KV SUNDERBANI

Class XII – Holiday Homework

📌 Note: All attachments, question papers, worksheets, and PDFs mentioned below will be provided at the end.

English

• Complete your homework notebook.
• Revise all chapters covered in class.
• Go through the study material provided by RO.
• Solve two sample papers (to be shared in the official group).

Physics

• Complete your Physics notebook positively.
• Learn and write Ray Optics and Wave Optics.
• Solve the two worksheets shared in the group.

Chemistry

• Prepare and write chemical reactions of Carboxylic Acids.
• Write down all named reactions in your homework notebook.
• Learn the named reactions from the PDF (to be shared in class group) and prepare them well for solving.

Mathematics

• Revise MCQs, Assertion–Reason questions, Case-based questions, 2, 3 and 5 mark questions from:
- Integration
- Application of Integrals
- Vectors
- Three-Dimensional Geometry
- Linear Programming
• Use study material provided by KVS HQ and Jammu Region.

Biology

• Complete your homework notebooks up to the Ecosystem chapter.
• Do worksheets based on competency-based questions of Chapters 11 and 12 in your homework notebooks.
• Solve one sample paper given below in your homework notebook.

Computer Science

- Complete your notebook up to the last topic covered in class.
- Solve all the 4 worksheets in your notebook.

Hindi

पठन कार्य (Reading)

दिए गए अध्यायों का क्रमवार प्रतिदिन एक घंटे पठन(Reading) करें।

आरोह (गद्य खंड)

अध्याय:

श्रम विभाजन और जाति प्रथा

मेरी कल्पना का आदर्श समाज

वितान भाग-2: "जूझ" और "अतीत में दबे पांव"

लेखन

"शिरीष के फूल" और"बादल राग" पाठों का सारांश व प्रश्नोत्तर

अनुच्छेद लेखन

दिए गए विषय पर अनुच्छेद लिखें।

(i) डिजिटल माध्यम, लाभ और हानियां

दोहरान (Revision): समय की उपलब्धता होने पर पिछली बोर्ड परीक्षाओं के प्रश्न-पत्र देखें व अभ्यास करें।

संदर्भ (Reference) के लिए अध्ययन सामग्री (Study Material) देखें।

Sample Monthly Test-July 2025

Time: 90 min **Class-XII** **Sub - Physics** **M. M. : 40**

1. A big hollow metal sphere A is charged to 100 volts and another smaller hollow sphere B is charged to 50 volts. If B is put inside A and joined with a metallic wire, then the direction of charge flow: (1M)

(a) is from A to B (b) is from B to A (c) no charge flows (d) depends on the radii of spheres.

2. Two charges 4q and q are placed at a distance ℓ apart. A third charged particle Q is placed at the middle of them. If resultant force on q is zero then the value of Q is: (1M)

(a) q (b) −q (c) 2q (d) −2q

3. A solid conducting sphere having a charge Q is surrounded by an uncharged concentric conducting spherical shell. Let the potential difference between the surface of the solid sphere and the outer surface of the shell be V. If the shell is now given a charge −3Q the new potential difference between the same two surfaces is: (1M)

(a) V (b) 2V (c) 4V (d) −2V

4. An electric dipole of moment p is placed normal to the lines of force of electric intensity E, then the work done in deflecting it through an angle of 180° is: (1M)

(a) pE (b) +2pE (c) −2pE (d) Zero

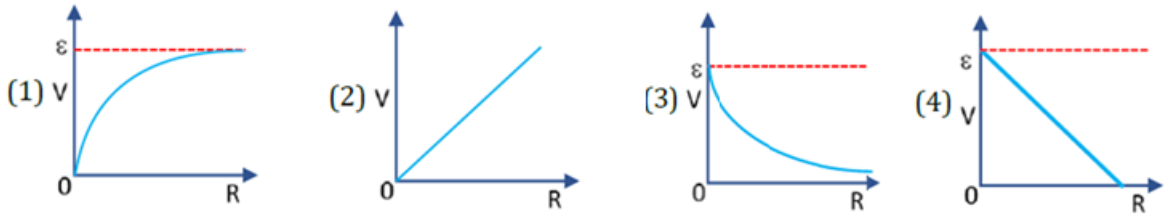
5. When a piece of aluminium wire of finite length is drawn to reduce its diameter to half its original value, its resistance will become: (1M)

(a) two times (b) four times (c) eight times (d) sixteen times

6. A wire of resistance 12 ohms per meter is bent to form a complete of circle of radius 10 cm. The resistance between its two diametrically opposite points is: (1M)

(a) 6Ω (b) 0.6πΩ (c) 3Ω (d) 6πΩ

7. A cell having an emf ε and internal resistance r is connected across a variable external resistance R. As the resistance R is increased, the plot of potential difference V across R is given by: (1M



8. The current in a conductor varies with time t as $I = 2t + 3t^2$ A where I is amperes and t in seconds. Electric charge flowing through a section of the conductor during t = 2 s to t = 3 s is: (1M)

(a) 10 C (b) 24 C (c) 33 C (d) 44 C

9. A coil of one loop is made by a wire of length L and there after a coil of two loops is made by same wire. The ratio of magnetic field at the centre of coils respectively: (1M)

(a) 1 : 4 (b) 1 : 1 (c) 1 : 8 (d) 4 : 1

10. Two infinite long parallel wires carry equal currents in same direction. The magnetic field at a mid-point in between the two wire is: (1M)

(a) Twice the magnetic field produced due to each of the wires
(b) Half of the magnetic field produced due to each of the wires
(c) Square of the magnetic field produced due to each of the wires
(d) Zero

For question numbers 11 to 16, two statements are given-one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.

a) Both A and R are true and R is the correct explanation of A
b) Both A and R are true but R is NOT the correct explanation of A
c) A is true but R is false
d) A is false and R is also false

11. Assertion (A): Sensitive instruments can be protected from outside electrical influence by enclosing them in a hollow conductor. (1M)

Reason(R): Potential inside the cavity is zero.

12. Assertion(A): Work done by the electrostatic force in bringing the unit positive Charge form infinity to the point P is positive. (1M)

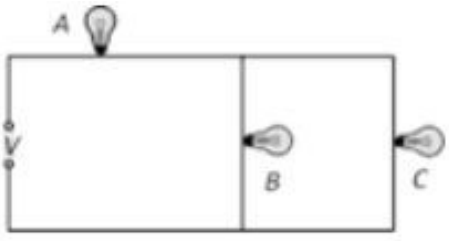
Reason(R): The force on a unit positive test charge is attractive, so that the electrostatic force and the displacement (from infinity to P) are in the same direction.

13. Assertion(A): The presence of water molecules makes separation of ions easier in an electrolyte.

Reason(R): The presence of water molecules decreases the resistance of electrolyte. (1M)

14. Assertion(A): In the given circuit if lamp B or C fuses then the light emitted by lamp A decreases.

Reason(R): Voltage on A decreases. (1M)



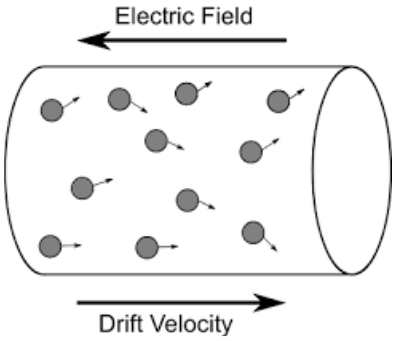
15. Assertion (A): Magnetic field due to an infinite straight conductor varies inversely as the distance from it. (1M)

Reason (R): The magnetic field due to a straight conductor is in the form of concentric circles.

16. Assertion(A): Electric field at the surface of a charged conductor is always normal to the surface at every point. (1M)

Reason(R): Electric field gives the magnitude & direction of electric force ($\boldsymbol{F}$) experienced by any charge placed at any point.

17. Drift velocity is the average velocity of electrons in a conductor material due to an electric field. In a conducting material, it is also proportional to the magnitude of an external electric field.



i) The drift velocity of electrons in a conductor is 0.8 mm/s. The potential difference across a conducting wire is doubled keeping other factors constant. What is the value of new drift velocity?

