helps in obtaining right people and putting them on the right jobs? Explain any four points of importance of this function?
7. Blue Heavens Ltd purchased a new Hi-tech machine From Germany for manufacturing high quality auto components in an effective manner. But during the production process, the manager observed that the quality of production was not as per standard. On investigation it was found that there was lack of knowledge amongst the employees of using hi-techmachines. So, frequent visit of engineers was required from Germany. Suggest what measures can be done to develop the skills and abilities of employees of producing hi-tech machines.
8. Explain the methods of training.
9. Give the meaning of staffing and explain its importance.
10. Give the difference between internal and external sources of recruitment.
11. Give the difference between recruitment and selection.
12. Explain commonly used external sources of recruitment.
13. Write any three merits and limitations of external sources of recruitment?
14. What is meant by selection? Explain the steps in the process of selection.

Answer key

1. Job description is the concept that provides the details about the vacancies available in terms of the desired qualifications, experience, personality characteristics and so on.
2. It measures the ability of a candidate to acquire the new skills.
3. Workforce analysis
4. Apprenticeship training
5. Recruitment has been defined as 'the process of searching for prospective employees and stimulating them to apply for jobs in an organisation.'
6. **Staffing Function.**

Importances of Staffing are:

(a) Fulfilling job with competent Personnel: Staffing helps in selection of right person for right job. The staffs selected is according to need of the job which in result helps in smooth functioning of the enterprise

(b)-Better Performance: The staff selected is according to them need of the job. The person selected will be expertise in his field resulting inbetter job performance with fewer chances of mistakes.

(c) Expansion and Growth an organization having capable employees will lead to the pathof growth and development. Able employees which are the real asset of the enterprise take their firm to the heights of development.

(d) Improves Job Satisfaction and morale. A person when selected for right job tries to give his 100% in his working. This is because he is fully satisfied with his job which is very much necessary. It will boost his performance and he will prove to be the real asset of the firm.

7. Training of employees.

Advantages of Training.

1. **Increase in capacity and efficiency**: Through training, one learns the art of doing a special job methodically. It increases the skill and efficiency of the employee
2. **Increase in market value**: Trained employees have a better market value. Increased market value means that other organization is always willing to employ trained personnel at higher remuneration.
3. **Fewer accidents**: Reduction of accidents is not only beneficial to the organization; it also protects the life of the workers. By learning the art of operating the machine the rate of accident can be minimized.
4. **Job satisfaction**: In the life of an employee, job satisfaction is most important. It means that whatever job he is performing, he should be fully satisfied with it.

8. Training is imparted to the employees through two methods

1. On the job methods of training

2. Off the job methods of training

On the job method of training: Under this method the trainers are asked to do a particular job on a machine or in a workshop. They are taught the techniques of operating a machine orusingtools andequipmentsby anexperiencedemployeeoraspecial supervision

Main methods of on the job training are:

1. Apprenticeship programme: Organisation conducts apprenticeship programme to impart higher level of skill. Generally, this training programme is conducted for those jobs, which are of complicated in nature. In this method, trainee has to work with a experienced guide or trainer for a prescribed time.

2. Internship training: It is a joint training programme, in which educational institutions and business firms cooperate. Selected candidates carry on regular studies for the prescribed period. They also work in some factory or office to acquire practical knowledge and skills.

3. Job rotation: This kind of training involves shifting the trainee from one department to another or from one job to another. This enables the trainee to gain a broader understanding of all parts of the business operations.

Off the job method of training: Under this method, training is imparted to the trainees at a particular place other than the place of work. This training is given in special seminars, classers etc. During the course of this training, both the theoretical and the practical information is conveyed to the trainee.

The main method of off the job training is Vestibule Training: Under this method, with

a view to imparting training to new employees, a separate training center is set up. An experienced and trained trainer is appointed as an in charge of this centre. Machines, tools and other equipments are so arranged in this centre as to present a look of a workshop.

9. **Meaning: It is the process of management** which is concerned with obtaining and maintaining a satisfactory and satisfied work force

Importance of Staffing

Obtaining competent personnel: Proper staffing helps in discovering and obtaining competent personnel for various jobs.

Higher performance; Proper staffing ensures higher performance by putting right person on the right job.

Continuous survival and growth: Proper staffing ensures continuous survival and growth of the enterprise, research & development, innovation.

Optimum utilization of human resources: Proper staffing helps to ensure optimum utilization of human resources. By avoiding over manning, it prevents underutilization of personnel and high labour costs. At the same time, it avoids disruption of work by indicating in advance the shortages of personnel.

Improve job satisfaction: Proper staffing improves job satisfaction and morale of employee through objective assessment and fair rewarding of their contribution.

Helps in achieving organizational goals: The efficiency and effectiveness of an organization in achieving its goals is determined to a great extent on the competence, motivation and general effectiveness of its human resources.

Human resources are the foundation of any business. The right people can help a business to take it to the top where the wrong people can break the business. With efficient and competent personnel, the firm can maintain quality products and sell them profitably.

Conclusion: Staffing function must be performed efficiently by all organizations. If right kind of employee is not available, it will lead to wastages of materials, time, efforts and energy, resulting in lower productivity.

It is, therefore, essential that right kind of people must be available in right number at the right time.

10.

Basis	Internal Source	External Source
Nature of process	It is a quick process	It is lengthy process
2. Economy	This process is cheaper	This process is costly
3. Effect on staff	The existing staff is motivated	The existing staff dissatisfied
4. Quality of recruitment	Choice of candidate is limited. Less fresh talent.	More talented fresh candidate available.
5. Time involved	It is less time consuming process	It is more time consuming process.

11.

Basis	Recruitment	Selection
1. Meaning	It is the process of searching candidates for vacant jobs and persuading them to apply for the same.	It is the process of selection of right types of candidates and offering them jobs.
2. Process	It is a positive thinking process.	It is negative thinking process.
3. Purpose	It's aims to attract more and more candidates for the vacant jobs.	It aims to reject unsuitable candidate.
4. Sequence	It takes place prior to selection.	It is alone after the recruitment
5. Number	No restriction on the number of candidates	Only a limited number of candidates are selected.

12. The commonly used external sources of recruitment are discussed below:

1. Direct recruitment:

Under the direct recruitment, a notice is placed on the notice – board of the enterprise specifying the details of the jobs available. Job- seekers assemble outside the premises of the organization on the specified date and selection in done on the spot. This method is used to recruit unskilled and semiskilled workers.

2. Casual callers:

Many-reputed organizations regularly receive a large no. of application of job. These unsolicited applications are kept and when required, these lists are screened for recruitment purpose.

3. Advertisement:

Advertisement in newspapers is a good source for the recruitment of senior position of industry and commerce. It provides a wide choice to organization.

4. Employment exchange:

Employment exchanges run by the government are regarded as good source of recruitment for unskilled and skilled operative jobs. In some cases, law requires compulsory notification of vacancies to employment exchange.

5. Placement agencies and management consultants:

Placement agencies provide a nationwide service in matching personnel demand and supply. These agencies compile bio – data of a large no. of candidates and recommend suitable names to their client.

Management consultants firm help the organizations to recruit technical, professional and managerial personnel. They specialise in middle and top level recruitment and placements.

6. Campus recruitment:

Many big organizations maintain a close liaison with the universities, vocational

schools and management institutes to recruit qualified personnel for various jobs. This refers to campus recruitment.

7. Recommendations of employees:

Some times organisation asks preset employees to recommend the name of eligible and efficient candidates. It helps in primary screening because organisation knows both present employee and the candidates.

8. Labour contractors:

In this source of external recruitment, workers are recruited through labour contractors who are themselves employees of the organisation. This source is suitable for recruitment of unskilled workers at short notice.

8. Advertising on television:

In this source, organisation gives advertisement for vacant vacancies on television with detailed requirement of job and qualities required. This is good source for recruiting qualified people.

9. Web publishing:

Now a day there certain websites specifically designed and dedicated for purpose of providing information about both job seekers and job opening e.g. Naukri.com. Monsterjob.com. organisation can use these sites for recruiting the personnel for managerial job.

13. Merits of external sources:

1. It helps organization in selection of qualified personnel,
2. It provides wider choice to organization,
3. It brings fresh talent or new blood in organization
4. It motivates existing employees to increase their productivity.

Limitation of external sources:

1. It creates dissatisfaction among existing staff,
2. Organization has to wait for long time for starting selection.
3. Organization has to spend a lot of money on advertisement and processing of applications.

14. Selection is the process of identifying and choosing the best person out of a number of prospective candidates for a job.

It is called a negative process because some candidates are eliminated in each step of selection procedure.

Selection process:

:

1. Preliminary screening:

Selection process starts with eliminating unqualified or unfit job seekers based on the information supplied in the application form.

2. Selection test:

In this steps, organisation conduct different written test to measure certain characteristics of candidates. These tests are for measuring intelligence, aptitude, personality, trade, interest etc.

3. Employment interview:

Organisation conducts employment interview, for those candidates who have passed selection test, to evaluate their suitability for the job.

4. Reference and background checks:

Most of employers ask for names, address and telephone numbers of references for verifying information on an applicant.

5. Selection decision:

Now, organisation takes decision to select those applicants who are successful in previous steps.

6. Medical examination:

Applicants, who are selected, are required to undergo a medical fitness test.

7. Job offer:

Now, organisation make job offer through letter of appointment/confirm his acceptance with stipulated time to submit their acceptance.

8**. Contract of employment:**

In this step, organisation prepare contract of employment. It shows detail about job title, duties, responsibilities, date of continuous employment etc.

UNIT 7: DIRECTING

Q.1: Explain the formal communication network? Write its Feature.

Q.2. Mr Ekant Miglani, after completing his studies of B.B.A is working in the Production Department of 'jai chemicals limited'. There are fifty persons working at different posts in this Department. He tries hard to keep a watch over the Routine Activities of all the employees. He observed one of the employees, Bholoram and a few others working on machines. They were running the machines in a wrong manner. The machines were very sophisticated. Mr Miglani at once explained the right method of working to them. He wanted to solve this problem of the employees for good. He called a meeting of his subordinates. He took this decision that the company will have to organize training of the employee immediately. They also decided all the employees will drop a suggestion each in the suggestion-box daily, so that the different activities of the department may be improved speedily. It was announced that the employees giving valuable suggestions shall be rewarded. On the basis of the above paragraph answer the following question:

(a) WhichfunctionofmanagementisbeingdischargedbyMrMiglanibykeepinga watchovertheRoutineActivities?

(b) WhichmethodoftrainingoftheemployeeswillbesuitabletobeadoptedhereExplain.

(c) WhichstyleofleadershipisbeingfollowedbyMrMiglani?

(d) Which methodof motivation willbedecidedtobeadoptedinthemeetingof employees?

Q.3. FivestudentsofBBAtookpartinadiscussion.Thesubjectoftheirdiscussionwas:"Why dopeoplegetmotivatedtodoanything?" Themainportionsoftheirdiscussionareas under:

The first student said,"Peopleworkbecausetheywanttodepositwealthenough toprotectthemselvesfromdiseasesandtoberelievedofthetensionofoldage."

Thesecondstudentsaid, "Peopleworkbecausetheywanttoarrangefood,clothand shelterforthemselvesatanyrate."

The third student said, “People work because they want to reach the top of the field in which they are.They, therefore, put in untiring efforts.”

The fourth student said, “People work, so that when they have money, people will become friendly with the m and they will stand by them through think and thin.”

The fifth student said, “People work, so that they may get respect in the society and that they may be recognize as exceptional persons.”

The discussion given above relates to which function of management?
The five friends spoke about the different needs of people as the basis of their doing work. Identify these needs.
Q4: Discuss six monetary Incentives.
Q5. Explain various leadership styles.
Q6. What is meant by directing? Explain the importance of directing.
Q7. Write the meaning of supervision.
Q.8. Communication serves as the lubricant fostering for the smooth operations of the management process. Give reason in support of above statements?
Q.9. Mrs. Rajlaxmi is working as the Human Resource Cosultant in a firm manufacturing cosmetic, which is facing a problem of high employee turnover. The CED of the company has invited suggestions from her for retaining the talented employees & reducing the employee turnover. Mrs. Rajlaxmi recommends that the good employees be rewarded in a way that it creates a feeling of ownership among the employees and at the same time makes them contribute towards the growth of the organization.
(a) Identify the incentive and explain its type, which has been suggested by Mrs. Rajlaxmi to the CEO of the company.
(b) Also explain any two other incentives of the same type.

Q10 Sunidhi has started a designer studio in the basement of her residence after completing her masters in fashion designing. She has appointed ten employees to take care of the various aspects of the work. She interacts regularly with each employee to tell exactly what is expected of him/.her and what he/she needs to do to be regarded as a good performer. At the same time she allows a free work environment wherein the employees openly chit chat with each other in order to fulfill their social and emotional needs. Sometimes, these interactions also lead to spreading rumors which are not authentic.
In the context of the above case:
Name and explain the two types of communication being referred to in the above paragraph.

Q11. Roshan is the chief of „Khidmat“ restaurant located in the city of Bangaluru. The place is known for its exquisite Mughlai cuisine especially mutton briyani and kababs. All the food is prepared under Roshan‟s purview. The various activities in the kitchen are initiated in accordance to his instructions. He is very clear and specific in issuing instructions to his subordinates in order to ensure smooth working of the department.

He personally oversees the method followed by the chefs for preparation of each dish. He misses no opportunity to praise his subordinates for their good work. All his team members feel very happy and satisfied under his direction. He provides constant guidance to them in order to improve upon its taste and presentation and also encourages them to innovate and be more creative in their work.
In the above context:
Identify the various elements of directing mentioned in the above paragraph by quoting lines from the paragraph.

Answer key

Ans1: It refers to the communication within organization that is officially sanctioned.
Features:

(a)Write ten and oral. It can be both in written or oral. Daily works are handed through oral communication while the policy matters require written communication.

(b)Formal Relations: This communication is adopted among those employees where formal relation shave been established by the organization. The sender and the receiver have some sort of organizational relation.

(c)Prescribed path: The communication has to pass through a definite channel while moving from one person to another For example to convey the feelings of a worker to the manager, their foreman's help has to be sought.

(d) Organizational message. This channel is concerned with the authorized organizational messages only and the personnel messages are out of its jurisdiction.
Ans2: Supervision.
(b) Here the **Vestibule training Method** will be suitable to be adopted. Under this training method a separate training centre is set up. In this centre factory like atmosphere or circumstances is / are created and the employees are trained to work on sophisticated machines.
(c) Democratic Leadership Style.
(d) Employee Recognition Programme.
Ans3. (a) Motivation
(b) First friend: Safety Needs
(c) Second friend: Physiological Needs
(d) Third friend: Self Actualization Needs
(e) Fourth friend: Social Needs
(f) Fifth friend: esteem needs

Ans. 4. The incentives that have a monetary and financial benefit are called financial incentives. They are

a) Profit sharing: It has been accepted that the profit earned by the firm is also due to the effort put by the workers. So they have a full right to receive a share in it.It is an effective incentive which satisfies the workers.

b) Co-partnership: Under this system, employees share the capitalas well as the profits. Under employees stock option plan the workers are given shares. They are also given Bonus shares and they share the ownership of the firm. It motivates them as they share the profits too.

c) Productivity linked wages: Under this system, a sales person is guaranteed a minimum wage as well as commission on sales. A commission plan motivates him to work better.

d) Suggestion system: Valuable suggestions are accepted and the most valuable ones a real so rewarded with cash money.

e) Retirement benefits: Every employee wants his future to be secured. The firm provides retirement benefits, pension, provident fund, gratuity etc.

Perks: various perks such as housing, car allowance foreign trips etc can be given to the managers to boost up his morale.

Ans.5. Auto critic leadership: An auto critic leader gives orders and expects that they are obeyed.

He determines the policies forth e group without consulting them. All decision making power is centralized with the leader.

Democratic leadership: In this style, the leader consults with his subordinates on proposed actions and decisions and encourages them to participate in decision making. This improves the attitude of the employees towards their jobs and increases their morale.

Laissez faire leadership: This style gives a high degree off reedom to his subordinates. Group members work themselves as per their own choice and competence. Such a leader avoids use of power. He exist as a contact man with the outsiders to bring information and there sources the group requires for.

Ans6.Meaning of directing: Directing refers to the process of instruction, guiding, counselling, motivation and leading people in the organisation to achieve objectives.

Importance of directing:

1. Help to initiates action: It is directing that initiates action by issuing proper instruction and orders to people in the organisation towards attainment of desired objectives.

2. Integrates employees' efforts: Directing integrates employees' efforts in the organisation towards achievement of common goal by proper leading and motivating.

3. Guide employees in realizing potential: Directing guides employees to realize their potential and capabilities by motivating and providing effective leadership.

4. Facilitates introduction of needed change in organisation: Directing facilitates needed change in organisation by effective motivation, communication and leadership.

5. Brings stability and balance in organisation: Effective directing fosters cooperation and commitment among people and helps to achieve balance among various groups, activities and department.

Ans. 7. Supervision:Supervision means overseeing what subordinates are doing and giving instructions to ensure optimum utilization of resources and achievement of work targets.