(a) 0.4mm/s (b) 0.64 mm/s (c) 1.6 mm/s (d) 0.2 mm/s (1M)

ii) How would be the current density of a conductor get affected when the potential difference is tripled keeping other factors constant. (1M)

(a) Doubled (b) halved (c) no change (d) tripled

iii) Two conducting wires of the same material, radii in the ratio 1:2 and lengths in the ratio 2:3 are connected in series to a battery of emf 5V. What is the ratio of the drift velocities of electrons in the two wires? (1M)

(a) 4:1 (b) 1:3 (c)2:3 (d) 4:3

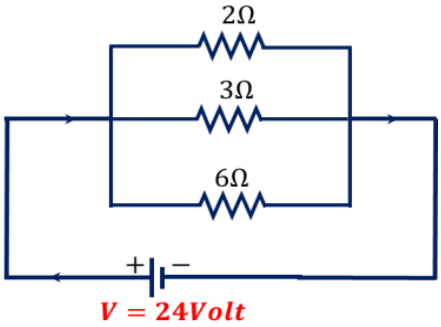
iv) A current of 3.2 A flows through a conducting wire of number density 10^{28} m^{-3} and cross-sectional area 10^{-6} m^2. The drift velocity of electrons in the wire is (1M)

(a) 4 mm/s (b) 2 mm/s (c) 1mm/s (d) 0.5 mm/s

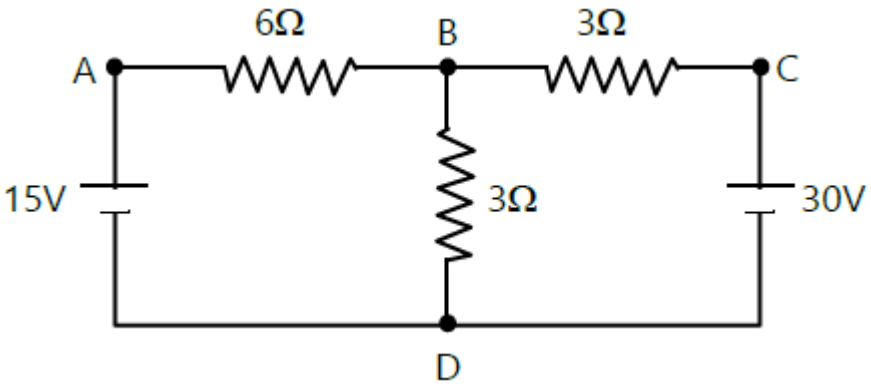
18. Two wires each of radius of cross-section r but of different materials are connected together end to end (in series). If the densities of charge carriers in the two wires are in the ratio 1 : 4, find the ratio of the drift velocities of electrons in the two wires. **(**2M)

19. Work done in rotating dipole from 0° to 60° is W. Find torque required to hold the dipole at this position. (2M)

20. In given network find out equivalent resistance of network. Also find current passing through each resistor. (3M)



21. In the circuit shown in figure, find the current through the branch BD. (3M)



22. Write Biot-Savart law and using it derive formula for the magnitude and direction of magnetic field at an axial point of a current carrying loop of radius R, carrying current I. What will be the value of magnetic field at the centre of the loop? (5M)

23. A parallel plate capacitor of capacitance C is charged to a potential V by a battery & Q is the charge stored in the capacitor. The battery is then disconnected and the distance between the plates of the capacitor is increased by a small amount. What changes will occur in each of the following quantities? Will they increase, decrease or remain the same? Give an explanation in each case. (5M)

(a) Capacitance

(b) Charge

(c) Potential difference

(d) Electric field

(e) Energy stored in the capacitor.

Second Pre Board

Lucknow Region

CLASS XII : PHYSICS

TIME: 3 hour Max Marks: 70

General Instructions

1. There are 33 questions an all questions are compulsory.
2. There are a total of five sections A,B,C,D, and E in this paper.
3. Section A contains 12 MCQ s and 4 Assertion Reason questions of one mark each.Section B contains 5 questions of 2 marks each, section C contains 7

questions of 3marks each, section D contains 2 case study based questions of 4 marks each and section E contains 3 long answer questions of 5 marks each.

4. There is no overall choice. Internal choice has been provided in one question in section B,C and one question each in CBQ and for all the three questions in section E.
5. Use of calculator is not allowed.
6. The following constants may be used wherever necessary.

$C = 3 \times 10^8$ m/s
$m_e = 9.1 \times 10^{-31}$ kg
$e = 1.6 \times 10^{-19}$C
$\mu_0 = 4\pi \times 10^{-7}$ Tm/A
$h = 6.63 \times 10^{-34}$ Js
$\varepsilon_0 = 8.854 \times 10^{-12}$ $C^2N^{-1}m^{-2}$

SECTION A

1.	A point charge Q is placed at a point O as shown in the figure. Is the potential difference V_A-V_B positive, negative or zero if Q is (i) positive (ii) negative ? O ——————————— A ——————— B (a) negative, negative (b) negative, positive (c) positive, positive (d) Positive, negative	1
2.	A plane electromagnetic wave travels in free space along positive X axis. At a particular point in space, the electric field along Y axis is 9.3 V/m. The magnetic induction **B** along Z axis is (a) 3.1×10^{-7} T (b) 3.1×10^{-8} T (c) 3×10^{-5} T (d) 3×10^{-6} T	1
3.	Two wires of same length are shaped into a square and a circle respectively. If they carry same current, ratio of magnetic moment is: (a) 2 : π (b) π: 2 (c) π : 4 (d) 4 : π	1
4.	The current in ampere in an inductor is given by I = 5 + 16t where t is in second. The self induced emf in it is 10 mV. The self inductance is	1

	(a) 5.55×10^{-5} H (b) 6.25×10^{-4} H (c) 5.26×10^{-6} H (d) 7.5×10^{-7} H	
5.	A 15 ohm resistor, an 80 mH inductor and a capacitor of capacitance C are connected in series with a 50 Hz ac source. If the source voltage and current in the circuit are in phase, the value of capacitance is (a) 100 μF (b) 127 μF (c) 142 μF (d) 160 μF	1
6.	Two students A and B calculated the charge flowing through a circuit. A concludes that 300 C charge flows in one minute. B concludes that 3.125×10^{19} electrons flow in one second. If the current measured in the circuit is 5 A, then the correct calculation is done by: (a) A (b) B (c) both A and B (d) neither A nor B	1
7.	Beams of electrons and protons move parallel to each other in the same direction. They (a) Attract each other (b) Repel each other (c) neither attract nor repel (d) Attraction or repulsion depends upon Speed	1
8.	The momentum of a photon of wavelength λ is (a) hλ (b)h/λ (c) λ/h (d) h/cλ	1
9.	If the kinetic energy of a particle is increased to 16 times its previous value, the percentage change in the de Broglie wavelength of the particle is (a) 60 (b) 50 (c) 25 (d) 75	1
10.	A biconcave lens of power P vertically splits into two identical plano concave parts. The power of each part will be (a) 2P (b) P/2 (c) P (d) P/√2	1
11.	In an N – type silicon, which of the following statements is true ? (a) Electrons are majority carriers and trivalent atoms are dopants. (b) Electrons are minority carriers and pentavalent atoms are dopants. (c) Holes are minority carriers and pentavalent atoms are dopants. (d) Holes are majority carriers and trivalent atoms are dopants.	1
12.	The formation of depletion region in a P-N junction diode is due to (a) Movement of dopant atoms (b) Diffusion of electrons and holes (c) Drift of electrons only (d) Drift of holes only	1

Questions 13 to 16 consist of two statements, each labelled as Assertion and Reason. While answering these questions, you are required to choose any one of the following four responses.

(a) If both Assertion and Reason are correct and the Reason is a correct explanation of theAssertion.

(b) If both Assertion and Reason are correct but Reason is not a correct explanation of theAssertion.

(c) If the Assertion is correct but Reason is incorrect.

(d) If both the Assertion and Reason are incorrect.