Ans.8.It is rightly said. Importance of communication in management can be judged from the following:
1. Acts as basis of coordination: Effective communication systems create mutual understanding about organizational goal, the mode of its achievement and inter-relationship between activities of department and persons in organisation. Thus, it acts as basis of coordination.
2. Helps in smooth working of an enterprise: without communication, no action can be taken in organisation. All organizational interactions and decisions are taken through communication. Thus it helps in smooth working of an enterprise.
3. Acts as basis of decision making: for taking decision, a manager needs all sorts of information. Communication system helps in collection of important information. Thus it acts as basis of decision making.
4. Increases managerial efficiency: communication helps in efficient performance of managerial activities because it is communication system, through that manager conveys the goals and targets, issues instruction, allocates jobs and assess performance of employees.
5. Promotes cooperation and industrial peace: Two way communication systems create mutual understanding between management and workers. This helps in promoting cooperation and industrial peace in organisation.
6. Establishes effective leadership: it is communication skill that makes someone an effective leader. He will be able to influence of behavior of people only through his communication with his subordinates.
7. Boosts morale and provides motivation: a good communication system improves human relations in industry by motivating, influencing and satisfy the subordinates. This helps in boosting morale and provides motivation to both managers and subordinates.

Ans.9.Financial incentives -------Co-Partnership/Stock Option
Other financial incentives:
(i) Pay and allowances: For every employee, salary is the basic financial incentive. It includes basic pay, dearness allowance and other allowance. Pay hike and increments improve performance level of employees.
(ii) Profit sharing: Employees are given a share in the profits of the organization. This motives them to improve their performance and contributes to increase in profits of the organization.
Ans10.The two types of communication being referred to in the above paragraph are formal communication and informal communication.
Formal communication: The communication that flows through official channels designed in the organization structure is called formal communication. This communication may take place between a subordinate and superior or among same team employees or managers. Usually a written record of such communications is maintained, recorded and filed in the office. Formal communication may be further

classified as – Vertical and Horizontal.
Informal communication: Informal communication is the type of communication that takes place without following the formal lines of communication. It is generally referred to as the „grapevine" because it spreads throughout the organization with its branches going out in all directions in utter disregard to the levels of authority. The informal communication arises out of needs of employees to exchange their views, which cannot be done through formal channels.

Ans.11. The various elements of directing mentioned in the above paragraph are as follows:
*Communication:"*He is very clear and specific in issuing instructions to his subordinates in order to ensure smooth working of the department."
Supervision: "He personally oversees the method followed by the chefs for preparation of each dish."
Leadership: "He provides constant guidance to them in order to improve upon its taste and presentation and also encourages them to innovate and be more creative in their work."
Motivation: "He misses no opportunity to praise his subordinates for their good work."

UNIT 8: CONTROLLING

1. Give the meaning of Controlling.

2. Which function of management ensures that actual activities confirm to plan activities?
3. Name the function of management which reviews the operations in a business unit.
4. What is deviation?

5. What is management by exception? 3M
6. What is Critical Point Control?
7. Explain the importance of controlling.
8. Explain the process of controlling?

Answer Key

1.	It is a process of taking steps to bring actual results and desired results closer together.
2.	Controlling
3.	Controlling
4.	Difference between actual performance and standard activities.
5.	Controlling the key areas.
6.	Ans: It is neither economical nor easy to keep a check on each and every activity in an organisation. Controlling should focus on key result areas (KRAs) only which are critical to the success of the organization.
7.	Importance of Controlling are:

	(i) **Accomplishing organisational goals:** It guides the organisation and keeps it on the right track so that organisational goals might be achieved. (ii) **Judging accuracy of standards:** A good control system enables management to verify whether the standards set are accurate and objective. (iii) **Making efficient use of resources:** By exercising control, a manager seeks to reduce wastage and spoilage of resources. Each activity is performed in accordance with predetermined standards and norms. (iv) **Improving employee motivation:** A good control system ensures that employees know well in advance what they are expected to do and what are the standards of performance on the basis of which they will be appraised. It, thus, motivates them and helps them to give better performance. (v) **Ensuring order and discipline:** Controlling creates an atmosphere of order and discipline in the organisation. It helps to minimise dishonest behaviour on the part of the employees by keeping a close check on their activities. (vi) **Facilitating coordination in action:** Controlling provides direction to all activities and efforts for achieving organisational goals. Each department and employee is governed by predetermined standards which are well coordinated with one another.
8.	**PROCESS OF CONTROLLING:** **1. Setting up of performance standards:** Standards are the Criteria against which actual performance would be measured. Standards serve as bench marks. They can be set in both quantitative as well as qualitative. **2. Measurement of actual performance:** Performance should be measured in an objective and reliable manner. **3. Comparing actual performance with standards:** **4. Analyzing deviations:** Major deviation or minor deviation and analyzing the causes of deviation **a) Critical point control:** Focus only on Key Result Areas (KRAs). **b) Management by Exception:** Concentrate only on major deviations only. **5. Taking corrective action:** When deviations go beyond the acceptable range, especially in the important areas, it demands immediate managerial attention so that deviations do not occur again and standards are accomplished.

UNIT 9: Financial Management

1. Define Financial Management. Explain the role of Financial management (any four).
2. Financial management of 'XYZ' Ltd. is concerned with three broad decisions. One of which involves how much amount of profit earned by the company (after paying tax) is to be distributed among the shareholders and how much of it should be retained in the business.

(a) Which financial decision related with the extent of profits to be distributed?
(b)Explain any two factors affecting the above Financing Decision?

3.Madhur Milan is a popular online matrimonial portal . It seeks to provide personalised match making service . the company has 80 offices in India, and is now planning to open offices in Singapore, Dubai and Canada to cater to its customers beyond the country. The company has decided to opt for the sources of Equity capital to raise the required amount of Capital.
State and Explain the type of Risk which increases with the higher use of Debt.
Explain briefly any four factors because of which you think the company has decided to opt for equity capital.

4.You are financial manager of a newly established company. The Directors have asked you to determine the amount of working capital requirement for the company. Explain any four factors that you will consider while determining the working capital requirement for the company.

5.Every manager has to take three major decisions while performing the finance function. Explain them.

6. Somnath Ltd. is engaged in the business of export of garments. In the past, the performance of the company had been upto the expectations. In line with the latest technology, the company decided to upgrade its machinery. For this, the Finance Manager, Dalmia estimated the amount of funds required and the timings. This will help the company in linking the investment and the financing decisions on a continuous basis. Dalmia therefore, began with the preparation of a sales forecast for the next four years. Fie also collected the relevant data about the profit estimates in the coming years. By doing this, he wanted to be sure about the availability of funds from the internal sources of the business. For the remaining funds he is trying to find out alternative sources from outside. Identify the financial concept discussed in the above para. Also state the objectives to be achieved by the use of financial concept, so identified.

7. "A business that doesn't grow dies", says Mr. Shah, the owner of Shah Marble Ltd. with glorious 36 months of its grand success having a capital base of RS.80 crores. Within a short span of time, the company could generate cash flow which not only covered fixed cash payment obligations but also create sufficient buffer. The company is on the growth path and a new breed of consumers is eager to buy the Italian marble sold by Shah Marble Ltd. To meet the increasing demand, Mr. Shah decided to expand

his business by acquiring a mine. This required an investment of RS.120 crores. To seek advice in this matter, he called his financial advisor Mr. Seth who advised him about the judicious mix of equity (40%) and Debt (60%). Mr. Seth also suggested him to take loan from a financial institution as the cost of raising funds from financial institutions is low. Though this will increase the financial risk but will also raise the return to equity shareholders. He also apprised him that issue of debt will not dilute the control of equity shareholders. At the same time, the interest on loan is a tax deductible expense for computation of tax liability. After due deliberations with Mr. Seth, Mr. Shah decided to raise funds from a financial institution.

Identify and explain the concept of Financial Management as advised by Mr. Seth in the above situation.

State the four factors affecting the concept as identified in part (1) above which have been discussed between Mr. Shah and Mr. Seth.

8. Explain any five factors affecting fixed capital requirements.

Answer Key

Ans 1 : Financial Management is concerned with management of Flow of Funds and involves decisions relating to procurement and investment of funds and also distribution of earnings to the shareholders.

Role of financial management:

(i)Financial management plays a significant role in determining the size and composition of fixed assets of the business.

(ii)Financial Management also helps in determining the quantum and also break up of Current assets into cash, inventories and receivables.

(iii)Financial Management takes decisions regarding the proportion of long and short term finance.

Ans2. (a) Dividend Decision.

(b)Factors affecting Dividend Decisions:

(i) Earnings: If Earning of the company is high then Dividends are paid at a higher rate .On the other hand if Earning of the company is Low then Dividends are paid at a lower rate .

(ii) Growth Prospects: A company planning to pursue a growth opportunity is likely to retain more profits and pay lower Dividends.

Management also helps in fixing the ratio between debt and equity in the long term finance.

Ans3. Financial Risk of the company increases with the higher use of Debt.

Factors because of which the company has decided to opt for equity capital are:

Capital Market Conditions: The state of Capital market is bullish , so people are likely to invest more in equity.

Fixed operating Cost: The fixed operating Cost of Company is high so it cannot take the further burden fixed commitment in terms of payment of interest and repayment of capital by issuing debt.

Cash Flow position: The Cash Flow position of Company is weak so it cannot meet the

fixed obligations involved in issue of debt.
Risk: The proportion of debt in its capital structure is already high so it cannot issue further debt, thereby endangering the solvency of the company.
Ans. 4.
(i)Scale of Operations: More Working capital is required in case of big organizations , while less working capital is needed in case of small organizations.
(ii)Business Cycle: During the Booming period, the demand of a product increases and sales also increases. Therefore, more working capital is needed. On the contrary , during the period of Depression, the demand declines and it affects both the production and sale of goods. Therefore in such a situation, less working capital is required.
(iii) Production Cycle : Longer the Production Cycle, more working capital is required as more time is required for converting raw material into finished goods. Shorter the production cycle, less working capital is required as less time is required for converting raw material into finished goods.
(iv) Credit Allowed: Those enterprises which sell goods on cash Payment basis need little working capital but those who provide credit facilities to the customers need more working capital.

Ans. 5. Investment Decisions: It refers to the selection of assets in which funds will be invested by the business. On this basis Investment decisions are further classified into two parts:
Long Term Investment Decisions (Capital Budging Decisions) : It refers to the investment in long term assets.
Short Term Investment Decisions(Working Capital Management): It relates to the investment in short term assets such as Cash, stock, Debtors etc.
(ii) Financing Decisions: It refers to the determination as to how the total funds required by the business will be obtained from various long term sources, like equity shares, preference shares, debentures , retained earning etc.
Dividend Decisions: It refers to the determination of how much part of the earning should be distributed among shareholders by the way of Dividend and how much should be retained for meeting future needs as retained earnings.

Answer 6:
Financial planning is the financial concept discussed in the above paragraph. The process of estimating the fund requirements of a business and specifying the sources of funds is called financial planning. It relates to the preparation of a financial blueprint of an organisation’s future operations. The objectives to be achieved by the use of financial concept are stated below:
To ensure availability of funds whenever required which involves estimation of the funds required, the time at which these funds are to be made available and the sources of these funds.
To see that the firm does not raise resources unnecessarily as excess funding is almost as bad as inadequate funding. Financial planning ensures that enough funds are available at right time.
Answer 7:
Capital structure is the concept of Financial Management as advised by Mr. Seth in the

above situation. Capital structure refers to the mix between owner's funds and borrowed funds.

The four factors affecting capital structure which have been discussed between Mr. Shah and Mr. Seth are explained below:

Cashflow position: The issue of debt capital involves a fixed burden on the company in the form of payment of interest and repayment of capital. Therefore if the cash flow position of a company is good it may issue debt else equity to raise the required amount of capital.

Risk Consideration: Financial risk refers to a situation when a company is unable to meet its fixed financial charges. Financial risk of the company increases with the higher use of debt. This is because issue of debt involves fixed commitment in terms of payment of interest and repayment of capital.

Tax rate: Considering the fact that amount of interest paid is a deductible expense, cost of debt is affected by the tax rate. If for example a firm is borrowing @ 10% and the tax rate is 30%, the after tax cost of debt is only 7%. Therefore, when the tax rate is higher it makes debt relatively cheaper and increases its attraction vis-a-vis equity.

Control: The issue of debentures doesn't affect the control of the equity shareholders over the business as the debenture holders do not have the right to participate in the management of the business.

Answer 8. Factors affecting fixed capital requirements are:

1. Nature of Business: The type of business has a bearing upon the fixed capital requirements. For example, a trading concern needs lower investment in fixed assets compared with a manufacturing organisation; since it does not require to purchase plant and machinery etc.

2. Scale of Operations: A larger organisation operating at a higher scale needs bigger plant, more space etc. and therefore, requires higher investment in fixed assets when compared with the small organisation.

3. Choice of Technique: Some organisations are capital intensive whereas others are labour intensive. A capital-intensive organisation requires higher investment in plant and machinery as it relies less on manual labour. The requirement of fixed capital for such organisations would be higher. Labour intensive organisations on the other hand require less investment in
fixed assets. Hence, their fixed capital requirement is lower.

4. Technology Upgradation: In certain industries, assets become obsolete sooner. Consequently, their replacements become due faster. Higher investment in fixed assets may, therefore, be required in such cases. For example, computers
become obsolete faster and are replaced much sooner than say, furniture. Thus, such organisations which use assets which are prone to obsolescence require higher fixed capital to purchase such assets.

5. Growth Prospects: Higher growth of an organisation generally requires higher investment in fixed assets. Even when such growth is expected, a business may choose to create higher capacity in order to meet the anticipated higher demand quicker. This entails higher investment in fixed assets and consequently higher fixed capital.

UNIT 10: Financial Market

Q1. Functioning of stock exchange creates a conducive climate for active and growing primary market for new issues as well as for an active and healthy secondary market.' In the light of this statement state any five functions of a stock exchange.
Q2. Keeping in mind the emerging nature of the securities market in India, Securities and Exchange Board of India (SEBI) was entrusted with the twin task of regulation and development of securities market. Out of this, state the Regulatory functions of SEBI.
Q3. Name the market where securities are issued for the first time. Explain any four methods of floatation in this market.

Q4. The SEBI has imposed penalty of Rs. 80,000 on Parul Corporation Limited and its three directors – Nisha, Richa and Sulakshana who had mobilized funds from the general public through illegal collective investment schemes in the name of purchase and development of agricultural land. While imposing the penalty the biggest in its history SEBI said the Company deserve "maximum penalty" for duping the common man. Its prevention of fraudulent and unfair trade practices regulations provides for "severe to severe penalties" for dealing with such violations.
In the context of the above case :
State the objectives of setting up SEBI.
Identify the type of function performed by SEBI by quoting lines from the above paragraph.
Name other two functions also.
Q.5 Squib Ltd. Is a large creditworthy company operating in the Kashmir Valley. It is an export-oriented unit, dealing in exclusive embroidered shawls. The floods in the valley have created many problems for the company. Many craftsmen and workers have been dislocated and raw material has been destroyed. The firm is therefore, unable to get an uninterrupted supply of raw materials and the duration of the production cycle has also increased. To add to the problems of the organization, the suppliers of raw materials who were earlier selling on credit are asking the company for advance payment or cash payment on delivery. The company is facing a liquidity crisis. The CEO of the company feels that taking a bank loan is the only option with the company to meet its short –term shortage of cash.
(a) As a finance manager of the company, name and explain the alternative to bank borrowings that the company can use to resove the crisis.
(b) Also, explain any other two money market instruments.
Q.6. After doing a course in online trading, Arsh started an online portal for stock trading under the name 'Investment Guru'. He met his school friend Ajay after a long time in a bank where Ajay had come to open a D-Mat account. Arsh urged Ajay to invest in the forthcoming IPO of a blue chip companies whereas Ajay was inclined to buy existing securities of the other companies to build his investment portfolio.
In context of the above case:

Identify the two different types of capital market being referred to by quoting lines from the para.
State any four differences between the two different types of capital markets as identified in part (a).
Q7. What is another name of Secondary Market? Explain the trading Procedure of it.
.

Q.8.

Madhav's is one of the India's most trusted brands in Indian sweets and snacks segment. The company has manufacturing plants in Kota, Kanpur, New Delhi, and Mumbai. Madhav's has its own retail chain stores and a range of restaurants in these cities. Now, the company plans to extend its business in 12 more cities in India. In order to raise the funds, its directors have decided to float a public issue through prospectus. Besides, it intends to raise money to meet the floatation costs in terms of brokerage, underwriting commission, advertising etc.
In context of the above case:
What is the other name used for the funds required to meet floatation costs?
Describe briefly the short term instrument popularly used by the companies to raise for the funds required to meet floatation costs. Who can issue them?
Distinguish between the two types of financial markets that the company intends to approach to meet its financial needs.