13.	**Assertion :** The poles of magnet can not be separated by breaking into two pieces. **Reason :** The magnetic moment will be reduced to half when a magnet is broken into two equal pieces.	1
14.	**Assertion :** Induced emf will always occur whenever there is change in magnetic flux. **Reason :** Current always induces whenever there is change in magnetic flux.	1
15.	**Assertion :** If the rays are diverging after emerging from a lens; the lens must be concave. **Reason :** The convex lens cannot give diverging rays.	1
16.	**Assertion :** Energy is released when heavy nuclei undergo fission or light nuclei undergo fusion. **Reason :** For heavy nuclei, binding energy per nucleon increases with increasing Z while for light nuclei it decreases with increasing Z.	1

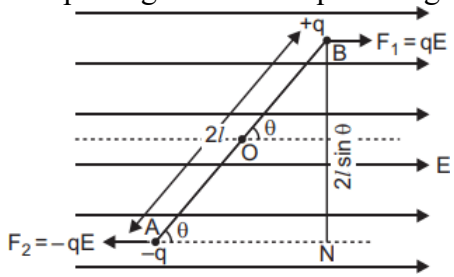
SECTION B

17.	Show diagrammatically the behavior of magnetic field lines in the presence of (i)paramagnetic and (ii) diamagnetic substances.	2
18.	A battery that contains emf E and internal resistance r when connected across an external resistance of 12 ohm, produces a current of 0.5 A. When connected across a resistance of 25 ohm, it produces a current of 0.25 A. Find (i) internal resistance and (ii) emf of the cell.	2
19.	A spherical rubber balloon carries a charge that is uniformly distributed over its surface. As the balloon is blown up, how does E vary for points (i) inside the balloon (ii) on the surface of the balloon.	2
20.	Draw the intensity pattern for single slit diffraction and double slit interference. Hence state two differences between interference and diffraction patterns. OR Two harmonic waves of monochromatic light $y_1 = a \cos \omega t$, $y_2 = a \cos (\omega t + \Phi)$ are superimposed on each other. Show that maximum intensity in interference pattern is four times the intensity due to each slit .	2
21.	Calculate the energy released in MeV in the following nuclear reaction : $_{92}U^{238} \longrightarrow {}_{90}Th^{234} + {}_{2}He^{4} + Q$ [Mass of $_{92}U^{238}$ = 238.05079 u Mass of $_{90}Th^{234}$ = 234.043630 u Mass of $_{2}He^{4}$ = 4.002600 u 1u = 931.5 MeV/c^2]	2

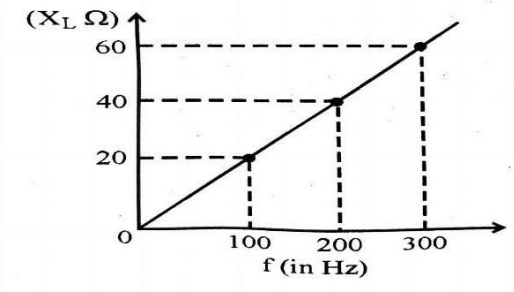
SECTION C

22.	A capacitor of unknown capacitance is connected across a battery of V volt. The charge stored is 360 μC. When potential across the capacitor is reduced by 120 V,	3

	the charge stored becomes 120 μC. Calculate the potential V and the unknown capacitance C	
23.	What is a wave front ? What is the geometrical shape of a wave front of light emerging out of a convex lens, when point source is placed at the focus ? Using Huygen's principle show that, for a parallel beam incident on a reflecting surface,the angle of reflection is equal to the angle of incidence.	3
24.	a) Name the em wave produced during radioactive decay of nucleus. Mention one use of it. b) Why do welders wear special type of goggles while working? c) Which part of electromagnetic spectrum has a wavelength range of 390 to 770 nm?	3
25	(a) Monochromatic light of wavelength 589 nm is incident from air on a water surface. If refractive index for water is 1.33 , find the wavelength, frequency and speed of refracted light. (b) A compound lens is made of two lenses in contact having powers +11.5 D and –1.5 D. An object is placed at 15cm from this compound lens. Find the position of the image formed.	3
26.	A potential difference of V volt is applied to a conductor of length l and diameter D. How will the drift velocity of electrons and the resistance of the conductor change when (i) V is doubled (ii) L is halved where the other two factors remain the same. Give reason.	3
27.	Draw a plot showing the variation of photoelectric current with collector plate potential for two different frequencies, $\nu_1 > \nu_2$, of incident radiation having the same intensity. In which case will the stopping potential be higher? Justify your answer.	3
28	(a) A student wants to use two p-n junction diodes to convert alternating current into direct current. Draw the labeled circuit diagram she would use and explain how it works. (b) Show graphically the input and output voltages. OR (a) Draw the circuit arrangement for studying the V – I characteristics of a p - n junction diode in forward bias. Draw the typical V – I characteristics of a silicon diode. (b) Describe briefly the following terms (i) 'Minority carrier injection' in forward bias (ii) 'Breakdown voltage' in reverse bias	3
	SECTION D	
29	A prism is a portion of a transparent medium bounded by two plane faces inclined to each other at a suitable angle. A ray of light suffers two refraction on passing through a prism and hence deviates through a certain angle from its original path . The angle of deviation of a prism is $\delta = (\mu-1) A$, through which a ray deviates on passing through a thin prism of small refracting angle A . If μ is	

	the refractive index of the material of the prism then the prism formula is $\mu = \sin(A+\delta m)/2)/\sin(A/2)$. (i) For which colour , angle of deviation is minimum ? (a) Voilet (b) Yellow (c) Red (d) Blue. (ii) When white light moves through vacuum (a) all colours have same speed (b) different colours have different speed (c) violet has more speed then red (d) red has more speed then violet. (iii)The deviation through a prism is maximum when angle of incidence is (a) 450 (b) 700 (c) 900 (d) 600 . OR What is the deviation produced by a prism of angle 60 ? (μ=1.644) (a) 3.840 (b) 4.595 (c) 7.259 (d) 1.252. (iv) A ray of light falling at an angle of 500 is refracted through a prism and suffers minimum deviation . If the angle of prism is 600, then the angle of minimum deviation is (a) 450 (b) 750 (c) 500 (d) 400	1 1 1 1
30	When electric dipole is placed in uniform electric field, its two charges experience equal and opposite forces, which cancel each other and hence net force on electric dipole in uniform electric field is zero. However these forces are not collinear, so they give rise to some torque on the dipole. Since net force on electric dipole in uniform electric field is zero, so no work is done in moving the electric dipole in uniform electric field. However some work is done in rotating the dipole against the torque acting on it.  (i) The dipole moment of a dipole in a uniform external field $\bar{E}$ is p. Then the torque τ acting on the dipole is (a) $\tau = p \times E$ (b) $\tau = p.\bar{E}$ (c) $\tau = 2(p + \bar{E})$ (d) $\tau = (p + E)$ (ii) An electric dipole consists of two opposite charges, each of magnitude 1.0 μC separated by a distance of 2.0 cm. The dipole is placed in an external field of 105 NC^{-1}. The maximum torque on the dipole is (a) 0.2 x 10-3 Nm (b) 1x 10-3 Nm	1 1

	(c) 2 x 10-3 Nm (d) 4x 10-3 Nm (iii) Torque on a dipole in uniform electric field is minimum when θ is equal to (a) 0° (b) 90° (c) 180° (d) Both (a) and (c) OR When an electric dipole is held at an angle in a uniform electric field, the net force F and torque τ on the dipole are (a) $F = 0, \tau = 0$ (b) $F \neq 0, \tau \neq 0$ (c) $F = 0, \tau \neq 0$ (d) $F \neq 0, \tau = 0$ (iv) An electric dipole of moment p is placed in an electric field of intensity E. The dipole acquires a position such that the axis of the dipole makes an angle with the direction of the field. Assuming that potential energy of the dipole to be zero when 0 = 90°, the torque and the potential energy of the dipole will respectively be (a) pEsinθ, -pEcosθ (b) pEsinθ, -2pEcosθ (c) pEsinθ, 2pEcosθ (d) pEcosθ, - pEsinθ	1 1
	SECTION E	
31	a) State Biot – Savart law. Using this law, find expression for the magnetic field at a point on the axis of a circular current carrying coil. b) From the above result obtain an equation for magnetic field at the centre of the coil. c) Schematically represent the direction of the magnetic field lines through a circular coil carrying current. Also mention the law used to find the direction. OR (a) With the help of a diagram, explain the principle and working of a moving coil galvanometer. (b) What is the importance of radial magnetic field and how is it produced? (c) Why is it that while using a moving coil galvanometer as a voltmeter a high resistance in series is required whereas in an ammeter a shunt is used.	5
32	A device X is connected across an ac source of voltage $V = V_0 \sin \omega t$ the current through X is given as $I = I_0 \sin(\omega t + \pi/2)$. (a) Identify the device X and write the expression for its reactance. (b) Draw graphs showing the variation of voltage and current with time over one cycle of ac, for X. (c) How does the reactance of the device X vary with frequency of ac? Show this variation graphically. (d) Draw the phasor diagram for this device X. OR	5

	a) Show that an ideal inductor does not dissipate power in an ac circuit. b) The variation of inductive reactance (X_L) of an inductor with the frequency (f) of the ac source of 100 V and variable frequency is shown in the figure.  (i) Calculate the self inductance of the inductor. (ii) When this inductor is used in series with a capacitor of unknown value and a resistor of 10 ohm at 300 s^{-1}, maximum power dissipation occurs in the circuit. Calculate the capacitance of the capacitor .	
33	(a) Draw a schematic arrangement of Geiger-Marsden experiment showing the scattering of α-particles by a thin foil of gold. (b) Why is it that most of the α-particles go right through the foil and only a small fraction gets scattered at large angles ? (c) Draw the trajectory of the α-particle in the coulomb field of a nucleus. (d) What is the significance of impact parameter and what information can be obtained regarding the size of the nucleus ? (e)Estimate the distance of closest approach to the nucleus (Z = 79) if a 7.7 MeV α-particle before it comes momentarily to rest and reverses its direction OR (a) Depict the variation of potential energy of a pair of nucleons with the separation between them. (b) Plot a graph showing the variation of binding energy nucleon as a function of mass number. Which property of nuclear force explains the approximate constancy of binding energy in the range 30<A<170? How does one explain the release of energy in both the processes of nuclear fission and fusion from the graph?	5