Answer Key

Ans1. Following are the functions of Stock Exchange: (any five)
1.**Economic Barometer**-Every major change in country and economy is reflected in the prices of shares. This is also known as pulse of economy or economic mirror which reflects the economic conditions.
2.Pricing of Securities-The stock market helps to value the securities on the basis of demand and supply factors.
3. Safety of Transaction- In stock market only the listed securities are traded and stock exchange authorities include the companies names in the trade list only after verifying the soundness of company.
4. Contributes to economic growth-In stock exchange securities of various companies are bought and sold. This process of disinvestment and reinvestment helps to invest in most productive investment proposal and this leads to capital formation and economic growth.

5. Spreading of Equity Cult-Stock exchange encourages people to invest in ownership securities by regulating new issues, better trading practices and by educating public about investment.
6.Liquidity-The presence of stock exchange market gives assurance to investors that their investment can be converted into cash whenever they want.
7. Providing scope for speculation-To ensure liquidity and demand of supply of securities the stock exchange permits healthy speculation of securities.
8. Promotes the Habits of Savings and Investment-The attractive opportunities encourage people to save more and invest in securities of corporate sector rather than investing in unproductive assets such as gold, silver etc.
Ans2. Regulatory functions of SEBI are as follows: (any five)
i. SEBI registers and regulates the working of mutual funds.
ii. SEBI regulates takeover of companies
iii. SEBI conducts inquires and audit of the stock exchange.
iv. SEBI registers and regulates the working of stock – brokers, Sub – Brokers, Brokers to an issue, and Registrars to an issue, share transfer agents and such other intermediaries in the stock market.
v. SEBI regulates the business in stock exchanges and securities market.
vi. SEBI has notified rules and regulations and a code of conduct to regulate the intermediaries in the securities market such as underwriters, merchants, brokers etc.,
vii. Levying fee or other charges for carrying out the purposes of the Act.
.
Ans23. Primary market
Following are the methods of floatation from the primary market :
1. Public issue through prospectus: under this method the company wanting to raise capital issues a prospectus to inform and attract the investing public. It invites prospective investors to apply for the securities.
2.Offer for sale: under this method the sale of securities takes place in two steps. In the first step the company sells the entire lot of shares to the intermediary firms of stock brokers at an agreed price .In the second step, the intermediary resells these shares to investors at a higher price.
3. Private placement: In private placement the entire lot of new securities is purchased by an intermediary at a fixed price and sold not to the public but to selected clients at a higher price.
4 .Rights issue (for existing companies): This is the offer of new shares (additional shares) by an existing company to the existing shareholders. The shareholder may either accept the offer for himself or assign to another. A rights issue to the existing shareholders is a mandatory requirement.
5. e-IPOs: A company proposing to issue capital to the public through the on-line system of the stock exchange has to enter into an agreement with the stock exchange. This is called an Initial Public Offer (IPO). The issuer company should also appoint a registrar to the issue having electronic connectivity with the exchange.

Ans.4 (a) **OBJECTIVES OF SEBI**
To regulate stock exchanges and the securities industry to promote their orderly functioning.

To protect the rights and interests of investors, particularly individual investors and to guide and educate them.
To prevent trading malpractices and achieve a balance between self regulation by the securities industry and its statutory regulation.
To regulate and develop a code of conduct and fair practices by intermediaries like brokers, merchant bankers etc., with a view to making them competitive and professional.

(b) Protective Function
"The SEBI has imposed penalty of Rs. 80,000 on Parul Corporation Limited"
(c) Regulatory Function and Developmental Function.

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Ans. 5(a) Commercial Papers may be used by Squib Ltd. As it is a popular short term instrument which is issued by large and credit worthy companies. The instrument is an unsecured promissory note and is freely transferable by endorsement. Its maturity period may range from a fortnight to a year. It is sold at discount and redeemed at par.
(b) Any other two instruments
(i) Call Money- It is a short term money market instruments through which one bank may borrow money from another bank to maintain its cash reserve ratio as per the guidelines of RBI. Its maturity period may range from a single day to a fortnight. The rate at which the interest is paid on call money is called call rate.
(ii) Certificate of deposit- It is a short term money market instrument issued by commercial banks and development financial institutions. It is an unsecured and negotiable instrument in bearer form. It may be issued to individuals, corporations and companies when bank need cash to meet credit needs.
(iii) Treasury bills- They are short term money market instruments which are issued by RBI on behalf of the Govt. of India. They are issued in the form of promissory notes and are very safe instruments. They are sold at discount and redeemed at par. They are also known as zero-coupon discount bonds. The minimum value of their purchase is Rs.25,000 and in multiples thereof.
(iv) Commercial bill- It is a short term money market instrument. A business firm may draw a bill of exchange in favour of another in lieu of credit purchases. A bill of exchange is a freely negotiable instrument. It is usually drawn for a period of 3 months.

Ans6. (a) The two different types of capital market being referred to are-
Primary Market:-"Arsh urged Ajay…….. companies."
Seondary Market:-" Ajay was inclined…… portfolio."
Differences between Primary Market and Secondary market:

S. No.	**Basis**	**Primary Market**	**Secondary Market**
1	Meaning	It is the new issue market.	It is the market for old securities.

2	Aspects	Only buying of securities takes place.	Both buying and selling of securities takes place.
3	Price	Prices of the securities are determined by the company.	Prices of the securities are determined by the forces of demand and supply.
4	Parties Involved	It involves dealing between the company and investors.	It involves dealing between the two investors.

Ans7.**TRADING PROCEDURE**:-

The procedure for purchase and sale of securities in a stock exchange involves the following steps:

1. **Selection of broker -**The first step is to select a broker who will buy/sell securities on behalf of the investor. This is necessary because trading of securities can only be done through SEBI registered brokers who are the members of a stock exchange.
2. **Opening demat account -**The next step is to open a demat account. Demat (Dematerialised) account refers to an account which an Indian citizen must open with the depository participant (banks, stock, brokers) to trade in listed securities in electronic form.
3. **Placing the order -**The next step is to place the order with the broker. The order can be communicated to the broker either personally or through telephone, cell phone, e-mail etc.
4. **Executing the order -**According to the instructions of the investor, the broker buys or sells securities.
5. **Settlement -**This is the last stage in the trading of securities done by the brokers on behalf of their clients. The mode of settlement depends upon the nature of the contract.

Equity spot market follows a T+2 rolling settlement. This means that any trade taking place on Monday gets settled by Wednesday.

Answer:8

Bridge financing is the other name used for the funds required to meet floatation costs. Commercial Papers issued by large and credit worthy companies. The instrument is in the form of an unsecured promissory note and is freely transferable by endorsement. It is sold at discount and redeemed at par. Its maturity period may range from a fortnight to a year. It is also used to meet the short term seasonal and working capital requirements of a business enterprise. For example it is used for the purpose of bridge financing.

Capital Market and Money Market.

Differences between Capital Market and Money Market:

S. No	Basis	Capital Market	Money Market
1.	Duration	It is a market for long term funds.	It is a market for short term funds whose maturity period is upto one year.

2.	Participants	The main participants in capital market are banks, financial institutions, corporate bodies, foreign investors and retail investors.	The main participants are institutional investors.
3.	Investment outlay	Since, the cost of securities may be low, investment can be made in the capital market can be with less capital.	Since the cost of securities may be high, investment in the money market requires huge capital outlay.
4.	Liquidity	The securities in capital market enjoy good liquidity.	The securities in money market enjoy high liquidity as The Discount Finance House of India works as a compulsory market maker.
5.	Risk and return	The instruments in capital market carry high risk as the expected return is high on them.	The instruments in money market carry low risk as the expected return is low on them.

UNIT 12: CONSUMER PROTECTION

	QUESTIONS
Q. 1	Which act provides for the setting up of 3 tier machinery?
Q. 2	Who can file a complaint on behalf of a deceased consumer?
Q. 3	On which type of products is ISI mark used?
Q. 4	What is the purpose of enacting the “Consumer protection Act 2019”?
Q. 5	A co. is using sub- standard electric wiring in its coolers. Which consumer right is being violet?
Q. 6	Give any four points to explain the importance of consumer protection in India?
Q. 7	As a well-informed consumer. What kind of quality certification marks you will. Look for before buying ‘products? Specify any 5.
Q. 8.	**Briefly explain rights available to a consumer under the Consumer Protection Act 2019.**
Q. 9.	**Explain responsibilities of consumers to safeguard their interests.**
Q 10	**Discuss the Judicial machinery for redressing their grievances under the**

.	**consumer protection Act 2019.**
Q. 11	**State the remedies available to a consumer.**

ANSWER KEY

Q.1	Consumer protection act 2019
Q.2	Nominee / heir
Q.3	Consumer durables.
Q.4	To protect and promote the interest of the consumers
Q.5	Right to safety.
Q.6	a. long term interest of business b. social responsibilities c. moral justification d. government intervention (with explanation)
Q.7	Ans) Some of the quality certification marks are: FPO(Fruit Products Order 1955) – It contains specification and quality control requirements regarding the production and marketing of processed fruits and vegetables ,sweetened aerated water, vinegar and synthetic syrups. ISI- On consumer durable products. Hall mark- BIS certification scheme for gold jewellery items. Earthen Pitcher –For Labeling Environment friendly products. AGMARK – It is a grade standard for agricultural commodities and like stock products. Wool mark- It signifies 100% pure wool.
Q.8	The rights available to a consumer under Consumer Protection Act, 2019 for protection of consumers are as follows: **Right to Safety:** This is the right to be protected against the marketing of goods which are hazardous to health or life. Certain goods like electrical goods and pressure cookers can cause injury, if there is any manufacturing defect. Consumers have the right to be protected against any such danger. **Right to be informed:** Consumers have right to be given the facts they need to make an informed choice. Therefore, the manufacturer should give all information regarding the quality, price, date of manufacture, precaution for use, etc. either on the package or separately on a piece of paper. **Right to choose:** This is the right to be assured, wherever possible, of access to a variety of products and services at competitive prices. The manufacturers should give the consumer the chance to choose from alternative products. A consumer should not be forced to buy a particular product. **Right to be heard:** In case a consumer has been exploited or has complaint against the product or service, he has the right to be heard and assured that his / her interest

	would receive due consideration. **Right to seek redressal:** This is the right to get relief against unfair trade practices and exploitation. When consumers are cheated or exploited they have a right to get their claims settled against the manufacturer. A number of consumer courts and agencies have been setup specifically for this purpose. **Right to consumer education**: A consumer can protect himself against various malpractices when he knows his rights and remedies available to him. Therefore, he has the right to be educated about the rights and remedies available to him.
Q 9	**Ans.:**The consumers should keep a few things in mind while purchasing product or services or any things. **Do not buy in hurry:** The consumers should make an estimate of the things they want to buy well in time. They should think about the things they want to buy along with their quality required by them. They also take in consideration the place from where to buy their things. **Do not buy blindly:** The consumers should make full use of their reason while buying things. They should not take the seller's words as the final truth. **Beware of false advertisement:** The seller's inform the consumers about their things through the medium of advertisement. The sellers exaggerate the qualities of their goods through advertisement. Therefore it is the responsibilities of consumers to recognize the truth of the advertisement. **Buy only ISI and Agmark goods:** It is the responsibility of consumers only buys goods with the ISI or Agmark printed on them. Both these symbols are indicative of the good quality of the goods. **Do not compromise on quality**: Consumers should not buy inferior stuff out of greed for less prices. **Do not forget to get receipt & guarantee/warranty card:** Consumers should always get a receipt or bill for the things purchased. In case a guarantee/warrantee card is also offered by seller, it should also be taken. These documents will be of great help in setting all kinds of disputes with the seller. **Approach immediately the officer concerned in case of complaint:** It is the responsibility of the consumers to approach the officer concerned in case there is some complaint about the goods purchased. A late compliant may find that the period of guarantee/warrantee has lapsed.
Q 10	**Ans. (a) District forum:** According to consumer protection Act state government can setup one or more district forum in each district. 1) District forum hears disputes involving a sum up toRs. 1 CRORE. 2) It can file appeal against it with the state commission within 45 days. (b) **State commission:** 1) State commission redresses grievances involving a sum exceeds Rs. 1 crore and up toRs. 10 crore. 2)It can file an appeal before the national commission within 45 days. (c) **National commission :**

	1) It is appointed by the Central Government 2) It has the jurisdiction to hear complaints involving a sum exceeding Rs. 10 crore. 3) It can file an appeal with the Supreme Court within 45 days
Q. 11	(i) To remove the defect in goods or deficiency in service. (ii) To replace the defective product with a new one, free from any defect. (iii) To refund the price paid for the product, or the charges paid for the service. (iv) To pay a reasonable amount of compensation for any loss or injury suffered by the consumer due to the negligence of the opposite party. (v) To pay punitive damages in appropriate circumstances. (vi) To discontinue the unfair/ restrictive trade practice and not to repeat it in the future. (vii) Not to offer hazardous goods for sale. (viii) To withdraw the hazardous goods from sale. (ix) To cease manufacture of hazardous goods and to desist from offering hazardous services. (x) To pay any amount (not less than 5% of the value of the defective goods or deficient services provided), to be credited to the Consumer Welfare Fund or any other organisation/person, to be utilised in the prescribed manner. (xi) To issue corrective advertisement to neutralise the effect of a misleading advertisement. (xii) To pay adequate costs to the appropriate party.

Practice Paper-1 (2021-22)
Business Studies (054)
Term II
Std-XII

Max.Marks-40
Time-2Hours

General Instructions:

(i) This is a Subjective question paper containing 12 questions.
This paper contains 4 questions of 2 marks each, 4 questions of 3 marks each and 4 questions
Of 5 marks each.
(ii) 2 marks questions are Short Answer Type Questions and are to be answered in 30-50 words
(iii) 3 marks questions are Short Answer Type Questions and are to be answered in 50-80 words
(iv) 5 marks questions are Short Answer Type Questions and are to be answered in 80-120

words **(v) This question paper contains case/Source Based Questions.**		
1	**The workers of a factory are unable to work on new machines and always demands for help of supervisor. The supervisor is overburdened with their frequent calls. Suggest two methods of remedies**	**2**
2	**The HR manager sent emails to all employees who took leave in the last month without informing the office. He demanded explanation from all employees in writing. It is one of the points of importance of the last function of management. Identify it and explain one more point of importance.**	**2**
3	**'Mission Coach Ltd.' is a large and creditworthy company manufacturing coaches for Indian Railways. It now wants to export these coaches to other countries and decides to invest in new hi-tech machines. Since the investment is large, it requires long-term finance. It decides to raise funds by issuing equity shares. The issue of equity shares involves huge floatation cost. To meet the expenses of floatation cost, the company decides to tap the money market.** **(a) Name and explain the money-market instrument the company can use for the above purpose.** **(b) What is the duration for which the company can get funds through this instrument ?**	**2**
4	**An organization provides security services .It requires such candidates who are reliable and don't leak out the secrets of their clients. What step should be incorporated in selection process? Explain**	**2**
5	**Challenging job profiles, variety of work content and need for higher knowledge and skills is source of motivation for many employees. Identify this non-financial incentive being referred above and explain two more such incentives of the same category.**	**3**
6	**'An effort to control everything may end up in controlling nothing'. Explain the statement**	**3**
7	**State whether the working capital requirements of following business would be large or small. Give Reasons also:** **(a) Sugar (b) Bread (c) Furniture manufactured against order** **OR** **The Return on Investment (ROI) of a company ranges between 10-12% for the past three years. To finance its future fixed capital needs, it has the following options for borrowing debt:** **Option 'B': Rate of interest 13%** **Option "A": Rate of interest 9%;**	**3**

	Which source of debt, "Option A' or 'Option B, is better? Give reason in support of your answer. Also state the concept being used in taking the decision.	
8	**In an organization employees always feel they are under stress. They take least initiatives and fear to express their problems before the manager. What do you think is wrong with the manager?**	**3**
9	**Prakhar purchased an ISI mark electric iron from 'Bharat Electricals. While using he found that it was not working properly. He approached the seller and complained for the same. The seller satisfies Prakhar by saying that he will ask the manufacturer to replace this iron. The manufacturers refused to replace and 'Bharat Electricals' decided to file a complaint in consumer Court. Can 'Bharat Electricals' do this? Why? Also explain who is a consumer as per Consumer** **OR** **Reena purchased one litre of pure Desi Ghee from a shopkeeper. After using it, she had a doubt that it is adulterated. She sent it for a laboratory test which confirmed that the ghee was adulterated. State any five reliefs available to Reena, if she complaints and the consumer court is satisfied about the genuineness of the complaint**	**5**
10	**Once the candidates clear basic screening and selection tests, the selected candidates go through the formal interview process and after clearing the personal interview, they need to pass through many more steps of selection process. Explain them briefly**	**5**
11	**New Delhi has been declared as the most polluted city in the world. Bengaluru, Mumbai, Patna, Ahmedabad, Lucknow, Kanpur and Ludhiana are also the highly populated Indian cities. This has resulted in the dramatic increase in the sales of home purifiers. The price of these devices range from Rs.2000 to 25000 depending upon the type of pollutant these purifiers remove. Looking at the increasing demand of these purifiers 'Pure Air Technology India Ltd. has developed a low-cost home air purifier in its R&D Lab. The company has estimated that the commercial production of 1, 00,000 units per year may cost the company Rs.500 per unit. For this capital of Rs.2500 crores will be required. The company decided to have both equity and debt in its capital structure. Explain any five factors that the company should consider while deciding its capital structure.**	
12	**'SEBI is known as the WATCHDOG of securities market'. Explain the statement** **OR** **Explain briefly the following terms:-** **(a) Insider Trading (b) Price Rigging (c) Contract note**	**5**