KENDRIYA VIDYALAYA SUNDERBANI
Class 12 – Computer Science
Worksheet 1: Networking and Database Management

Section A – Multiple Choice Questions (1 mark each)

1. Which of the following was the first network?
   a) NSFNET
   b) ARPANET
   c) INTERNET
   d) Ethernet

2. What type of switching divides data into packets before transmission?
   a) Circuit Switching
   b) Packet Switching
   c) Message Switching
   d) None of the above

3. Which of the following is a wireless transmission medium?
   a) Twisted Pair Cable
   b) Co-axial Cable
   c) Fiber-optic Cable
   d) Radio Waves

4. Which key uniquely identifies each record in a database table?
   a) Foreign Key
   b) Candidate Key
   c) Primary Key
   d) Alternate Key

5. Which protocol is used to send emails from a client to a server?
   a) FTP
   b) SMTP
   c) HTTP
   d) POP3

Section B – Short Answer Questions (2 marks each)

6. Define bandwidth and data transfer rate. How are they related?

7. Write any two differences between LAN and WAN.

8. Mention two components of data communication and explain their roles briefly.

Section C: Draw a labeled diagram of **Star topology** and mention one advantage and one disadvantage.

9. Write a short note on **Domain Name System (DNS)** and its purpose.

10. Consider a database table STUDENT with attributes RollNo, Name, Class, DOB. Identify:

- Primary Key
- Candidate Key

KENDRIYA VIDYALAYA SUNDERBANI
Class 12 – Computer Science
Worksheet 2: Networking and Database Management

Section A – Multiple Choice Questions (1 mark each, 5 Marks)

1. Which of the following is an example of **circuit switching**?
   a) Telephone network
   b) Internet
   c) Email
   d) Packet-switched network

2. Which device is used to connect multiple networks and direct data packets between them?
   a) Hub
   b) Router
   c) Switch
   d) Repeater

3. Which of the following is a secure protocol for data transfer on the web?
   a) HTTP
   b) HTTPS
   c) FTP
   d) TELNET

4. What is the cardinality of a relation in a database?
   a) Number of attributes
   b) Number of tuples
   c) Number of domains
   d) Number of keys

5. Which of the following is **not a valid network type**?
   a) PAN
   b) LAN
   c) NAN
   d) MAN

Section B – Short Answer (2 marks each)

6. Explain the difference between **circuit switching** and **packet switching** with one example each.

7. What is the difference between **Primary Key** and **Foreign Key** in a database?

8. Define the following with one example each:
   - Protocol
   - URL

Section C – Application / Diagram / Coding-style Questions (4 marks each, 9 Marks)

9. Draw a labeled diagram of **Bus topology** and write one advantage and one disadvantage.

10. A database table EMPLOYEE has attributes: EmpID, Name, DeptID, Salary.

- Identify a suitable **Primary Key**.

11. Write a short note on **Web Browser** and **Web Server** with one example each.

KENDRIYA VIDYALAYA SUNDERBANI
Class 12 – Computer Science
Worksheet 3: Networking and Database Management

1.
Consider the relation STUDENT(RollNo, Name, Class, DOB, Address)

a) What is the degree of the relation?
b) If we remove Address from the relation, what will be the new degree?

2.
Given a table COURSE(CourseID, CourseName, Credits) with the following tuples:

CourseID	CourseName	Credits
C101	Math	4
C102	Physics	3
C103	Chemistry	4
C104	ComputerSci	3

a) What is the cardinality of the COURSE relation?
b) If two more courses are added, what will be the new cardinality?

3.
Consider two relations:

STUDENT(RollNo, Name)

RollNo	Name
1	Alice
2	Bob

COURSE(CourseID, CourseName)

CourseID	CourseName
C101	Math
C102	Physics

a) Write the result of the cross product STUDENT × COURSE.
b) How many tuples will the resulting relation have?

4.
A table EMPLOYEE(EmpID, Name, Dept) has 5 tuples and 3 attributes. Another table DEPARTMENT(DeptID, DeptName) has 4 tuples and 2 attributes.

a) Find the degree and cardinality of EMPLOYEE.
b) Find the degree and cardinality of the cross product EMPLOYEE × DEPARTMENT.

KENDRIYA VIDYALAYA SUNDERBANI
Class 12 – Computer Science
Worksheet 4: Networking and Database Management

1. Fill in the blank:

_____ protocol provides access to services hosted on a remote computer.

a. FTP

b. PPP

c. Telnet

d. SMTP

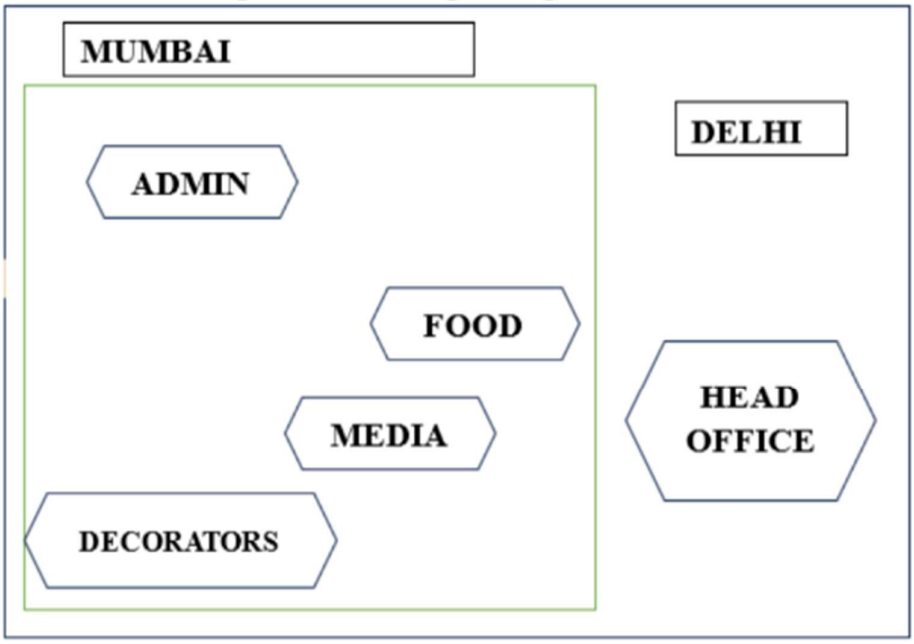
2. Write two advantages and two disadvantages of circuit switching.

3. Differentiate between Web server and web browser. Write the names of any two web browsers.

4.

Fun Media Services Ltd is an event planning organization. It is planning to set up its India campus in Mumbai with its head office in Delhi. The Mumbai campus will have four blocks/buildings - ADMIN, DECORATORS, FOOD, and MEDIA.

You as a network expert need to suggest the best network-related solutions for them to resolve the issues/problems mentioned in points (i) to (v), keeping in mind the distances between various blocks/buildings and other given parameters.



Shortest distance between various buildings:

FROM – TO	DISTANCE
ADMIN TO DECORATORS	90 meters
ADMIN TO MEDIA	75 meters
ADMIN TO FOOD	50 meters
DECORATORS TO FOOD	65 meters
DECORATORS TO MEDIA	50 meters
FOOD TO MEDIA	45 meters
DELHI Head Office to MUMBAI Campus	1475 KM

The number of computers at various buildings is as follows:

BUILDING	NUMBER OF COMPUTERS
ADMIN	110
DECORATORS	75
MEDIA	12
FOOD	20

i. Suggest the most appropriate location of the server inside the MUMBAI campus (out of the 4 buildings). Justify your answer.
ii. Draw the cable layout to efficiently connect various buildings within the MUMBAI campus.
iii. Which hardware device will you suggest to connect all the computers within each building?
iv. Which of the following will you suggest to establish online face-to-face communication between the people in the Admin Office of the MUMBAI campus and the DELHI Head Office?
   a. Cable TV
   b. Email
   c. Video Conferencing
   d. Text Chat
v. What type of network (out of PAN, LAN, MAN, WAN) will be set up in each of the following cases?
   a. The Mumbai campus gets connected with the Head Quarter in Delhi
   b. The computers connected in the MUMBAI campus

5. Select the network device from the following, which connects, networks with different protocols
   a) Bridge b)Gateway c)Hub d) Router
6. Which of the following is NOT a guided communication medium?

a) Twisted pair cable b) Microwave

c) Coaxial cable d) Optical fibre

7. i) Expand the following :

a) SMTP b) VoIP

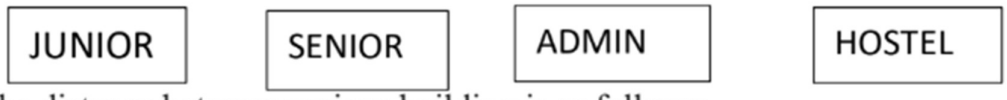
ii) Give one disadvantage of Star topology

8. i) What is a web browser ?

ii) Define the term MAC Address.

9.

Oxford college, in Delhi is starting up the network between its different wings. There are four Buildings named as SENIOR, JUNIOR, ADMIN and HOSTEL as shown below:



The distance between various building is as follows:

ADMIN TO SENIOR	200 m
ADMIN TO JUNIOR	150 m
ADMIN TO HOSTEL	50 m
SENIOR TO JUNIOR	250 m
SENIOR TO HOSTEL	350 m
JUNIOR TO HOSTEL	350 m

Number of computer in each building is :

SENIOR	130
JUNIOR	80
ADMIN	160
HOSTEL	50

i) Suggest the cable layout of connections between the buildings.

ii) Suggest the most suitable place (i.e., building) to house the server of this college, provide a suitable reason.

iii) Is there a requirement of a repeater in the given cable layout? Why/ Why not?

iv) Suggest the placement of hub/switch with justification.

v) The organisation also has inquiry office in another city about 50-60 km away in hilly region. Suggest the suitable transmission media to interconnect to college and inquiry office out of the following:

a. Fiber optic cable
b. Microwave
c. Radiowave

10.

XYZNova Inc. is planning a new campus in Hyderabad while maintaining its headquarters in Bengaluru. The campus will have four buildings: HR, Finance, IT, and Logistics. As a network expert, you are tasked with proposing the best network solutions for their needs based on the following:

From	To	Distance (in meters)
HR	Finance	50
HR	IT	175
HR	Logistics	90
Finance	IT	60
Finance	Logistics	70
IT	Logistics	60

Number of Computers in Each Block:

Block	Number of Computers
HR	60
Finance	40
IT	90
Logistics	35

I. Suggest the best location for the server in the Hyderabad campus and explain your reasoning.

II. Suggest the placement of the following devices:
a) Repeater b) Switch

III. Suggest and draw a cable layout of connections between the buildings inside the campus.

IV. The organisation plans to provide a high-speed link with its head office using a wired connection. Which of the cables will be most suitable for this job?

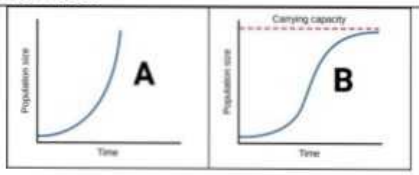
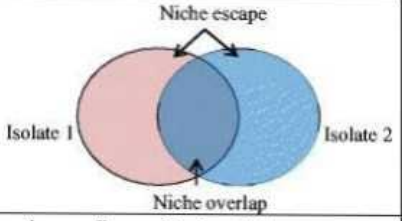
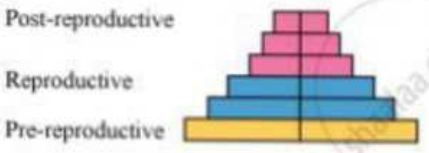
V. A. What is the use of VoIP?

OR

B. Which type of network (PAN, LAN, MAN, or WAN) will be formed while connecting the Hyderabad campus to Bengaluru Headquarters?

Chapter – 11 (Organism and Population) Worksheet - 1

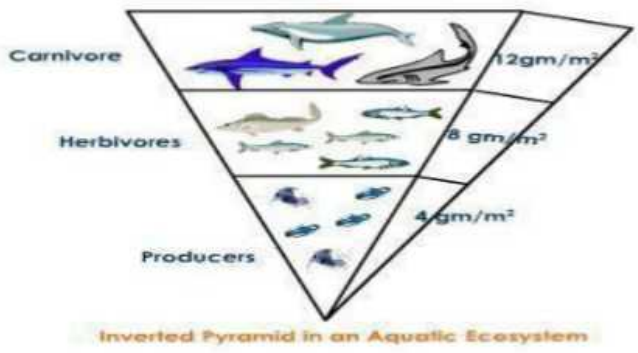
Max. Marks – 20 **Time – 20 min**

Q.No.	Questions	Marks
Q1	Which one of the following is an example of a commensalism relationship? 29. Cuckoo laying eggs in crow's nest B. Sea anemone and clown fish AA. Tick on dog D. Lichen formation	**1**
Q2	In a population growing in a habitat with limited resources, the growth pattern eventually becomes: 30. Exponential B.Declining C.Logistic D.Linear	**1**
Q3	Which of the following is not a feature of a population? 31. Birth rate 32. Death rate 33. Age pyramid 34. Organism's organ system	**1**
Q4 **Q5**	**FOR QUESTION NO. 4 AND 5 CHOOSE THE RIGHT OPTION FROM FOLLOWING:** **35. Both A and R are true, and R is the correct explanation of A** **36. Both A and R are true, but R is not the correct explanation of A** **37. A is true, but R is false** **38. A is false, but R is true** Assertion (A): Some organisms suspend their metabolic activities under adverse conditions. Reason (R): This is a strategy to survive extreme environmental stress. Assertion (A): Logistic growth curve is S-shaped. Reason (R): Logistic growth occurs when resources are unlimited.	**1** **1**
Q6	Identify the type of growth shown in each curve A and B. What key environmental factor di**fferentiates these two patterns?** 	**2**
Q7	How do desert plants adapt to high temperatures and scarcity of water?	**2**
Q8	What does the overlapping area represent? What ecological outcome might follow if overlap persists? 	**3**
Q9	**39.** What type of population growth is represented in the given figure? Justify your answer based on pyramid shape. (2)  40. What does the bell-shaped age pyramid indicate about birth and death rates? (1)	**3**
Q10	Q10. Read the passage below and answer the questions that follow: "A scientist is studying the growth of a population of deer in a protected forest area. Initially, the population grows rapidly. After a few years, the growth slows and then levels off."	**5**

	BB. Name the type of population growth shown in this scenario. (1 mark) CC. Draw and label the graph for this growth pattern. (2 marks) DD. Explain the significance of the plateau phase in the graph. (2 marks)	

Chapter 12: Ecosystem Worksheet - 1

Time: 20 Min **Marks: 20**

Q. No.	Questions	Marks
1.	Which of the statement is not correct? 41. Pyramids of number and biomass may be either upright or inverted 42. Pyramid of biomass in sea is generally inverted as biomass of fish far exceeds that of phytoplankton 43. Food chains are generally short with few trophic levels as only 10% of the energy is transferred to higher trophic level from lower one 44. Pyramid of energy is mostly upright but sometimes it may be inverted	1
2	In an ecosystem, which of the following represents a grazing food chain? 45. Detritus → Earthworm → Bird B. Dead leaves → Bacteria → Fungi 46. Grass → Grasshopper → Frog → Snake D. Fallen fruit → Fungi → Worms	1
3.	What is the formula to calculate Net primary productivity (NPP) in an ecosystem? 47. GPP – R = NPP B. GPP + R = NPP C.GPP – NPP = R D. R – NPP = GPP	1
4.	Assertion (A): Decomposers help in nutrient recycling. Reason (R): Decomposers convert organic matter into inorganic substances. A. Both A and R are true, and R is the correct explanation of A. B. Both A and R are true, but R is not the correct explanation of A C. A is true, but R is false. D. A is false, but R is true	1
5.	Assertion (A): Energy flow in an ecosystem is cyclic. Reason (R): Energy is continuously lost as heat in the ecosystem. A. Both A and R are true, and R is the correct explanation of A. B. Both A and R are true, but R is not the correct explanation of A. C. A is true, but R is false. D. A is false, but R is true.	1
6.	A farmer wants to increase the productivity of his crop field. Based on your understanding of productivity in ecosystems, what measures could he take to enhance Net Primary Productivity (NPP)? Justify your answer.	2
7.	If all decomposers are removed from a forest ecosystem, predict and explain the changes that would occur in the nutrient cycling and overall functioning of the ecosystem.	2
8.	In a lake ecosystem, if the population of small fish suddenly declines, what possible impacts can this have on other trophic levels? Explain with reference to energy flow and food webs.	3
9.	Evaluate the differences between food chains and food webs. How do they contribute to energy flow and ecosystem stability?	3
10.	The diagram below shows a simplified ecological pyramid of biomass for a pond ecosystem. Analyse the pyramid and answer the following questions. (i) What trophic level does each section of the pyramid represent? (ii) Explain why the pyramid is inverted? (iii) Identify one limitation of using ecological pyramids to understand this ecosystem.  Inverted Pyramid in an Aquatic Ecosystem	5

BIOLOGY – Code No. 044
SAMPLE QUESTION PAPER*
CLASS – XII (2025-26)

Maximum Marks: 70 **Time: 3 hours**

General Instructions:

(i) All questions are compulsory.
(ii) The question paper has five sections and 33 questions.
(iii) Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section– C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E has 3 questions of 5 marks each.
(iv) There is no overall choice. Answer all 33 questions. 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

Q. No. 1 to 12 are multiple choice questions. Only one of the choices is correct. Select and write the correct choice as well as the answer to these questions.