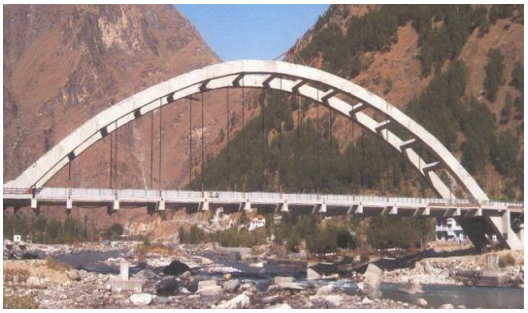
Marking Scheme
Business Studies (054)
Std-XII

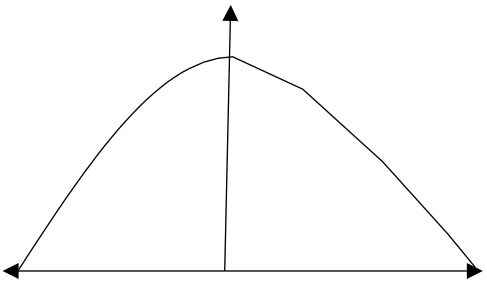
General Instructions :- **(i) Marking scheme is a suggested value points** **(ii) Students may give answers other than suggested points, If such points Are relevant, marks may be awarded to the students**		
1	**(i).Vestibule training** **(ii).Apprenticeship programme**	**2**
2	**(i). Ensuring Order and discipline** **(ii). Accomplishing organizational goals, Judging accuracy of standard, Making efficient use of resources, Improving employees morale, Facilitating co-ordination in action(any one point)**	**2**
3	**(a)Commercial paper (b) 15-365 Days**	**2**
4	**Personality Test is to be conducted**	**2**
5	**(a)Job Enrichment** **(b) Status, Organizational climate, Career Advancement opportunity, Employee Recognition, Job Security, Employee Participation, Employee Empowerment (Any two)**	**3**
6	**'Control By Exception' to be explained**	**3**
7	**(a)Sugar- More working capital, Reason- Larger stock of Raw Material to be maintained** **(b) Bread- Less working capital, Reason- Quick sales turnover** **(c) Furniture manufactured against order- Less working capital, Reason- Advance money may be received/Less operating cycle**	**3**
8	**Manager is an Autocratic Leader. He should change his leadership style from Autocratic to Democratic**	**3**
9	**No, Because Bharat Electricals is not a consumer.** **Consumer means any person who buys any goods or hires or avails services for consideration, or which has been paid or promised or partly paid and partly promised or under any system of deferred payment and includes any user of such goods other than the person who buys such goods for consideration paid or promised or partly paid or ,partly promised or under any system of deferred payment, when such use is made with the approval of such person,** **BUT DOES NOT INCLUDE A PERSON/INSTITUTION WHO OBTAINS SUCH GOODS FOR RESALE OR FOR ANY COMMERCIAL PURPOSE.**	**5**

	OR **If the consumer court is satisfied about the genuineness of the complaint It can issue one or more of the following directions to the opposite party:** **(a)To remove the defects in goods or deficiency in service.** **(b)To replace the defective product with a new one, free from any defects.** **(c) To refund the price paid for the product, or the changes paid for the service.** **(d) To pay a reasonable amount of compensation for any loss or injury suffered by the consumer due to the negligence of the opposite party** **(e) To pay punitive damage in appropriate circumstances.** **(f)To discontinue the Unfair Trade Practice and not to repeat it in the future** **(g) Not to offer hazardous goods for sale** **(h) To withdraw the hazardous goods from sale** **(i) To withdraw the hazardous goods from being offered sale** **(ANY FIVE POINTS)**	
10	**Reference and Background Checking, Selection decision, Medical Examination, Job offer & Contract of Employment**	**5**
11	**Cash flow position, Interest Coverage Ratio, Debt Service Coverage Ratio, Return on Investment, Cost of Debt, Cost of Equity, Floatation Costs, Risk Consideration, Flexibility, Control, Regulatory Framework, Stock market conditions, Capital structure of other companies (ANY FIVE POINTS)**	**5**
12	**Regulative and Protective Functions of SEBI to be written** **OR** **(a)Insider Trading :- It is a practice of buying and selling of securities by the Insiders (Directors, Promoters, Finance Managers, Accountants and others) of their own company to get personal benefits. Insiders are persons having price sensitive information which are not available to common investors, they may take undue advantages of these information being Insiders. SEBI strictly prohibits it.** **(b) Price Rigging: It is a practice of manipulating the price of securities by inflating or deflating it.** **(c) Contract note is a document issued by the Broker to the Investor which contains the information regarding the number of shares bought and sold, the price, the date and time of deal, and the brokerage charge. It is legally enforceable and helps to settle disputes/claims between the Investors and and the Broker**	**5**

MATHEMATICS

CASESTUDY5:





The bridge connects two hills 100 feet apart. The arch on the bridge is in a parabolic form.The highest point on the bridge is 10 feet above the road at the middle of the bridge as seen in thefigure.

Based on the information given above, answer the following questions:

1. The equation of the parabola designed on the bridge is

a.$x^2=250y$

b.$x^2=-250y$

c.$y^2=250x$

d.$y^2=250y$

2. The value of the integral $\int_{-50}^{50} \frac{x^2}{250} dx$is

a. $\frac{1000}{3}$

b. $\frac{250}{3}$

c.1200

d. 0

3. The integer and of the integral $\int_{-50}^{50} x^2 dx$ is_____function.

5.

a. Even

b. Odd

c. Neither odd nor even

d. None

4. The area formed by the curve X^2 =250y, x-axis, y= 0, y=10

a. 1000√2/3

b. 4/3

c. 1000/3

d. 0

6. The area formed between x^2=250y, y-axis, y=2 and y=4 is

a. $\frac{1000}{3}$

b.0

c. $\frac{1000\sqrt{2}}{3}$

d. noneofthese

ANSWERS

1. b) $x^2=-250y$

2. a) 1000/3

3. a)Even

4. c) 1000/3

5. d)noneof these

Differential Equation

CASE STUDY1:

A Veterinary doctor was examining a sick cat brought by a pet lover. When it was brought to the hospital, it was already dead. The pet lover wanted to find its time of death. He tookthe temperature of the cat at 11.30 pm which was 94.6°F. He took the temperature again after one hour; the temperature was lower than the first observation. It was 93.4°F. The room in which the cat was put is always at 70°F. The normal temperature of the cat is taken as 98.6°F when it was alive. The doctor estimated the time of death using *Newton law of cooling which is governed by the differential equation:* $(T-70)$, where 70° F is the

dt

Room temperature and T is the temperature *of the object* at time *t.*

Substituting the two different observations of T and t made, in the solution of the differential equation $^{dT}=(T-70)$ where k is a constant of proportion, time of death is calculated.

1. State the degree of the above given differential equation.
2. Which method of solving a differential equation helped in calculation of the time of death?

a. Variable separable method
b. Solving Homogeneous differential equation
c. Solving Linear differential equation
d. All of the above

3. If the temperature was measured 2 hours after 11.30pm, will the time of death change?(Yes/No)
4. The solution of the differential equation $^{dT}/_{dt} = k(T-70)$ is given by,

a. log| T–70|= kt +C
b. log| T–70|= log|kt|+C
c. T–70 =kt +C
d. T – 70= kt C

5. I ft=0 when T is72, then the value of c is

a. -2
b. 0
c. 2
d. Log2

ANSWERS

1. Degree is 1
2. (a)Variable separable method
3. No

4.(a)log| T–70|= kt +C

5.(d)log2

CASE STUDY2:

Polio drops are delivered to 50K children in a district. The rate at which polio drops are given is directly proportional to the number of children who have not been administered the drops. By the end of 2nd week half the children have been given the polio drops. How many will have been given the drops by the end of 3rd week can be estimated using the solution to the differential equation $^{dy}/_{dx} = (\mathbf{50} - \mathbf{y})$ where x denotes the number of weeks and y the number of children who have been given the drops.

1. State the order of the above given differential equation.

2. Which method of solving a differential equation can be used to solve $\frac{dy}{dx}=(50-y)$.?

Variable separable method

Solving Homogeneous differential equation

Solving linear differential equation
All of the above
The solution of the differential equation $\frac{dy}{dx}=(50-y)$ is givenby,

log|50–y| =kx +C
-log|50–y| =kx+C
log|50–y|= log| kx|+C
50–y=kx+C
The value of c in the particular solution given that y(0)=0 and k=0.049 is.
log50
log 1/50
50
d- 50

Which of the following solutions may be used to find the number of children who have been given the polio drops?
y= 50–ekx
y= 50-e=kx
c.y= 50(1– e-kx)
d.y=50 (e=kx–1)

ANSWERS:

Order is 1
(a)Variable separable method
3.(b)-log|50– y|=kx+C4.(b) log1/50
5.(c)y =50 (1–e-kx)

Vector Algebra

CASE STUDY1:

Solar Panel shave to be installed carefully so that the tilt of the roof, and the direction to the sun, produce the largest possible electrical power inthesolar panels.

Asurveyoruseshisinstrumenttodeterminethecoordinates of the four corners of a roof where solarpanelsaretobemounted.Inthepicture,supposethe points are labelled counter clockwise from the roofcorner nearest to the camera in units of meters $P_1(6,8,4)$,$P_2(21,8,4)$, $P_3(21,16,10)$and $P_4(6,16,10)$

What are the components to the two edge vectors defined by $\vec{A}$=PVofP_2 –PVof P_1 and $\vec{B}$=PV of P_4–PV of P_1? (where PV stands for position vector)
Write the vector in standard notation with $\hat{\imath}$, and $\hat{k}$(where $\hat{\imath},\hat{\jmath}$ and $\hat{k}$are the unit vectors along the three axes).
What are the magnitudes of the vectors $\vec{A}$a nd $\vec{B}$ and in what units?
What are the components to the vector $\vec{N}$, perpendicular to$\vec{}$and $\vec{B}$ and the surface of the roof?
What is the magnitude of $\vec{N}$ and its units? The sun is located along the unit vector $\vec{S}$=½ $\hat{\imath}$-6/7$\hat{\jmath}$+1/7$\hat{k}$ If the flow of solar energy is given by the vector $\vec{F}$=910S in units of watts/meter^2, what is the dot product of vectors$\vec{F}$*with*$\vec{N}$, and the units for this quantity?
What is the angle between vectors$\vec{N}$ and$\vec{}$? What is the elevation angle of the sun above the plane of the roof? (COS51^0=0.629)

ANSWERS

1.15,0, 0: 0, 8,6
Answer 15$\boldsymbol{i}$+0$\boldsymbol{j}$+0$\boldsymbol{k}$ Answer 2:0i+8$\boldsymbol{j}$+6$\boldsymbol{k}$

3. Answer : 15unit, Answer:$\sqrt{8^2+6^2}=\sqrt{64+36}=\sqrt{100}$= 10unit

4. $\vec{N}=\vec{A}\times\vec{B}$

$\boldsymbol{i}$ j k
$N=|1\ \ 0|=-15(6\boldsymbol{j}-8\boldsymbol{k})=-90\boldsymbol{j}+120\boldsymbol{k}$;Answer-90,120
5 6
0 8

5.$\sqrt{(-90)^2+120^2}=\sqrt{8100+14400}=\sqrt{22500}=150$

Answer of secondpart:$\vec{F}$=910(1/2$\hat{\boldsymbol{\imath}}$-6/7$\boldsymbol{\jmath}$+1/7$\hat{\boldsymbol{k}}$)=455$\hat{\boldsymbol{\imath}}$–780$\boldsymbol{\jmath}$+130$\hat{\boldsymbol{k}}$

The dot product is just $\vec{F}\cdot\vec{N}$=455*(0)-780*(-90) +130*120 =**85,800watts**.

From the definition of dot product: $\vec{\cdot}\cdot\vec{N}=|\vec{F}||\vec{N}|\cos\theta$

Then since $|\vec{F}|$ = 910 and $|\vec{N}|$ = 150 and $\vec{F}\cdot\vec{N}$=85,800 we have cosθ=(85800/(910x150))=0.629andsoθ**=cos^{-1}(0.629)whichis0.8905radandis51^{o}**.(*using cosine table)*

This is the angle between the normal to the surface and the incident solar rays.

The compliment of this is the elevation of the sun above the plane of the roof or 90-51 = 39^{o}.

CASE STUDY2:

A class XII student appearing for a competitive examination was asked to attempt the following questions.

Let$\vec{a},\vec{b}$,and$\vec{c}$ *be three* non zero vectors.

1. If $\vec{a}$ and $\vec{b}$ are such that $|\vec{a}+\vec{b}|=|\vec{a}-\vec{b}|$then

a. $\vec{a}\perp\vec{b}$

b. $\vec{a}||\vec{b}$

c. $\vec{a}=\vec{b}$

d.None of these

2. If $\vec{a}=\hat{\imath}-2\hat{\jmath}$, $\vec{b}=2\hat{\imath}+\hat{\jmath}+3\hat{k}$then evaluate $(2\vec{a}+\vec{b})\cdot[(\vec{a}+\vec{b})\times(\vec{a}-2\vec{b})]$

a. 0

b. 4

c. 3

d. 2

3. If $\vec{a}$ and$\vec{b}$ are unit vectors and θ be the angle between them then $|\vec{a}-\vec{b}|$ is

a.$sin\frac{\theta}{2}$

b.$2sin\frac{\theta}{2}$

c.$2cos\frac{\theta}{2}$

d.$cos\frac{\theta}{2}$

- Let$\vec{a},\vec{b}$ and $\vec{c}$ be unit vectors such that $\vec{a}\cdot\vec{b}=\vec{a}\cdot\vec{c}=0$ and angle between $\vec{b}$ and $\vec{c}$ is $\frac{\pi}{6}$ then $\vec{a}$=

a. $2(\vec{b}\times\vec{c})$

b. $-2(\vec{b}\times\vec{c})$

c. $\pm2(\vec{b}\times\vec{c})$

d. $2(\vec{b}\pm\vec{c})$

- The area of the parallelogram formed by $\vec{a}$ and $\vec{b}$ as diagonals is

  a) 70

  b) 35

c.$\sqrt{70}/2$

d.$\sqrt{70}$

ANSWERS

1.(a) $|\vec{a}+\vec{b}|^2 = |\vec{a}-\vec{b}|^2 \Rightarrow 2.\vec{a}\cdot\vec{b}=0, \vec{a}\perp\vec{b}$

2.(a)0

3.(b) $\frac{2\sin^{\theta}}{2}$

4. (c)$\pm2(\vec{b}\times\vec{c})$

5.(c)$\sqrt{70}/2$squnits

CASE STUDY3:

A cricket match is organized between two Clubs A and B for which a team from each clubis chosen. Remaining players of Club A and Club B are respectively sitting on the plane represented by the equation $\vec{r}.(2\vec{i}-\vec{j}+\vec{k}) = 3$ and $\vec{r}.(\vec{i}+3\vec{j}+2\vec{k}) = 8$, to cheer the team of their own clubs.

Based on the above answer the following:

1. The Cartesian equation of the plane on which players of Club A are seated is

a.$2x-y+z=3$

b.$2x-y+2z=3$

c.$2x-y+z=-3$

d.$x- y+ z=3$

2. The magnitude of the normal to the plane on which players of club Bare seated, is

a.$\sqrt{15}$

b.$\sqrt{14}$

c.$\sqrt{17}$

d.$\sqrt{20}$

3. The intercept form of the equation of the plane on which players of Club B are seated is

a.$\frac{x}{8}+\frac{y}{8}+\frac{z}{-2}=1$

b.$\frac{x}{5}+\frac{y}{8}+\frac{z}{-3}=1$

c.$\frac{x}{8}+\frac{y}{8}+\frac{z}{-4}=1$

d.$\frac{x}{8}+\frac{y}{7}+\frac{z}{2}\equiv 1$

4. Which of the following is a player of Club B?

Player sitting at (1, 2,1)

Player sitting at (0, 1,2)

Player sitting at (1, 4,1)

Player sitting at (1, 1,2)

The distance of the plane, on which players of Club Bareseated, from the originis

$\frac{8}{\sqrt{14}}$ $units$

$\frac{6}{\sqrt{14}}$ $units$

$\frac{7}{\sqrt{14}}$ $units$

$\frac{9}{\sqrt{14}}$ $units$

ANSWERS

1.(a) $2x- y+z=3$

2.(b)$\sqrt{14}$

3.(c)$\frac{x}{8}+\frac{y}{8}+\frac{z}{-4}=1$

4.(d)Player sitting at (1,1, 2)

5.(a)$\frac{8}{\sqrt{14}}$ $units$

CASE STUDY2:

The Indian coast guard, while patrolling, saw a suspicious boat with people. They were no where looking like fisher men. The coast guards were closely observing the movement of the boat for an opportunity to seize the boat. They observed that the boat is moving alonga planar surface.At an instant of time, the coordinates of the position of the coast guardhelicopterand theboatis (1, 3,5)and (2,5,3) respectively.