Q. No	Question	Marks
1	The male gametes in plants are formed by: A. Mitotic division of nucleus of vegetative cell B. Meiotic division of nucleus of vegetative cell C. Mitotic division of nucleus of generative cell D. Meiotic division of nucleus of generative cell	1
2	The primary endosperm nucleus is formed by fusion of which of the following? A. A male gamete and a female gamete B. A male gamete and two polar nuclei C. A female gamete and two synergids D. Two male gametes and an egg cell	1
3	During the menstrual cycle of a human female, formation of graafian follicle is stimulated by secretion of which of the following gonadotropin hormones? A. Estrogen and progesterone B. FSH and Estrogen C. FSH and LH D. Progesterone and LH	1

**Please note that the assessment scheme of the Academic Session 2024-25 will continue in the current session i.e. 2025-26.*

4	The experimental proof on the thermal stability of genetic material was first provided by experiments of A. Hershey and Chase B. Meselson and Stahl C. Frederick Griffith D. Jacob an Monod	1
5	Short stretches of DNA used to identify complementary sequences in a sample are called A. Probes B. Markers C. Primers D. Minisatellites	1
6	Select the **incorrect statement** among the following. A. $p^2+2pq+q^2 = 1$. This is binomial expansion of $(p+q)^2$. B. When frequency measured differs from expected values, the difference (direction) indicates the extent of evolutionary change. C. Hardy-Weinberg principle says that phenotype frequencies in a population are stable and are constant from generation to generation. D. The gene pool (total genes and their alleles in a population) remains constant. This is called genetic equilibrium. Sum total of all the allelic frequencies is 1.	1
7	Albinism is known to be due to an autosomal recessive mutation. The first child of a couple with normal skin pigmentation was an albino. What is the probability that their second child will also be an albino? A. 100% B. 25% C. 50% D. 75%	1
8	"In Cricket species, the sound produced by rubbing the wings or legs together play a crucial role in attracting mates, any change in the morphology of Cricket legs could potentially affect their ability to produce sound". A mutant Cricket had thicker hind legs. What would you expect for this cricket species? A. The leg mutation will not lead to speciation if they diversify into new habitats. B. The leg mutation will have little effect on other external features, and therefore have little effect on speciation. C. The leg mutation will have no effect on behavior, and thus have little effect on speciation. D. The leg mutation might lead to reproductive isolation and speciation due to an effect on the mating call.	1

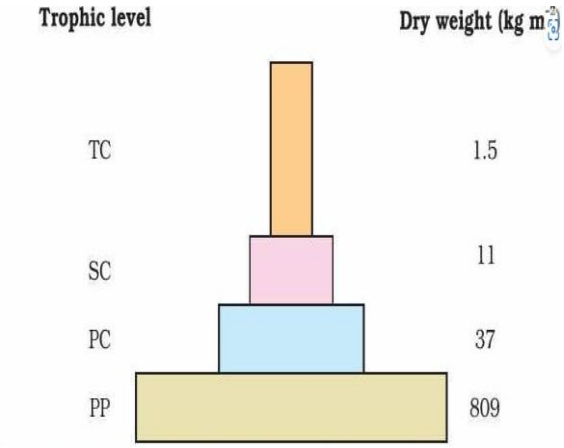
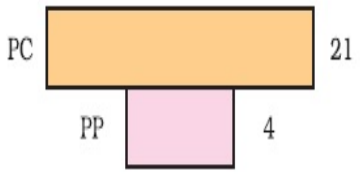
**Please note that the assessment scheme of the Academic Session 2024-25 will continue in the current session i.e. 2025-26.*

<table>
<tr><td>9</td><td>Plasmodium is a pathogen that causes malaria. Identify the correct sequence of transmission of the pathogen.
<table>
<tr><th></th><th>I
Stage of pathogen as it is transferred by vector bite</th><th>II
First site in the host body where the pathogens infect and proliferates</th><th>III
Second site in the host body where the pathogen infects and manifests clinical symptoms</th><th>IV
Stage of pathogen as it is transferred to a new vector</th></tr>
<tr><td>A</td><td>Sporozoites</td><td>Erythrocyte infection</td><td>Liver infection</td><td>Gametocytes</td></tr>
<tr><td>B</td><td>Gametocytes</td><td>Erythrocyte infection</td><td>Liver infection</td><td>Sporozoites</td></tr>
<tr><td>C</td><td>Gametocytes</td><td>Liver infection</td><td>Erythrocyte infection</td><td>Sporozoites</td></tr>
<tr><td>D</td><td>Sporozoites</td><td>Liver infection</td><td>Erythrocyte infection</td><td>Gametocytes</td></tr>
</table></td><td>1</td></tr>
<tr><td>10</td><td>Which mRNA will be translated to a polypeptide chain containing 8 amino acids?
A. AUGUUAAUAGACGAGUAGCGACGAUGU
B. AUGAGACGGACUGCAUUCCCAACCUGA
C. AUGCCCAACCGUUAUUCAUGCUAG
D. AUGUCGACAGUCUAAAACAGCGGG</td><td>1</td></tr>
<tr><td>11</td><td>In order to isolate genetic material of a bacterium, the cell must be treated with
A. Lysozyme, ribonuclease, protease, chilled ethanol
B. Cellulase, ribonuclease, protease, chilled ethanol
C. Chitinase, ribonuclease, chilled ethanol, water
D. Ribonuclease, protease, chilled ethanol, water</td><td>1</td></tr>
<tr><td>12</td><td>Integrated Pest Management involves
I. Using pesticides/insecticides judiciously
II. Using biocontrol agents
III. Engaging in organic farming
A. Only I
B. Only II
C. Both I and II
D. Only III</td><td>1</td></tr>
<tr><td colspan="3">Question No. 13 to 16 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:
A. Both A and R are true and R is the correct explanation of A.
B. Both A and R are true and R is not the correct explanation of A.
C. A is true but R is false.
D. A is False but R is true.</td></tr>
<tr><td>13</td><td>Assertion (A): The ability of the pistil to recognise the pollen is the result of a continuous dialogue between pollen and pistil.
Reason (R): This electrical dialogue allows only compatible pollen to germinate.</td><td>1</td></tr>
</table>

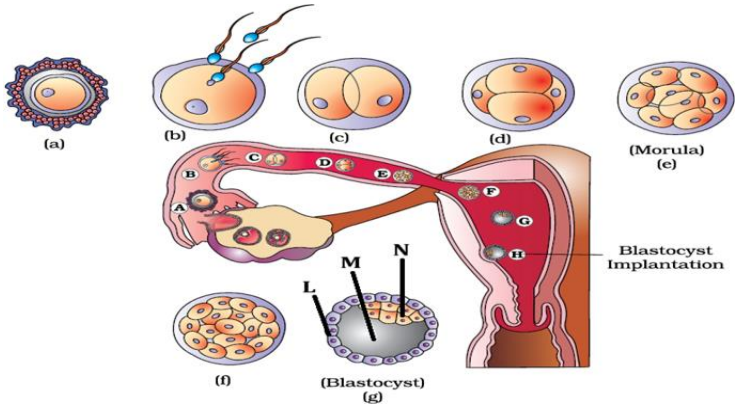
**Please note that the assessment scheme of the Academic Session 2024-25 will continue in the current session i.e. 2025-26.*

<table>
<tr><td>14</td><td>Assertion (A): Some organisms are better adapted to survive in an otherwise hostile environment.
Reason (R): Adaptive ability is inherited and has a genetic basis.</td><td>1</td></tr>
<tr><td>15</td><td>Assertion (A): Excess dose of coke or crack produces a sense of euphoria, increased energy and causes hallucinations.
Reason(R): It interferes with the transport of dopamine</td><td>1</td></tr>
<tr><td>16</td><td>Assertion (A): Rosie was the first transgenic cow to make more nutritionally balanced milk for consumption by human babies.
Reason (R): The milk of Rosie cow contained human beta- lactalbumin which made the milk rich in protein.</td><td>1</td></tr>
<tr><td colspan="3">Section – B</td></tr>
<tr><td>17</td><td><u>Attempt either option A or B.</u>
A. During artificial hybridization, it is important to ensure that only desired pollen grains are used for pollination. How is it ensured?
OR
B. Why is manual transfer of desired pollen grains relatively easy in pea plants for hybridization, but in wheat, pollen grains are often utilized from pollen banks for hybridization purposes?</td><td>2</td></tr>
<tr><td>18</td><td>How is the rate of initiation of RNA polymerase at a given promoter in a transcriptional unit of prokaryotes regulated?</td><td>2</td></tr>
<tr><td>19</td><td>The table below shows a hypothetical blood report of a patient.
<table>
<tr><th>Test description</th><th>Observed value</th><th>Unit</th><th>Reference range</th></tr>
<tr><td>Leucocytes</td><td></td><td></td><td></td></tr>
<tr><td>Total leucocyte count</td><td>1100</td><td>Per Microliter</td><td>4400-11000</td></tr>
<tr><td>Neutrophils</td><td>31</td><td>%</td><td>55-70</td></tr>
<tr><td>Lymphocytes</td><td>25</td><td>%</td><td>20-40</td></tr>
<tr><td>Basophils</td><td>0.5</td><td>%</td><td>0.5 - 1</td></tr>
<tr><td>Eosinophils</td><td>02</td><td>%</td><td>1-4</td></tr>
<tr><td>Monocytes</td><td>0</td><td>%</td><td>1-8</td></tr>
</table>
A. Looking at the values suggest which defense mechanism/ immunity is affected and state how this defense mechanism provides immunity.
B. Name the barrier with least count and enumerate its role in providing immunity.</td><td>2</td></tr>
</table>

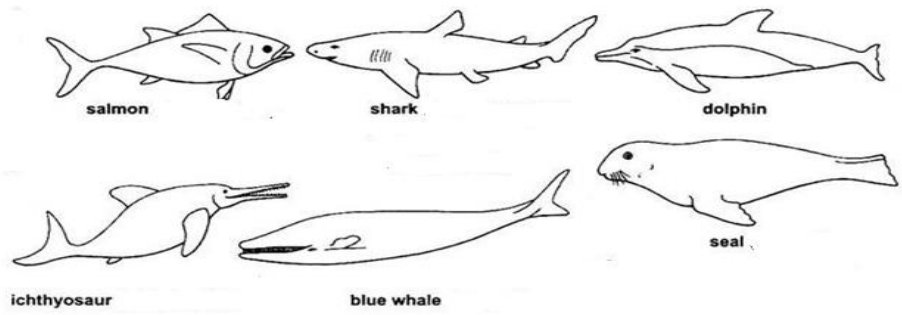
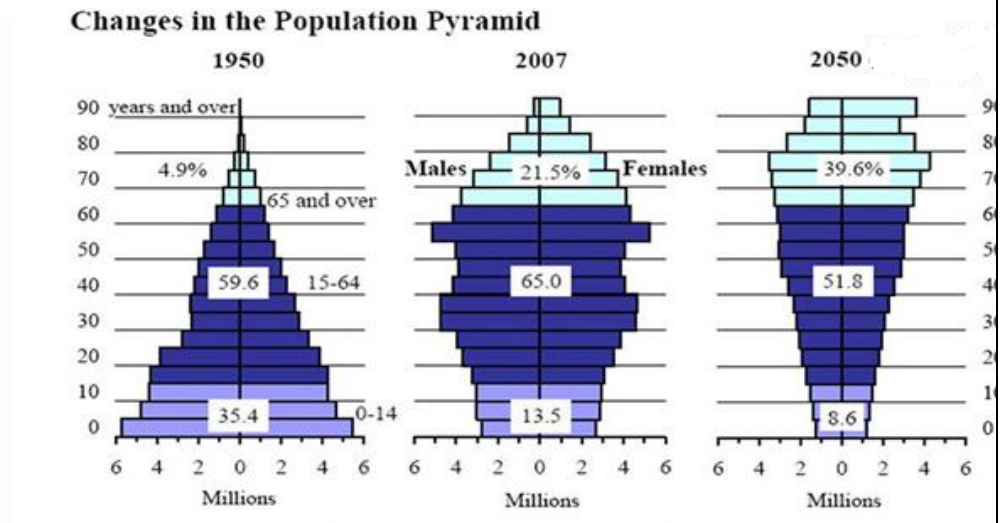
**Please note that the assessment scheme of the Academic Session 2024-25 will continue in the current session i.e. 2025-26.*

20	***Attempt either option A or B.*** A. A cheese maker claims to be a biotechnologist. How will you support the same? **OR** B. Why does the 'insertional inactivation' method to detect recombinant DNA is preferred to 'antibiotic resistance' procedure?	2
21	***Attempt either option A or B.*** A. (i) Compare the two ecological pyramids of biomass I and II given below and explain the situations in which this is possible.  **Fig. I**  **Fig. II** (ii) Construct an ideal pyramid of energy if 200,000 joules of sunlight are available. - - - - - - - - - - - - - - - - - - *For Visually impaired students*: A. (i) Compare the upright and inverted ecological pyramids of biomass and explain the situations in which this is possible. (ii) Construct an ideal pyramid of energy if 200,000 joules of sunlight is available. **OR** B. A tropical rainforest in South America is home to more than 40,000 species of plants, 3,000 of fishes, 1,300 of birds, 427 of mammals, 427 of amphibians, 378 of reptiles and 1,25,000 insects, snails and worms. From the given data, calculate the total number of known vertebrate species in the rainforest. (i) Give a reason to justify the huge difference in the number of plant and animal species.	2

**Please note that the assessment scheme of the Academic Session 2024-25 will continue in the current session i.e. 2025-26.*

Section - C		
22	Suggest a suitable contraceptive device for the following cases with justification. (i) Mohini does not want to take the risk of conception and sexually transmitted infections (STIs). (ii) Lalita has two children and does not want any more children. (iii) Geeta wants a contraceptive that she can take till she wants to avoid conception and can resume back to her fertile life without the intervention of the doctor. Also, it should have a lower failure rate.	3
23	Given below is a figure showing transport of ovum, fertilisation and passage of growing embryo through fallopian tube in a human female. Answer the questions that follow: (i) What will be the ploidy of cells shown in (a) and (c) stage in the figure given below? (ii) What will happen if component L as shown in the figure (g) given below does not attach properly to the endometrium? (iii) In a pregnant mother (case X), during early pregnancy, the fertilised egg splits into two embryos at stage C shown in the figure given below, resulting in the formation of twins. Will the genome of cells of these two embryos exhibit variation? Justify your answer.  - - - - - - - - - - - - - - - - - - *For Visually impaired students* Explain the events and journey of an ovum in the fallopian tube of a mother from fertilisation stage to implantation.	3
24	In guinea pigs, black coat colour (G) dominates over white (g) and brown eyes (B) dominate over blue (b). The alleles for coat colour and eye colour are not linked. What will be the probability of the offspring having blue eyes and a white coat if both parents are heterozygous for eye and coat colour? Find the probability using a Punnett square	3

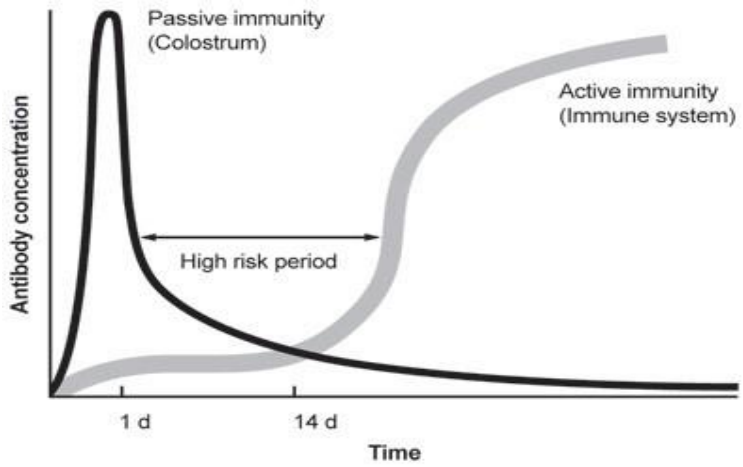
**Please note that the assessment scheme of the Academic Session 2024-25 will continue in the current session i.e. 2025-26.*