Based on the above answer the following:

If the line joining the positions of the helicopter and the boat is perpendicular to the plane in which the boat moves, then the equation of the plane is

a.-x+ 2y–2z=6

b.x+2y+ 2z= 6

c.x+ 2y–2z=6

d.x-2y–2z= 6

If the coast guard decides to shoot the boat at that given instant of time, then what is the distance (in meters) that the bullet has to travel?

5m

3m

6m

4m

If the coast guard decides to shoot the boat at that given instant of time, when the speed of bullet is 36m/sec, then what is the time taken for the bullet to travel and hit the boat?

a . $\frac{1}{8}$ $seconds$

b. $\frac{1}{14}$ $seconds$

c. $\frac{1}{10} onds$

d $\frac{1}{12}$ $seconds$

At that given instant of time, the equation ofline passing through the positions of the helicopter and boat is

a. $\frac{x-1}{1} = \frac{y-3}{2} = \frac{z-5}{-2}$

b. $\frac{x-1}{2} = \frac{y+3}{1} = \frac{z-5}{-2}$

c. $\frac{x+1}{-2} = \frac{y-3}{-1} = \frac{z-5}{-2}$

d. $\frac{x-1}{2} = \frac{y+3}{-1} = \frac{z+5}{2}$

At a different instant of time, the boat moves to a different position along the plane surface. What should be the coordinates of the location of the boat if the coast guard shoots the bullet along the line whose equationis $\frac{x}{1} = \frac{y-}{\frac{1}{2}} = \frac{z-2}{1}$ for the bullet to hit the boat?

a. $(\frac{-8}{3}, \frac{19}{3}, \frac{-14}{3})$

b. $(\frac{8}{3}, \frac{-19}{3}, \frac{-14}{3})$

c. $(\frac{8}{3}, \frac{-19}{3}, \frac{14}{3})$

d.none of the above

ANSWERS

1.(c)x +2y–2z= 6

2.(b)3m

3.(d)$\frac{1}{12} seconds$

4.(a)$\frac{x-1}{1} = \frac{y-3}{2} = \frac{z-5}{-2}$

5.(d)_None of the above

CASE STUDY3:

The equation of motion of a missile are x=3t,y=-4t,z=t, where the time ‘t’ is given in seconds, and the distance is measured in kilometres.

Based on the above answer the following:
What is the path of the missile?
Straight line
Parabola
Circle
Ellipse
Which of the following points lie on the path of the missile?a.(6,8,2)
b.(6, -8,-2)
c.(6, -8, 2)
d.(-6, -8,2)
At what distance will the rocket be from the starting point (0,0,0) in 5 seconds?

$\sqrt{550}$kms
$\sqrt{650}$kms

$\sqrt{450}$kms
$\sqrt{750}$kms
If the position of rocket at a certain instant of time is (5,-8,10), then what will be the height of the rocket from the ground? (The ground is considered as the xy–plane).
12km
11km
20km
10km
At a certain instant of time, if the missile is above these a level, where the equation of the surface of sea is given by 2x+y+3z=1 and the position of the missile at that instant of time is (1,1,2), then the image of the position of the rocket in the sea is
a. $(\frac{-9}{7}, \frac{-1}{7}, \frac{-10}{7})$
b.$(\frac{9}{7}, \frac{-1}{7}, \frac{-10}{7})$
c.$(\frac{-9}{7}, \frac{1}{7}$
d.$(\frac{-9}{10}, \frac{-1}{10})$

ANSWERS

1.(a)Straight line
2.(c)(6,-8, 2

3.(b)$\sqrt{650}$kms
4.(d)10 km
5.(a) $(\frac{-9}{7}, \frac{-1}{7}, \frac{-10}{7})$

CASE STUDY4:

Suppose the floor of a hotel is made up of mirror polished Salvato rest one.There is a large crystal chandelier attached to the ceiling of the hotel room. Consider the floor of the hotelroom as a plane having the equation x – y + z = 4 and the crystal chandelier is suspended at the point (1, 0,1).

Based on the above answer the following:

1. Find the direction ratios of the perpendicular from the point (1, 0, 1) to the planex–y+z= 4.

a.(-1, -1,1)
b.(1,-1, -1)
c. (-1,-1, -1)
d. (1, -1, 1)

2. Find the length of the perpendicular from thepoint (1,0,1) to the plane x– y+z= 4.

a. $\frac{2}{\sqrt{3}}$ *units*

b. $\frac{4}{\sqrt{3}}$ *units*

c. $\frac{6}{\sqrt{3}}$ *units*

d. $\frac{8}{\sqrt{3}}$ *units*

The equation of the perpendicular from the point (1, 0, 1) to the plane x – y + z = 4is

a. $\frac{x-1}{2} = \frac{y+3}{-1} = \frac{z+5}{2}$

b. $\frac{x-1}{-2} = \frac{y+3}{-1} = \frac{z-5}{2}$

c. $\frac{x-1}{1} = \frac{y}{-1} = \frac{z-1}{1}$

d. $\frac{x-1}{2} = \frac{y}{-2} = \frac{z-1}{1}$

The equation of the plane parallel to the plane x – y + z = 4, which is at a unit distance from the point(1, 0,1) is

a.x–y+z+(2-$\sqrt{3}$)

b.x–y+z-(2 +$\sqrt{3}$)

c.x–y+z+ (2 +$\sqrt{3}$)

d.Both (a) and (c)

The direction cosine of the normal to the plane x – y + z = 4 is

a. $\left(\frac{1}{\sqrt{3}}, \frac{-1}{\sqrt{3}}, \frac{-1}{\sqrt{3}}\right)$

b. $\left(\frac{1}{\sqrt{3}}, \frac{-1}{\sqrt{3}}, \frac{1}{\sqrt{3}}\right)$

c. $\left(\frac{-1}{\sqrt{3}}, \frac{-1}{\sqrt{3}}, \frac{1}{\sqrt{3}}\right)$

d. $\left(\frac{-1}{\sqrt{3}}, \frac{-1}{\sqrt{3}}, \frac{-1}{\sqrt{3}}\right)$

ANSWERS

1.(d)(1,-1, 1)

2.(a) $\frac{2}{\sqrt{3}}$ *units*

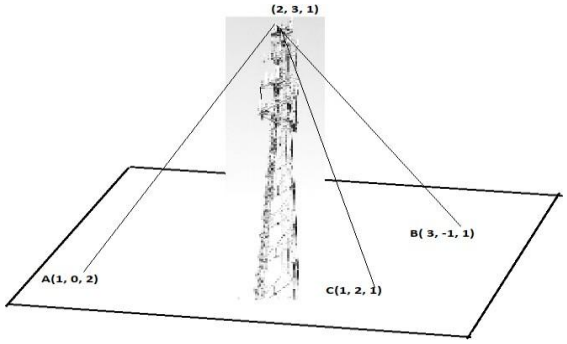
3. (c) $\frac{x-1}{1} = \frac{y}{-1} = \frac{z-1}{-1}$

4.(d)Both (a) and (c)

5.(b) $\left(\frac{1}{\sqrt{3}}, \frac{-1}{\sqrt{3}}, \frac{1}{\sqrt{3}}\right)$

CASE STUDY5:

A mobile tower stands at the top of a hill.Consider the surface on which the tower stands as a plane having points A(1,0,2), B(3,-1,1) and C(1,2,1) on it. The mobile tower is tied with 3 cables from the point A, B and C such that it stands vertically on the ground. The top of the tower is at the point (2,3,1) as shown in the figure.



Based on the above answer the following:

The equation of the plane passing through the points A, B and C isa.3x-2y+ 4z=-11
b.3x+ 2y+4z= 11
c.3x-2y- 4z= 11
d.-3x+ 2y+ 4z=-11

The height of the tower from the ground is

$\frac{5}{\sqrt{29}}$ units

$\frac{7}{\sqrt{29}}$ units

$\frac{6}{\sqrt{29}}$ units

$\frac{8}{\sqrt{29}}$ units

The equation of the perpendicular line drawn from the top of the tower to thegroundis

a. $\frac{x-1}{2}=\frac{y+3}{1}=\frac{z-5}{-2}$

b. $\frac{x-2}{-3}=\frac{y-3}{2}=\frac{z-1}{-4}$

c. $\frac{x-2}{3}=\frac{y-3}{2}=\frac{z-1}{4}$

d. $\frac{x+1}{-2}=\frac{y+3}{-1}=\frac{z-5}{2}$

The coordinates of the foot of the perpendicular drawn from the top of the tower to the ground are

a.$\left(\frac{43}{29}, \frac{-77}{29}, \frac{-9}{29}\right)$

b.$\left(\frac{9}{7}, \frac{-1}{7}, \frac{-10}{7}\right)$

c.$\left(\frac{-43}{29}, \frac{77}{29}, \frac{-9}{29}\right)$

d.$\left(\frac{43}{29}, \frac{77}{29}, \frac{9}{29}\right)$

The area of $\Delta\, ABC$ is

$\frac{\sqrt{29}}{4}$sq.units

$\frac{\sqrt{29}}{2}$sq.units

$\frac{\sqrt{39}}{2}$sq.units

$\frac{\sqrt{39}}{4}$sq.units

ANSWERS

1.(b) 3x+ 2y+ 4z= 11

2.(a)$\frac{5}{\sqrt{29}}$ $units$

3.(c))$\frac{x-2}{3} = \frac{y-3}{2} = \frac{z-1}{4}$

4.(d) $\left(\frac{43}{29}, \frac{77}{29}, \frac{9}{29}\right)$

5.(b))$\frac{\sqrt{29}}{2}$sq.units

Probability

CASE STUDY1:

A coach is training 3 players. He observes that the player A can hit a target 4 times in 5 shots, player B can hit 3 times in4 shots and the player C can hit 2 times in3 shots

From this situation answer the following:

Let the target is hit by A, B: the target is hit by Band, C: the target is hit by A and C. Then, the probability that A, B and, C all will hit, isa.4/5
b.3/5
c.2/5
d.1/5
Referring to (i), what is the probability that B, C will hit and A will lose?a.1/10
b.3/10
c.7/10
d.4/10
With reference to the events mentioned in (i),what is the probability that ‘any two of A, B and C will hit?
1.1/30
2.11/30
3.17/30
4.13/30
What is the probability that ‘none of them will hit the target’?
a.1/30

b. 1/60
c. 1/15
d. 2/15

5. What is the probability that at least one of A, B or C will hit the target?

a. 59/60
b. 2/5
c. 3/5
d. 1/60

Answers:

1.(c)2/5
2.(a)1/10
3.(d)13/30
4.(b)1/60
5.(a)59/60

CASE STUDY2:

There liability of a COVID PCR test is specified as follows:

Of people having COVID, 90% of the test detects the disease but 10% goes undetected. Of people free of COVID, 99% of the test is judged COVID negative but 1% are diagnosed as showing COVID positive. From a large population of which only 0.1% have COVID, one person is selected at random, given the COVID PCR test, and the pathologist reports him/her as COVID positive.

Based on the above information, answer the following

What is the probability of the ‘person to be tested as COVID positive’ given that ‘he is actually having COVID?

a.0.001
b.0.1
c.0.8
d.0.9

What is the probability of the ‘person to be tested as COVID positive’ given that ‘he is actually not having COVID’?

a.0.01
b.0.99
c.0.1
d.0.001

What is the probability that the ‘person is actually not having COVID?

a.0.998
b.0.999
c.0.001
d.0.111

What is the probability that the ‘person is actually having COVID given that ‘he is tested as COVID positive’?

a.0.83
b.0.0803
c.0.083
d.0.089

What is the probability that the ‘person selected will be diagnosed as COVID positive’?

a.0.1089
b.0.01089
c.0.0189
d.0.189

Answers

1.(d)0.9
2.(a)0.01
3.(b)0.999
4.(c)0.083

5.(b)0.01089

CASE STUDY3:

In answering a question on a multiple choice test for class XII, a student either knows the answer or guesses. Let 3/5 be the probability that he knows the answer and 2/5 be the probability that he guesses. Assume that a student who guesses at the answer will be correct with probability 1/3. Let E_1, E_2, E be the events that the student knows the answer, guesses the answer and answers correctly respectively.

Based on the above information, answer the following

1. What is the value of $P(E_1)$?

a. 2/5

b. 1/3

c. 1

d. 3/5

2. Value of $P(E|E_1)$ is

a. 1/3

b. 1

c. 2/3

d. 415

3. $\sum_{k=1}^{k=2} P(E|E_k)P(E_k)$ Equals

a. 11/15

b. 4/15

c. 1/5

d. 1

4. Value of $\sum_{k=1}^{k=2} P(E_k)$

a. 1/3
b. 1/5
c. 1
d. 3/5

5. What is the probability that the student knows the answer given that he answered it correctly?

a. 2/11
b. 5/3
c. 9/11
d. 13/3

Answers

1.(d)3/5
2.(b)1
3.(a)11/15
4.(c)1
5.(c)9/11

Practice Questions 2021-22ClassXII (Term2)

Subject:Mathematics(041)

Time: 2 hours Max.marks: 40

General instructions:

The question paper has three sections. Each partis compulsory.
Section-A has 6 questions of 2 marks each; Section-B has 4 questions of 3 marks each; and Section-C has 4 questions of 4marks each.
Internal choices have been provided in some questions.
Q14 is a case-based problem having 2 sub parts.

SECTIONA

Study the equation given below.

$$\int f(y)\,dy = \log_e\left(y + \frac{1}{y}\right)$$

Find $f(y)$. Show your steps.

OR

Integrate:

$$\int \frac{\sin a \cos a}{2\cos^2 a - 1}\, da$$

Show your steps.

Shown below is a differential equation.

$$y = e^{\sin\left(\frac{d^3y}{dx^3}\right)^2 + \left(\frac{dy}{dx}\right)^4}$$

Find the order and the degree of the given differential equation. Give reasons to support your answer.

Shown below are two vectors in their component forms.

$$\vec{u} = 3\hat{i} - p\hat{j} + 5\hat{k}$$

$$\vec{v} = -6\hat{i} + 14\hat{j} + q\hat{k}$$

For what values of *p* and *q* are the vectors collinear? Show your steps.

4.A(-1, 3, 2), B(-2, 3, -1), C(-5, -4, *p*) and D(-2, -4, 3) are four points in space. Lines AB and CD are parallel.

Find the value of *p*.Show your work and give valid reasons.

Bhavani is going to play a game of chess against one of four opponents in an inter college sports competition. Each opponent is equally likely to be paired against her. The table below shows the chances of Bhavani losing, when paired against each opponent.

Opponent	Opponent1	Opponent2	Opponent3	Opponent4
Bhavani's chancesof losing	12%	60%	*x*%	84%

If the probability that Bhavani loses the game that day is $\frac{1}{2}$, find the probability for Bhavani to be losing the game when paired against Opponent 3. Show your steps.

In the game of archery, the probability of Likith and Harish hitting the target are $\frac{2}{3}$ and $\frac{3}{4}$ respectively.

If both of them shoot an arrow, find the probability that the target is NOT hit by either of them. Show your steps.

SECTIONB

The first derivative of a function $f(x)$ is given below.

$$\frac{e^x (x-1)}{x^2}$$

If $f(1)$= e+3, find $f(x)$. Show your steps.

Find the general solution of the differential equation given below.

$$\frac{dy}{dx} = \frac{1}{x(1+x^2)}$$

Show your steps.

OR

Shown below is a differential equation where the value of y is 0 when x=3.

$$\frac{dy}{dx} + \frac{y}{x} = \frac{1}{x^2 \log x}$$

Find the value of y when x = 5. Show your steps.

Three vertices - A, B and D of a parallelogram ABCD are given by, A(0, -3, 3), B(-5,*m*-3, 0)and D(1, -3, 4). The area of the parallelogram ABCD is 6 sq units.

Using the vector method, find thevalue(s) of*m*. Show your steps.

OR

$\vec{r}$ and $\vec{s}$ are unit vectors. If $|\vec{r}+\vec{s}| = \sqrt{2}$, find:

i) the value of $(4\vec{r}-\vec{s}).(2\vec{r}+\vec{s})$.

ii) the angle between $\vec{r}$ and $\vec{s}$.

Show your steps.

The vector form of equations of two lines, l_1 *and* l_2 are:

$$l_1: \vec{r} = 2\hat{i} - \hat{k} + \lambda(-2\hat{j} + \hat{k})$$
$$l_2: \vec{r} = \hat{i} + 3\hat{j} + 2\hat{k} + \mu(\hat{i} - 2\hat{k})$$

Show that l_1 and l_2 are skew lines.