25	Shown below are certain aquatic vertebrates, where natural selection has favoured them to develop certain characteristics which enable them to live in water.  A. Name and explain the phenomenon exhibited by the above animals. B. Which one of the above is the most primitive one? What is its significance? - - - - - - - - - - - - - - - - - - - *For Visually impaired students* A. What are the basic conceptual similarities and differences between Lamarckian and Darwinian theory of evolution? B. Give an example that supports any one of the above two theories.	3
26	The Biological Oxygen Demand (BOD) of a primary effluent during sewage treatment is reduced. Enlist the process of how this is achieved.	3
27	Expand ELISA. On what principle is the ELISA test based? List two ways by which an infection can be detected by this test.	3
28	The population pyramids of Japan for the years 1950, 2007 and on the basis of the estimated value for 2050 have been shown below to answer the questions that follow:  A. Comment upon the growth status of the population on the basis of shape of the age pyramids.	3

**Please note that the assessment scheme of the Academic Session 2024-25 will continue in the current session i.e. 2025-26.*

<table>
<tr><td></td><td>B. What insights can you gain about their population dynamics?
- - - - - - - - - - - - - - - - - - -
<u>For visually impaired students</u>
The population pyramids of Japan for the years 1950, 2007 and on the basis of the estimated value for 2050 have broad-based, inverted bell and urn shape, respectively. Answer the following questions:
A. Comment upon the growth status of the population on the basis of shape of the age pyramids.
B. What insights can you gain about their population dynamics?</td><td></td></tr>
<tr><td colspan="3">Section – D</td></tr>
<tr><td>29</td><td>Given below is a set of information about some fruits and seeds.
<table>
<tr><th>Fruit</th><th>Fruit and seed formation</th></tr>
<tr><td>P</td><td>Nucellar cells surrounding the embryo sac develop into embryos.</td></tr>
<tr><td>Q</td><td>Ovary develops into the fruit by the application of growth hormones.</td></tr>
<tr><td>R</td><td>Thalamus contributes to fruit formation.</td></tr>
<tr><td>S</td><td>Ovary matures into a fruit after fertilisation.</td></tr>
</table>
On the basis of the information provided above, answer the following questions with justification for each answer.
A. How many embryo sacs will be present in each ovule of S before maturation and how many egg(s) will be present in each embryo sac when the embryo sac is developed from a single megaspore? (1)
B.
(i) Which of these fruits exhibits polyembryony? Will their embryos exhibit genetic variation? Justify.
(ii) What will be ploidy of the embryonic cells in the above case? (2)
<u>Attempt either subpart C or D.</u>
C. Which of these fruits can be considered as parthenocarpic? Give a reason. (1)
OR
D. Which of the fruits P, Q, R or S is a true fruit with seeds? Give reason. (1)</td><td>4</td></tr>
<tr><td>30</td><td>The graph below shows the Antibody concentration in young calves. Study the graph and answer the questions that follow:</td><td>4</td></tr>
</table>

**Please note that the assessment scheme of the Academic Session 2024-25 will continue in the current session i.e. 2025-26.*



A. What do you think is the difference between passive and active immunity **i**n this case? (1)

B. What kind of immunity will be observed when a vaccine is administered to the calf and why? (2)

Attempt either subpart C or D.

C. What kind of trend does passive immunity show and why? (1)

OR

D. Why does active immunity start after 14 days as per the above graph?

- - - - - - - - - - - - - - - - - -

For visually impaired students

The antibody concentration in a young calf was studied. It was found that the antibodies derived from colostrum (passive immunity) decreased from day 1 to 14, while the antibodies derived from immune cells (active immunity) increased between day 1 to day 14 and remained steady thereafter.

A. What do you think is the difference between passive and active immunity **i**n this case? (1)

B. What kind of immunity will be observed when a vaccine is administered to the calf and why? (2)

Attempt either subpart C or D.

C. What kind of trend does passive immunity show and why? (1)

OR

D. Why does active immunity start after 14 days as per the above graph?

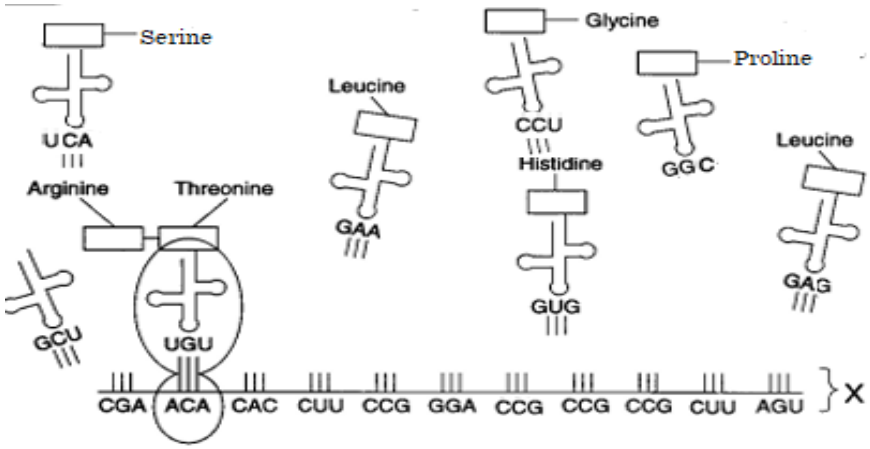
Section – E

31 A. Construct a complete transcription unit with promoter and terminator on the basis of the hypothetical template strand given below. 5



B. How is transcription a more complex process in eukaryotic cells?

**Please note that the assessment scheme of the Academic Session 2024-25 will continue in the current session i.e. 2025-26.*

	Explain the additional processes that a precursor mRNA has to undergo in these organisms. - - - - - - - - - - - - - - - - - - - *For visually impaired students* A. Why are both the strands not copied during transcription? B. How is transcription a more complex process in eukaryotic cells? Explain the additional processes that a precursor mRNA has to undergo in these organisms. **OR** A. Explain the process of aminoacylation of tRNA. Mention its role in translation. B. How do ribosomes in the cells act as factories for protein synthesis? C. Given below is a strand of mRNA undergoing the process of translation, what will be the sequence of Amino acids that will be translated? Name the triplet codons that should be added to bring to the end of translation at X.  - - - - - - - - - - - - - - - - - - - *For visually impaired students* C. Explain the phenomenon that forms the genetic basis to prove that codon is a triplet and it is read in a contiguous manner.	
32	Some plant and animal pathogens serve as one of the tools of recombinant DNA (rDNA) technology.' A. Name one animal and one plant pathogen and discuss the pathogenic nature of both. State how they serve as a tool in rDNA technology. B. What are the enzymes needed for rDNA technology? C. A farmer owns a cotton farm land which is getting infested with coleopteran pests. He is not willing to use the microbes to protect his farm. i. Name an alternate method to introduce the gene of interest the pathogen would have otherwise delivered and discuss how the alternate method would deliver the gene. ii. State how this gene would control the pest.	5

**Please note that the assessment scheme of the Academic Session 2024-25 will continue in the current session i.e. 2025-26.*

<table>
<tr><td></td><td>

OR

BamH1 is a restriction enzyme which recognizes the sequence-
5' - GGATCC - 3'. The restriction activity of this enzyme is between G and G.

A. Construct the palindrome for the above sequence.
B. Draw a labeled diagram to show the formation of recombinant DNA (rDNA) using BamH1.
C. PBR322 is a plasmid that has a restriction site for this enzyme at the tetracycline resistant gene. If BamH1 were to be used, how will it impact the response of the transformant with rDNA to antibiotics- ampicillin and tetracycline. Justify.

</td><td></td></tr>
<tr><td>33</td><td>

Justify the following statements with suitable proof/examples: -

A. ‘competition is not limited to closely related species’
B. ‘competition is not always dependent on resources being limiting’
C. ‘competitive exclusion occurs in nature’
D. ‘competing species may evolve mechanisms for co-existence’
E. ‘competition in nature comes from what is called ‘competitive release’’

OR

A. How does a simple food chain exemplify the First Law of Thermodynamics?
B. The table below shows the number of species in different parts of the world.

Name of Place	Number of Bird species
Columbia	1400
India	1200
Northern South America	1300
New York	105
Denmark	504

Identify the common factor in regions with a higher number of bird species and suggest at least two reasons for this greater diversity.

</td><td>5</td></tr>
</table>

****

**Please note that the assessment scheme of the Academic Session 2024-25 will continue in the current session i.e. 2025-26.*