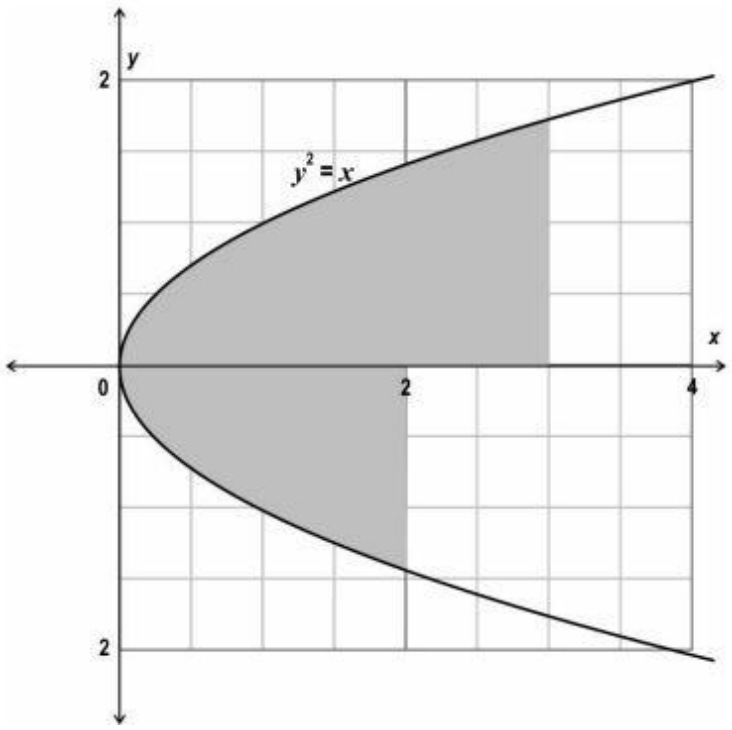
SECTIONC

Evaluate:

$$\int_2^5 \frac{dx}{4x^2 - 8x + 3}$$

Show your steps.

Shown below is aparabola.

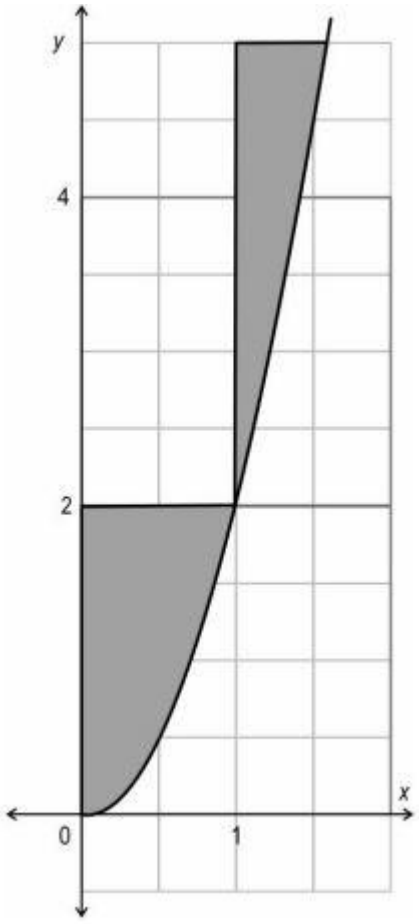


Find the area of the shaded region. Show your steps.

(Note:Take√2 as 1.4 and √3 as 1.7.)

OR

Shown below is the graph of $f(x)= 2x^2$ in the first quadrant.



Find the area of the shaded region.Show your steps.

(Note:You need not evaluate the square roots.)

Shown below are equations of two planes.

Plane1: $-6x-3y-2z=12$

Plane2: $\vec{r}(2\hat{\imath}-11\hat{\jmath}-10\hat{k})-6=0$

Is the point(-2, -3,-1) closer to plane1 or plane2? Show your work.

Read the information given below and answer the questions that follow.

For an audition of a reality singing competition, interested candidates were asked toapply under one of the two musical genres - folk or classical and under one of the two age categories- below 18 or 18 and above.

The following information is known about the 2000 applications received:
960 of the total applications were for the folk genre.
192 of the folk applications were for the below 18 category.
104 of the classical applications were for the 18 and above category.

What is the probability that an application selected at random is for the 18 and above category provided it isunder theclassical genre? Show your work.

[2marks]

An application selected at random is found to be under the below 18 category.

Find the probability that it is under the folk genre.Show your work.

[2marks]

Subject Code - 041

Sample Question Paper
CLASS: XII
Session: 2021-22
Mathematics (Code-041)
Term - 2

Time Allowed: 2 hours **Maximum Marks: 40**

General Instructions:

1. This question paper contains **three sections – A, B and C**. Each part is compulsory.
2. **Section - A** has 6 **short answer type (SA1) questions** of 2 marks each.
3. **Section – B** has 4 **short answer type (SA2) questions** of 3 marks each.
4. **Section - C** has 4 **long answer type questions (LA)** of 4 marks each.
5. There is an **internal choice** in some of the questions.
6. Q14 is a **case-based problem** having 2 sub parts of 2 marks each.

	SECTION – A	
1.	Find $\int \frac{logx}{(1+logx)^2} dx$ OR Find $\int \frac{sin2x}{\sqrt{9-cos^4x}} dx$	2
2.	Write the sum of the order and the degree of the following differential equation: $\frac{d}{dx}\left(\frac{dy}{dx}\right) = 5$	2
3.	If $\hat{a}$ and $\hat{b}$ are unit vectors, then prove that $\left\|\hat{a} + \hat{b}\right| = 2cos\frac{\theta}{2}$, where θ is the angle between them.	2
4.	Find the direction cosines of the following line: $\frac{3-x}{-1} = \frac{2y-1}{2} = \frac{z}{4}$	2
5.	A bag contains 1 red and 3 white balls. Find the probability distribution of the number of red balls if 2 balls are drawn at random from the bag one-by-one without replacement.	2
6.	Two cards are drawn at random from a pack of 52 cards one-by-one without replacement. What is the probability of getting first card red and second card Jack?	2
	SECTION – B	
7.	Find: $\int \frac{x+1}{(x^2+1)x} dx$	3
8.	Find the general solution of the following differential equation: $x\frac{dy}{dx} = y - xsin(\frac{y}{x})$ OR Find the particular solution of the following differential equation, given that y = 0 when x = $\frac{\pi}{4}$: $\frac{dy}{dx} + ycotx = \frac{2}{1+sinx}$	3
9.	If $\vec{a} \neq \vec{0}$, $\vec{a}.\vec{b} = \vec{a}.\vec{c}, \vec{a} \times \vec{b} = \vec{a} \times \vec{c}$, then show that $\vec{b} = \vec{c}$.	3

10.	Find the shortest distance between the following lines: $\vec{r} = (\hat{\imath} + \hat{\jmath} - \hat{k}) + s(2\hat{\imath} + \hat{\jmath} + \hat{k})$ $\vec{r} = (\hat{\imath} + \hat{\jmath} + 2\hat{k}) + t(4\hat{\imath} + 2\hat{\jmath} + 2\hat{k})$ OR Find the vector and the cartesian equations of the plane containing the point $\hat{\imath} + 2\hat{\jmath} - \hat{k}$ and parallel to the lines $\vec{r} = (\hat{\imath} + 2\hat{\jmath} + 2\hat{k}) + s(2\hat{\imath} - 3\hat{\jmath} + 2\hat{k}) = 0$ and $\vec{r} = (3\hat{\imath} + \hat{\jmath} - 2\hat{k}) + t(\hat{\imath} - 3\hat{\jmath} + \hat{k}) = 0$	3
	SECTION – C	
11.	Evaluate: $\int_{-1}^{2} \lvert x^3 - 3x^2 + 2x \rvert dx$	4
12.	Using integration, find the area of the region in the first quadrant enclosed by the line x + y = 2, the parabola $y^2 = x$ and the x-axis. OR Using integration, find the area of the region $\{(x, y): 0 \leq y \leq \sqrt{3}x, x^2 + y^2 \leq 4\}$	4
13.	Find the foot of the perpendicular from the point (1, 2, 0) upon the plane x – 3y + 2z = 9. Hence, find the distance of the point (1, 2, 0) from the given plane.	4
14.	**CASE-BASED/DATA-BASED**  Fig 3 An insurance company believes that people can be divided into two classes: those who are accident prone and those who are not. The company's statistics show that an accident-prone person will have an accident at sometime within a fixed one-year period with probability 0.6, whereas this probability is 0.2 for a person who is not accident prone. The company knows that 20 percent of the population is accident prone. **Based on the given information, answer the following questions.**	
	(i)what is the probability that a new policyholder will have an accident within a year of purchasing a policy?	2
	(ii) Suppose that a new policyholder has an accident within a year of purchasing a policy. What is the probability that he or she is accident prone?	2

Subject Code - 041

Marking Scheme
CLASS: XII
Session: 2021-22
Mathematics (Code-041)
Term - 2

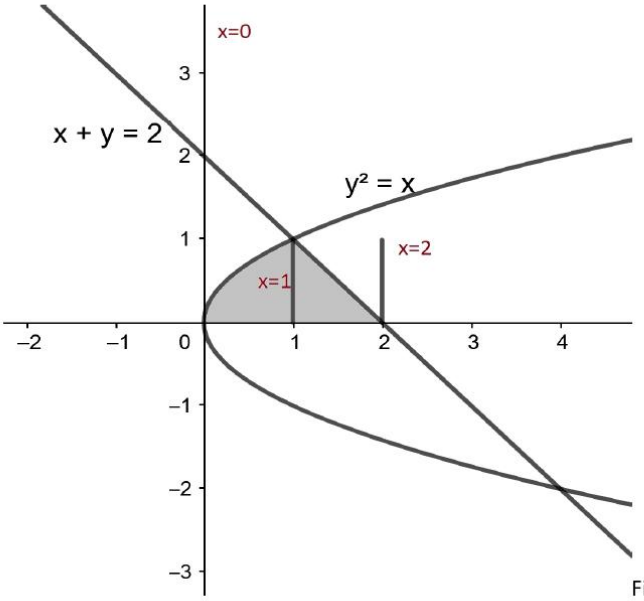
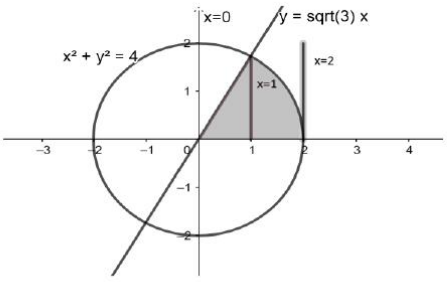
SECTION – A

1.	Find: $\int \frac{logx}{(1+logx)^2}dx$ Solution: $\int \frac{logx}{(1+logx)^2}dx = \int \frac{logx+1-1}{(1+logx)^2}dx = \int \frac{1}{1+logx}dx - \int \frac{1}{(1+logx)^2}dx$ $= \frac{1}{1+logx} \times x - \int \frac{-1}{(1+logx)^2} \times \frac{1}{x} \times xdx - \int \frac{1}{(1+logx)^2}dx = \frac{x}{1+logx} + c$ OR Find: $\int \frac{sin2x}{\sqrt{9-cos^4x}}dx$ Solution: Put $cos^2x = t \Rightarrow -2cosxsinxdx = dt \Rightarrow sin2xdx = -dt$ The given integral $= -\int \frac{dt}{\sqrt{3^2-t^2}} = -\sin^{-1}\frac{t}{3} + c = -\sin^{-1}\frac{cos^2x}{3} + c$	1/2 1+1/2 1 1
2.	Write the sum of the order and the degree of the following differential equation: $\frac{d}{dx}\left(\frac{dy}{dx}\right) = 5$ Solution: Order = 2 Degree = 1 Sum = 3	 1 1/2 ½
3.	If $\hat{a}$ and $\hat{b}$ are unit vectors, then prove that $\left\|\hat{a}+\hat{b}\right\| = 2cos\frac{\theta}{2}$, where θ is the angle between them. Solution: $(\hat{a}+\hat{b}).(\hat{a}+\hat{b}) = \|\hat{a}\|^2 + \left|\hat{b}\right|^2 + 2(\hat{a}.\hat{b})$ $\left\|\hat{a}+\hat{b}\right\|^2 = 1+1+2cos\theta$ $= 2(1+cos\theta) = 4cos^2\frac{\theta}{2}$ $\therefore \left\|\hat{a}+\hat{b}\right\| = 2cos\frac{\theta}{2}$,	 1 1/2 ½
4.	Find the direction cosines of the following line: $\frac{3-x}{-1} = \frac{2y-1}{2} = \frac{z}{4}$ Solution: The given line is $\frac{x-3}{1} = \frac{y-\frac{1}{2}}{1} = \frac{z}{4}$ Its direction ratios are <1, 1, 4> Its direction cosines are $\langle\frac{1}{3\sqrt{2}}, \frac{1}{3\sqrt{2}}, \frac{4}{3\sqrt{2}}\rangle$	 1 1/2 ½

5.	A bag contains 1 red and 3 white balls. Find the probability distribution of the number of red balls if 2 balls are drawn at random from the bag one-by-one without replacement. Solution: Let X be the random variable defined as the number of red balls. Then X = 0, 1 P(X=0) = $\frac{3}{4}\times\frac{2}{3}=\frac{6}{12}=\frac{1}{2}$ P(X=1) =$\frac{1}{4}\times\frac{3}{3}+\frac{3}{4}\times\frac{1}{3}=\frac{6}{12}=\frac{1}{2}$ Probability Distribution Table: X: 0, 1 P(X): $\frac{1}{2}$, $\frac{1}{2}$	1/2 1/2 1/2 ½
6.	Two cards are drawn at random from a pack of 52 cards one-by-one without replacement. What is the probability of getting first card red and second card Jack? Solution: The required probability = P((The first is a red jack card and The second is a jack card) or (The first is a red non-jack card and The second is a jack card)) =$\frac{2}{52}\times\frac{3}{51}+\frac{24}{52}\times\frac{4}{51}=\frac{1}{26}$	1 1
	SECTION – B	
7.	Find: $\int\frac{x+1}{(x^2+1)x}dx$ Solution: Let $\frac{x+1}{(x^2+1)x}=\frac{Ax+B}{x^2+1}+\frac{C}{x}=\frac{(Ax+B)x+C(x^2+1)}{(x^2+1)x}$ $\Rightarrow x+1=(Ax+B)x+C(x^2+1)$ (An identity) Equating the coefficients, we get B = 1, C = 1, A + C = 0 Hence, A = -1, B = 1, C = 1 The given integral = $\int\frac{-x+1}{x^2+1}dx+\int\frac{1}{x}dx$ $=\frac{-1}{2}\int\frac{2x-2}{x^2+1}dx+\int\frac{1}{x}dx$ $=\frac{-1}{2}\int\frac{2x}{x^2+1}dx+\int\frac{1}{x^2+1}dx+\int\frac{1}{x}dx$ $=\frac{-1}{2}\log(x^2+1)+\tan^{-1}x+log\lvert x\rvert+c$	1/2 ½ 1/2 1+1/2
8.	Find the general solution of the following differential equation: $x\frac{dy}{dx}=y-xsin(\frac{y}{x})$ Solution: We have the differential equation: $\frac{dy}{dx}=\frac{y}{x}-sin(\frac{y}{x})$ The equation is a homogeneous differential equation. Putting $y=vx\Rightarrow\frac{dy}{dx}=v+x\frac{dv}{dx}$ The differential equation becomes $v+x\frac{dv}{dx}=v-sinv$ $\Rightarrow\frac{dv}{sinv}=-\frac{dx}{x}\Rightarrow cosecvdv=-\frac{dx}{x}$ Integrating both sides, we get	1 ½

	$log\|cosecv - cotv\| = -log\|x\| + logK, K > 0$ (Here, $logK$ is an arbitrary constant.) $\Rightarrow log\|(cosecv - cotv)x\| = logK$ $\Rightarrow \|(cosecv - cotv)x\| = K$ $\Rightarrow (cosecv - cotv)x = \pm K$ $\Rightarrow \left(cosec\frac{y}{x} - cot\frac{y}{x}\right)x = C$, which is the required general solution. OR Find the particular solution of the following differential equation, given that y = 0 when x = $\frac{\pi}{4}$: $\frac{dy}{dx} + ycotx = \frac{2}{1+sinx}$ Solution: The differential equation is a linear differential equation I F = $e^{\int cotxdx} = e^{logsinx} = sinx$ The general solution is given by $ysinx = \int 2\frac{sinx}{1+sinx}dx$ $\Rightarrow ysinx = 2\int \frac{sinx+1-1}{1+sinx}dx = 2\int [1 - \frac{1}{1+sinx}]dx$ $\Rightarrow ysinx = 2\int [1 - \frac{1}{1+\cos\left(\frac{\pi}{2}-x\right)}]dx$ $\Rightarrow ysinx = 2\int [1 - \frac{1}{2cos^2\left(\frac{\pi}{4}-\frac{x}{2}\right)}]dx$ $\Rightarrow ysinx = 2\int [1 - \frac{1}{2}sec^2\left(\frac{\pi}{4}-\frac{x}{2}\right)]dx$ $\Rightarrow ysinx = 2[x + \tan\left(\frac{\pi}{4}-\frac{x}{2}\right)] + c$ Given that y = 0, when x = $\frac{\pi}{4}$, Hence, 0 = $2[\frac{\pi}{4} + tan\frac{\pi}{8}] + c$ $\Rightarrow c = -\frac{\pi}{2} - 2tan\frac{\pi}{8}$ Hence, the particular solution is $y = cosecx[2\left\{x + \tan\left(\frac{\pi}{4}-\frac{x}{2}\right)\right\} - \left(\frac{\pi}{2} + 2tan\frac{\pi}{8}\right)]$	1 ½ 1 ½ 1 ½
9.	If $\vec{a} \neq \vec{0}$, $\vec{a}.\vec{b} = \vec{a}.\vec{c}, \vec{a} \times \vec{b} = \vec{a} \times \vec{c}$, then show that $\vec{b} = \vec{c}$. Solution: We have $\vec{a}.(\vec{b} - \vec{c}) = 0$ $\Rightarrow (\vec{b} - \vec{c}) = \vec{0}$ or $\vec{a} \perp (\vec{b} - \vec{c})$ $\Rightarrow \vec{b} = \vec{c}$ or $\vec{a} \perp (\vec{b} - \vec{c})$ Also, $\vec{a} \times (\vec{b} - \vec{c}) = \vec{0}$ $\Rightarrow (\vec{b} - \vec{c}) = \vec{0}$ or $\vec{a} \parallel (\vec{b} - \vec{c})$ $\Rightarrow \vec{b} = \vec{c}$ or $\vec{a} \parallel (\vec{b} - \vec{c})$ $\vec{a}$ *can not be both perpendicular to* $(\vec{b} - \vec{c})$ *and parallel to* $(\vec{b} - \vec{c})$ Hence, $\vec{b} = \vec{c}$.	 1 1 1
10.	Find the shortest distance between the following lines: $\vec{r} = (\hat{\imath} + \hat{\jmath} - \hat{k}) + s(2\hat{\imath} + \hat{\jmath} + \hat{k})$ $\vec{r} = (\hat{\imath} + \hat{\jmath} + 2\hat{k}) + t(4\hat{\imath} + 2\hat{\jmath} + 2\hat{k})$	

	Solution: Here, the lines are parallel. The shortest distance = $\frac{\left\lvert(\overrightarrow{a_2}-\overrightarrow{a_1})\times\vec{b}\right\rvert}{\lvert\vec{b}\rvert}$ $= \frac{\left\lvert(3\hat{k})\times(2\hat{\imath}+\hat{\jmath}+\hat{k})\right\rvert}{\sqrt{4+1+1}}$ $(3\hat{k})\times(2\hat{\imath}+\hat{\jmath}+\hat{k}) = \begin{vmatrix}\hat{\imath} & \hat{\jmath} & \hat{k}\\ 0 & 0 & 3\\ 2 & 1 & 1\end{vmatrix} = -3\hat{\imath}+6\hat{\jmath}$ Hence, the required shortest distance = $\frac{3\sqrt{5}}{\sqrt{6}}$ units OR Find the vector and the cartesian equations of the plane containing the point $\hat{\imath}+2\hat{\jmath}-\hat{k}$ and parallel to the lines $\vec{r} = (\hat{\imath}+2\hat{\jmath}+2\hat{k})+s(2\hat{\imath}-3\hat{\jmath}+2\hat{k}) = 0$ and $\vec{r} = (3\hat{\imath}+\hat{\jmath}-2\hat{k})+t(\hat{\imath}-3\hat{\jmath}+\hat{k}) = 0$ Solution: Since, the plane is parallel to the given lines, the cross product of the vectors $2\hat{\imath}-3\hat{\jmath}+2\hat{k}$ and $\hat{\imath}-3\hat{\jmath}+\hat{k}$ will be a normal to the plane $(2\hat{\imath}-3\hat{\jmath}+2\hat{k})\times(\hat{\imath}-3\hat{\jmath}+\hat{k}) = \begin{vmatrix}\hat{\imath} & \hat{\jmath} & \hat{k}\\ 2 & -3 & 2\\ 1 & -3 & 1\end{vmatrix} = 3\hat{\imath}-3\hat{k}$ The vector equation of the plane is $\vec{r}.(3\hat{\imath}-3\hat{k}) = (\hat{\imath}+2\hat{\jmath}-\hat{k}).(3\hat{\imath}-3\hat{k})$ or, $\vec{r}.(\hat{\imath}-\hat{k}) = 2$ and the cartesian equation of the plane is x – z – 2 = 0	1+1/2 1 ½ 1 1 1
	SECTION – C	
11.	Evaluate: $\int_{-1}^{2}\lvert x^3-3x^2+2x\rvert dx$ Solution: The given definite integral = $\int_{-1}^{2}\lvert x(x-1)(x-2)\rvert dx$ $= \int_{-1}^{0}\lvert x(x-1)(x-2)\rvert dx + \int_{0}^{1}\lvert x(x-1)(x-2)\rvert dx + \int_{1}^{2}\lvert x(x-1)(x-2)\rvert dx$ $= -\int_{-1}^{0}(x^3-3x^2+2x)dx + \int_{0}^{1}(x^3-3x^2+2x)dx - \int_{1}^{2}(x^3-3x^2+2x)dx$ $= -[\frac{x^4}{4}-x^3+x^2]_{-1}^{0} + [\frac{x^4}{4}-x^3+x^2]_{0}^{1} - [\frac{x^4}{4}-x^3+x^2]_{1}^{2}$ $= \frac{9}{4}+\frac{1}{4}+\frac{1}{4} = \frac{11}{4}$	1+1/2 1/2 2

12.	Using integration, find the area of the region in the first quadrant enclosed by the line x + y = 2, the parabola $y^2 = x$ and the x-axis. Solution: Solving x + y = 2 and $y^2 = x$ simultaneously, we get the points of intersection as (1, 1) and (4, -2).	1
	 Fig 1	1
	The required area = the shaded area = $\int_0^1 \sqrt{x}\,dx + \int_1^2 (2-x)dx$ $= \frac{2}{3}[x^{\frac{3}{2}}]_0^1 + [2x - \frac{x^2}{2}]_1^2$ $= \frac{2}{3} + \frac{1}{2} = \frac{7}{6}$ square units	1 1
	OR Using integration, find the area of the region: $\{(x,y): 0 \le y \le \sqrt{3}x, x^2 + y^2 \le 4\}$ Solution: Solving $y = \sqrt{3}x$ *and* $x^2 + y^2 = 4$, we get the points of intersection as (1, $\sqrt{3}$) and (-1, $-\sqrt{3}$)	1
	 Fig 2	1

	The required area = the shaded area = $\int_0^1 \sqrt{3}x\,dx + \int_1^2 \sqrt{4-x^2}dx$ $= \frac{\sqrt{3}}{2}[x^2]_0^1 + \frac{1}{2}[x\sqrt{4-x^2} + 4\sin^{-1}\frac{x}{2}]_1^2$ $= \frac{\sqrt{3}}{2} + \frac{1}{2}[2\pi - \sqrt{3} - 2\frac{\pi}{3}]$ $= \frac{2\pi}{3}$ square units	1 1
13.	Find the foot of the perpendicular from the point (1, 2, 0) upon the plane x – 3y + 2z = 9. Hence, find the distance of the point (1, 2, 0) from the given plane. Solution: The equation of the line perpendicular to the plane and passing through the point (1, 2, 0) is $\frac{x-1}{1} = \frac{y-2}{-3} = \frac{z}{2}$ The coordinates of the foot of the perpendicular are $(\mu+1, -3\mu+2, 2\mu)$ for some μ These coordinates will satisfy the equation of the plane. Hence, we have $\mu + 1 - 3(-3\mu + 2) + 2(2\mu) = 9$ $\Rightarrow \mu = 1$ The foot of the perpendicular is (2, -1, 2). Hence, the required distance = $\sqrt{(1-2)^2 + (2+1)^2 + (0-2)^2} = \sqrt{14}\,units$	 1 ½ 1 ½ 1

14.	**CASE-BASED/DATA-BASED**	
	 Fig 3 An insurance company believes that people can be divided into two classes: those who are accident prone and those who are not. The company's statistics show that an accident-prone person will have an accident at sometime within a fixed one-year period with probability 0.6, whereas this probability is 0.2 for a person who is not accident prone. The company knows that 20 percent of the population is accident prone. **Based on the given information, answer the following questions.**	
	(i)what is the probability that a new policyholder will have an accident within a year of purchasing a policy?	
	(ii) Suppose that a new policyholder has an accident within a year of purchasing a policy. What is the probability that he or she is accident prone?	
	Solution: Let E_1 = The policy holder is accident prone. E_2 = The policy holder is not accident prone. E = The new policy holder has an accident within a year of purchasing a policy. (i) $P(E) = P(E_1) \times P(E/E_1) + P(E_2) \times P(E/E_2)$ 1 $= \frac{20}{100} \times \frac{6}{10} + \frac{80}{100} \times \frac{2}{10} = \frac{7}{25}$ 1 (ii) By Bayes' Theorem, $P(E_1/E) = \frac{P(E_1) \times P(E/E_1)}{P(E)}$ 1 $= \frac{\frac{20}{100} \times \frac{6}{10}}{\frac{280}{1000}} = \frac{3}{7}$ 1	

Sample Paper 1

Mathematics

Section - A

1. Find: $\int \frac{1}{\cos^2 x\,(1-\tan x)^2}\,dx$

OR

Evaluate: $\int \frac{dx}{1-\tan x}$

2. Determine the order and degree of the following differential equation $\frac{d^2y}{dx^2} = \cos 3x + \sin 3x$.

3. Find a vector r equally inclined to the three axes and whose magnitude is $3\sqrt{3}$ units.

4. Find the value of λ such that the line $\frac{x-2}{6} = \frac{y-1}{\lambda} = \frac{z+5}{-4}$ is perpendicular to the plane $3x-y-2z = 7$.

5. Three persons A, B and C, fire at a target in turn, starting with A. Their probability of hitting the target are 0.4, 0.3 and 0.2 respectively. Find the probability of two hits.

6. A die is rolled. Consider the events

$$A = \{2,4,6\},\ B = \{4,5\},\ C = \{3,4,5,6\}$$

Find $P[A \cup B/C]$.

Section - B

7. Evaluate : $\int_0^{\pi/2} \log \sin x\,dx$

8. Solve the following differential equation :

$$\frac{dy}{dx} + y = \cos x - \sin x$$

OR

Given that $\frac{dy}{dx} = e^{-2y}$ and if $x = 5$, then $y = 0$. When $y = 3$, then find the value of x.

9. Using vectors, find the area of a triangle with vertices A (1, 1, 2), B (2, 3, 5) and C(1, 5, 5).

10. Find the shortest distance between the following pair of lines :

$$\frac{x-3}{1} = \frac{y-5}{-2} = \frac{z-7}{1} \text{ and } \frac{x+1}{7} = \frac{y+1}{-6} = \frac{z+1}{1}.$$

OR

Find the cartesian equation of the line passing through the point A (1, 2, –4) and perpendicular to the lines:

$$\frac{x-4}{2} = \frac{y-2}{3} = \frac{z-3}{4} \text{ and } \frac{x-1}{1} = \frac{y+2}{-3} = \frac{z-3}{5}$$

Section - C

11. Evaluate : $\int \frac{3x+4}{(x-1)(x+2)(x-3)}dx$.

12. Find the area of the region enclosed between the parabola $4y = 3x^2$ and the line $3x - 2y + 12 = 0$.

OR

Find the area of the region quadrant enclosed by x-axis, line $x = \sqrt{3}y$ and the circle $x^2 + y^2 = 4$.

13. Find the distance of point $-2\hat{i}+3\hat{j}-4\hat{k}$ from the line $\vec{r} = \hat{i}+2\hat{j}-\hat{k}+\lambda(\hat{i}+3\hat{j}-9\hat{k})$ measured parallel to the plane $x - y + 2z - 3 = 0$.

14. In an office three employees Vinay, Sonia and Iqbal process incoming copies of a certain from. Vinay processes 50% of the forms. Sonia processes 20% and Iqbal processes the remaining 30% of the forms. Vinay has an error rate of 0.06%, Sonia has an error rate of 0.04% and Iqbal has an error rate of 0.03%.

Based on the above information answer the following:

(i) The total probability of committing an error in processing the form is?

(ii) The manager of the company wants to do a quality check. During inspection he selects a form at random from the days output of processed forms. If the form selected at random has an error, the probability that the form is NOT processed by Vinay is?

❑❑

Answers

Sample Paper 1

Section - A

1. We have given

$$\int \frac{1}{\cos^2 x(1-\tan x)^2}dx = \int \frac{\sec^2 x}{(1-\tan x)^2}dx \qquad \left[\because \cos x = \frac{1}{\sec x}\right]$$

Let, $1-\tan x = t \Rightarrow -\sec^2 x\, dx = dt$

$\Rightarrow$ $\sec^2 x\, dx = -dt$

$$I = -\int \frac{dt}{t^2}$$

$$= -\frac{t^{-1}}{-1} + C$$

$$= \frac{1}{t} + C$$

$$= \frac{1}{1-\tan x} + C$$

OR

Let $$I = \int \frac{dx}{1-\tan x} = \int \frac{dx}{1-\frac{\sin x}{\cos x}}$$

$\Rightarrow$ $$I = \int \frac{\cos x}{\cos x - \sin x}dx$$

$$= \frac{1}{2}\int \frac{2\cos x}{\cos x - \sin x}dx$$

$$= \frac{1}{2}\int \frac{(\sin x + \cos x) + (\cos x - \sin x)}{\cos x - \sin x}\, dx$$

$\Rightarrow$ $$I = \frac{1}{2}\int \frac{\sin x + \cos x}{\cos x - \sin x}dx + \frac{1}{2}\int dx$$

Put $\cos x - \sin x = t$

Differentiating both sides, we get

$\Rightarrow$ $(-\sin x - \cos x)\, dx = dt$

$\Rightarrow$ $(\sin x + \cos x)\, dx = -dt$

$\therefore$ $$I = \frac{-1}{2}\int \frac{dt}{t} + \frac{1}{2}\int dx$$

$\Rightarrow$ $$I = \frac{-1}{2}\log|t| + \frac{x}{2} + C$$

$\Rightarrow$ $$I = \frac{-1}{2}\log|\cos x - \sin x| + \frac{x}{2} + C$$

2. $$\frac{d^2y}{dx^2} = \cos 3x + \sin 3x$$

$\Rightarrow$ $$\frac{d^2y}{dx^2} - \cos 3x - \sin 3x = 0$$

The highest order derivative present in the differential equation is $\frac{d^2y}{dx^2}$. Therefore, its order is two.

It is a polynomial equation in $\frac{d^2y}{dx^2}$ and the power raised to $\frac{d^2y}{dx^2}$ is 1.

Hence, its degree is one.

3. We have $|\vec{r}| = 3\sqrt{3}$

Since, $\vec{r}$ is equally inclined to the three axes, direction consines of the unit vector $\vec{r}$ will be same.

i.e. $l = m = n$

Now we know that,

$$l^2 + m^2 + n^2 = 1$$

$$\Rightarrow \quad l^2 + l^2 + l^2 = 1 \qquad (\because l = m = n)$$

$$\Rightarrow \quad 3l^2 = 1$$

$$\Rightarrow \quad l^2 = \frac{1}{3}$$

$$\Rightarrow \quad l = \pm\frac{1}{\sqrt{3}}$$

So, $\hat{r} = \pm\frac{1}{\sqrt{3}}\hat{i} \pm \frac{1}{\sqrt{3}}\hat{j} \pm \frac{1}{\sqrt{3}}\hat{k}$

$\therefore$ $\vec{r} = |\vec{r}|.\hat{r}$

$$= 3\sqrt{3}\left[\pm\frac{1}{\sqrt{3}}\hat{i} \pm \frac{1}{\sqrt{3}}\hat{j} \pm \frac{1}{\sqrt{3}}\hat{k}\right]$$

$$= \pm 3\left[\hat{i} + \hat{j} + \hat{k}\right]$$

4. Given that line $\frac{x-2}{6} = \frac{y-1}{\lambda} = \frac{z+5}{-4}$ is perpendicular to plane $3x - y - 2z = 7$

$\therefore$ $\frac{6}{3} = \frac{\lambda}{-1} = \frac{-4}{-2}$

[$\therefore$ When a line is perpendicular to a plane, their direction ratios are proportional]

$$\Rightarrow \quad 2 = -\lambda = 2$$

$$\Rightarrow \quad -\lambda = 2$$

$$\Rightarrow \quad \lambda = -2$$

5. Here, $P(A) = 0.4$, $P(\overline{A}) = 0.6$, $P(B) = 0.3$,

$P(\overline{B}) = 0.7$, $P(C) = 0.2$ and $P(\overline{C}) = 0.8$

$\therefore$ Probability of two hits $= P(A).P(B).P(\overline{C}) + P(A).P(\overline{B}) + P(C) + P(\overline{A}).P(B).P(C)$

$= 0.4 \times 0.3 \times 0.8 + 0.4 \times 0.7 \times 0.2 + 0.6 \times 0.3 \times 0.2$

$= 0.096 + 0.056 + 0.036 = 0.188$

6. Given that, $A = \{2, 4, 6\}$, $B = \{4, 5\}$, $C = \{3, 4, 5, 6\}$

Now, $A \cup B = \{2, 4, 6\} \cup \{4, 5\} = \{2, 4, 5. 6\}$

So, $P(A \cup B) = \frac{4}{6} = \frac{2}{3}$

Now, $(A \cup B) \cap C = \{2, 4, 5, 6\} \cap \{3, 4, 5, 6\} = \{4, 5, 6\}$

So, $P[(A \cup B) \cap C] = \frac{3}{6} = \frac{1}{2}$

Also $P(C) = \frac{4}{6} = \frac{2}{3}$

$$\text{Required probability} = P[(A \cup B)/C] = \frac{P[(A \cup B) \cap C]}{P(C)}$$

$$= \frac{1/2}{2/3} = \frac{1}{2} \times \frac{3}{2} = \frac{3}{4}$$

Section - B

7. $$I = \int_0^{\pi/2} \log \sin x \, dx \qquad \ldots (1)$$

$\Rightarrow$ $$I = \int_0^{\pi/2} \log \sin\left(\frac{\pi}{2} - x\right) dx \quad \text{(using the property of definite integral)}$$

$\Rightarrow$ $$I = \int_0^{\pi/2} \log \cos x \, dx \qquad \ldots (2)$$

Adding, (1) and (2), we get

$$2I = \int_0^{\pi/2} \log (\sin x \cos x) \, dx$$

$\Rightarrow$ $$2I = \int_0^{\pi/2} \log \left(\frac{2 \sin x \cos x}{2}\right) dx$$

$$= \int_0^{\pi/2} \log \sin 2x \, dx - \int_0^{\pi/2} \log 2 \, dx$$

$\Rightarrow$ $$2I = \int_0^{\pi/2} \log \sin 2x \, dx - \frac{\pi}{2} \log 2$$

Putting $2x = t$

$\Rightarrow$ $$dx = \frac{dt}{2}$$

$\therefore$ $$2I = \frac{1}{2} \int_0^{\pi} \log \sin t \, dt - \frac{\pi}{2} \log 2$$

$$= \frac{1}{2} \times 2 \int_0^{\pi/2} \log \sin t \, dt - \frac{\pi}{2} \log 2 \qquad [\because \sin(\pi - x) = \sin x]$$

$\therefore$ using property $\int_0^a f(x) \, dx = 2 \int_0^{a/2} f(x) \, dx$

$\Rightarrow$ $$2I = I - \frac{\pi}{2} \log 2 \qquad \text{(From (1))}$$

$\Rightarrow$ $$I = -\frac{\pi}{2} \log 2 .$$

8. Given differential equation is

$$\frac{dy}{dx} + y = \cos x - \sin x \qquad \ldots (1)$$

Here $P = 1$, $Q = \cos x - \sin x$.

$$\text{I.F.} = e^{\int 1 . dx} = e^x$$

Solution of given equation will be given by

$$y.\text{I.F.} = \int Q \times \text{I.F.} dx + C$$

$\Rightarrow$ $$y.e^x = \{e^x (\cos x - \sin x) \, dx + C\}$$

$\Rightarrow$ $$y.e^x = \int e^x \cos x \, dx - \int e^x \sin x \, dx + C$$

$\Rightarrow$ $$y.e^x = -e^x \sin x - \int e^x .(-\sin x) dx - \int e^x \sin x dx + C$$

$\Rightarrow$ $$y.e^x = -e^x \sin x + C$$

$\Rightarrow$ $$y = -\sin x + ce^{-x}$$

OR

Given :

$$\frac{dy}{dx} = e^{-2y}$$

$$\Rightarrow \quad \frac{dy}{e^{-2y}} = dx$$

on integrating both sides

$$\Rightarrow \quad \int e^{2y} dy = \int dx$$

$$\Rightarrow \quad \frac{e^{2y}}{2} = x + C \qquad \ldots(1)$$

When $x = 5$ and $y = 0$, then putting these values in equation (1),

$$\frac{e^0}{2} = 5 + C$$

$$\Rightarrow \quad \frac{1}{2} = 5 + C$$

$$\Rightarrow \quad C = \frac{1}{2} - 5 = \frac{-9}{2}$$

Substituting Value of C in equation (1),

$$e^{2y} = 2x + 2 \times \left(\frac{-9}{2}\right) = 2x - 9$$

When $y = 3$, then

$$e^6 = 2x - 9$$

$$\Rightarrow \quad 2x = e^6 + 9$$

Hence,
$$x = \frac{e^6 + 9}{2}$$

9. A(1, 1, 2), B(2, 3, 5) and C (1, 5, 5) are the vertices of the given triangle.

$$\vec{AB} = (2-1)\hat{i} + (3-1)\hat{j} + (5-2)\hat{k}$$

$$\therefore \quad \vec{AB} = \hat{i} + 2\hat{j} + 3\hat{k}$$

and
$$\vec{AC} = (1-1)\hat{i} + (5-1)\hat{j} + (5-2)\hat{k}$$

$$\therefore \quad \vec{AC} = O\hat{i} + 4\hat{j} + 3\hat{k}$$

$$\text{Area of } \Delta ABC = \frac{1}{2}\vec{AB} \times \vec{AC}$$

$$= \frac{1}{2}\begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 1 & 2 & 3 \\ 0 & 4 & 3 \end{vmatrix}$$

$$= \frac{1}{2}\left|\hat{i}(6-12) - \hat{j}(3) + \hat{k}(4)\right|$$

$$= \frac{1}{2}\left|-6\hat{i} - 3\hat{j} + 4\hat{k}\right| = \frac{1}{2}\sqrt{(-6)^2 + (-3)^2 + 4^2}$$

$$= \frac{1}{2}\sqrt{36 + 9 + 16}$$

$$= \frac{\sqrt{61}}{2} \text{ sq. units}$$

10. Given lines are

$$\frac{x-3}{1}=\frac{y-5}{-2}=\frac{z-7}{1}$$

and $$\frac{x+1}{7}=\frac{y+1}{-6}=\frac{z+1}{1}$$

Here, $(a_1, b_1, c_1) = (1, -2, 1); x_1 = 3, y_1 = 5, z_1 = 7$

and $(a_2, b_2, c_2) = (7, -6, 1); x_2 = -1, y_2 = -1, z_2 = -1$

Now, we know that shortest distance between two lines is given by

$$d = \frac{\begin{vmatrix} x_2-x_1 & y_2-y_1 & z_2-z_1 \\ a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \end{vmatrix}}{\sqrt{(b_1c_2-b_2c_1)^2+(c_1a_2-c_2a_1)^2+(a_1b_2-a_2b_1)^2}}$$

$$= \frac{\left|\begin{vmatrix} -4 & -6 & -8 \\ 1 & -2 & 1 \\ 7 & -6 & 1 \end{vmatrix}\right|}{\sqrt{4^2+6^2+8^2}}$$

$\Rightarrow$ $$d = \frac{|-116|}{\sqrt{116}} = \sqrt{116} \Rightarrow d = 2\sqrt{29} \text{ units}$$

Hence, the required shortest distance is $2\sqrt{29}$ units.

OR

Equation of line passing through A(1, 2, – 4) and parallel to $\vec{b} = (b_1\hat{i} + b_2\hat{j} + b_3\hat{k})$

$$\frac{x-1}{b_1}=\frac{y-2}{b_2}=\frac{z+4}{b_3} \quad \ldots(1)$$

Now, given lines are:

$$\frac{x-4}{2}=\frac{y-2}{3}=\frac{z-3}{4} \quad \ldots(2)$$

and $$\frac{x-1}{1}=\frac{y+2}{-3}=\frac{z-3}{5} \quad \ldots(3)$$

Since line (1) is perpendicular to the lines (2) and (3).

$\therefore$ $2b_1 + 3b_2 + 4b_3 = 0$ …(4)

and $b_1 - 3b_2 + 5b_3 = 0$ …(5)

On solving (4) and (5), we get

$$\frac{b_1}{15+12}=\frac{b_2}{-10+4}=\frac{b_3}{-6-3}$$

or $$\frac{b_1}{27}=\frac{b_2}{-6}=\frac{b_3}{-9} \text{ or } \frac{b_1}{9}=\frac{b_2}{-2}=\frac{b_3}{-3}$$

Hence, the required line is

$$\frac{x-1}{9}=\frac{y-2}{-2}=\frac{z+4}{-3}.$$

Section - C

11. Let $$I = \int \frac{3x+4}{(x-1)(x+2)(x-3)}dx$$

Put $$\frac{3x+4}{(x-1)(x+2)(x-3)} = \frac{A}{(x-1)} + \frac{B}{(x+2)} + \frac{C}{(x-3)} \quad \ldots(1)$$

$\Rightarrow$ $(3x + 4) = A(x + 2)(x - 3) + B(x - 3)(x - 1) + (x + 2)(x - 1)$ ...(2)

Put $x = 1$ in (2)

$\Rightarrow$ $7 = A(3)(-2) + B(0) + C(0)$

$\Rightarrow$ $7 = -6A$

$\Rightarrow$ $A = -\frac{7}{6}$

Put $x = 3$ in (2)

$\Rightarrow$ $13 = 0 + 0 + C(5)(2)$

$\Rightarrow$ $C = \frac{13}{10}$

Put $x = -2$ in (2)

$\Rightarrow$ $-2 = B(-3)(-5)$

$\Rightarrow$ $B = \frac{-2}{15}$

Putting these values in (1)

$$\frac{3x+4}{(x-1)(x+2)(x-3)} = \frac{-7}{6(x-1)} + \left(\frac{-2}{15}\right)\frac{1}{(x+2)} + \frac{13}{10}\cdot\frac{1}{(x-3)}$$

$\therefore$ $$I = \int \frac{3x+4}{(x-1)(x+2)(x-3)}\,dx$$

$$= \int\left[\frac{-7}{6(x-1)} + \left(\frac{-2}{15}\right)\frac{1}{(x+2)} + \frac{13}{10}\left(\frac{1}{x-3}\right)\right]dx$$

$$= \frac{-7}{6}\int\frac{dx}{x-1} + \left(\frac{-2}{15}\right)\int\frac{dx}{x+2} + \frac{13}{10}\int\frac{dx}{x-3}$$

$$= \frac{-7}{6}\log|x-1| - \frac{2}{15}\log|x+2| + \frac{13}{10}\log|x-3| + C$$

12. Given, $4y = 3x^2$ ...(1)

and $y = \frac{3}{2}x + 6$ ...(2)

Solving (1) and (2), we get

$x = -2$ or $x = 4$

$\therefore$ Required area $= \int_{-2}^{4}(y \text{ of line})\,dx - \int_{-2}^{4}(y \text{ of parabola})\,dx$

i.e., $$A = \int_{-2}^{4}\left[\frac{(3x+12)}{2} - \left(\frac{3x^2}{4}\right)\right]dx$$

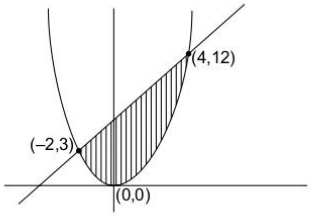
$$= \left[\frac{3}{4}x^2 + 6x - \frac{3}{4}\frac{x^3}{3}\right]_{-2}^{4}$$

$$= \left[\frac{3}{4}x^2 + 6x - \frac{x^3}{4}\right]_{-2}^{4}$$

$$= \left[\frac{3(4)^2}{4} + 24 - \frac{64}{4}\right] - \left[\frac{12}{4} - 12 + \frac{8}{4}\right]$$

$= 20 - (-7)$

$= 27$ sq. units



OR

The area of region bounded by the circle, $x^2 + y^2 = 4$, $x = \sqrt{3}y$, and the x-axis is the area OAB.

The point of intersection of the line and the circle in the first quadrant is $\sqrt{3}, 1$

$$\text{Area OAB} = \text{Area of } \Delta\text{OCA} + \text{Area of ACB}$$

$$\therefore \quad \text{Area of } \Delta\text{OCA} = \frac{1}{2}\times \text{OC} \times \text{AC} = \frac{1}{2}\times\sqrt{3}\times 1 = \frac{\sqrt{3}}{2}$$

$$\text{Area of ABC} = \int_{\sqrt{3}}^{2} y\, dx$$

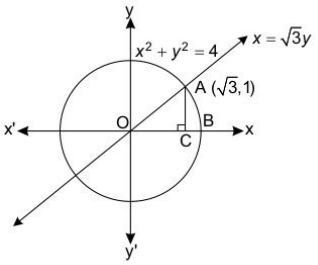
$$= \int_{\sqrt{3}}^{2} \sqrt{4-x^2}\, dx$$

$$= \left[\frac{x}{2}\sqrt{4-x^2} + \frac{4}{2}\sin x^{-1}\frac{x}{2}\right]_{\sqrt{3}}^{2}$$

$$= \left[2\times\frac{\pi}{2} - \frac{\sqrt{3}}{2}\sqrt{4-3} - 2\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)\right]$$

$$= \left[\pi - \frac{\sqrt{3}}{2} - \frac{2\pi}{3}\right]$$

$$= \left[\frac{\pi}{3} - \frac{\sqrt{3}}{2}\right] \quad \text{...(2)}$$



Therefore area enclosed by x-axis, the line $x = \sqrt{3}y$, and the circle $x^2 + y^2 = 4$ in the first quadrant

$$= \frac{\sqrt{3}}{2} + \frac{\pi}{3} - \frac{\sqrt{3}}{2} = \frac{\pi}{3} \text{ units.}$$

13. Let the given point be A $(-2\hat{i} + 3\hat{j} - 4\hat{k})$

Equation of line is,

$$\vec{r} = (\hat{i} + 2\hat{j} - \hat{k}) + \lambda(\hat{i} + 3\hat{j} - 9\hat{k}) \quad \text{...(1)}$$

Let B be the point on the line such that AB is parallel to plane

$$x - y + 2z - 3 = 0$$

In cartesian form, equation (1) can be written as,

So,
$$\frac{x-1}{1} = \frac{y-2}{3} = \frac{z+1}{-9} = \lambda \text{ (say)}$$

$$x = \lambda + 1,$$
$$y = 3\lambda + 2$$
$$z = -9\lambda - 1$$

Let co-ordinates of B be $(\lambda + 1, 3\lambda + 2, -9\lambda - 1)$

Now, equation of line AB can be written as,

$$\frac{x-(-2)}{\lambda+1-(-2)} = \frac{y-3}{3\lambda+2-3} = \frac{z-(-4)}{-9\lambda-1-(-4)}$$

$$\Rightarrow \quad \frac{x+2}{\lambda+3} = \frac{y-3}{3\lambda-1} = \frac{z+4}{-9\lambda+3} \quad \text{...(2)}$$

The line AB is parallel to the given plane, so it will be perpendicular to plane's normal.

$$\text{Direction ratios of AB} = (\lambda+3, 3\lambda-1, -9\lambda+3)$$
$$\text{Direction ratio of plane} = (1, -1, 2)$$

$$\therefore \quad (\lambda+3)(1) + (3\lambda-1(-1)+(-9\lambda+3)(2) = 0$$
$$\Rightarrow \quad \lambda + 3 - 3\lambda + 1 - 18\lambda + 6 = 0$$
$$\Rightarrow \quad -20\lambda + 10 = 0$$
$$\Rightarrow \quad \lambda = \frac{1}{2}$$

So, point B is

$$\left\{\left(\frac{1}{2}+1\right), \left(\frac{3}{2}+2\right), \left(\frac{-9}{2}-1\right)\right\} = \left(\frac{3}{2}, \frac{7}{2}, \frac{-11}{2}\right)$$

Thus, $$\text{Distance AB} = \sqrt{\left(\frac{3}{2}+2\right)^2+\left(\frac{7}{2}-3\right)^2+\left(\frac{-11}{2}+4\right)^2}$$

$$= \frac{\sqrt{59}}{2}\text{ Units.}$$

14. $$P(V) = 50\% = \frac{50}{100}$$

$$P(S) = 20\% = \frac{20}{100}$$

$$P(I) = 30\% = \frac{30}{100}$$

Let E be the event that error occurred.

$$P(E/V) = \frac{6}{100}$$

$$P(E/S) = \frac{4}{100}$$

$$P(E/I) = \frac{3}{100}$$

(i) $$P(E) = P(V)\,P(E/V) + P(S)\,P(E/S) + P(I)\,P(E/I)$$

$$= \frac{50}{100}\times\frac{6}{100}+\frac{20}{100}\times\frac{4}{100}+\frac{30}{100}\times\frac{3}{100}$$

$$= \frac{300}{10000}+\frac{80}{10000}+\frac{90}{10000}$$

$$= \frac{470}{10000}$$

$$= 0.047$$

(ii) $$P\left(\frac{V}{E}\right) = \frac{P(V)P\left(\frac{E}{V}\right)}{P(E)}$$

$$= \frac{50/100\times 6/100}{47/1000}$$

$$= \frac{30}{47}$$

$\therefore$ $$P(\text{Not processed by Vinya}) = 1-\frac{30}{47}$$

$$= \frac{17}{47}.$$

Sample Paper 2

Section - A

1. A bag has 5 red, 7 green and 4 white balls.

So, Total balls = 5 + 7 + 4 = 16

P(White, green and green) = P(White). P(green/white).P(green/white and green)

$$\frac{4}{16}\times\frac{7}{15}\times\frac{6}{14}=\frac{1}{20}.$$

EndofPaper