

Re-NEET (UG) 2026

Sample Paper

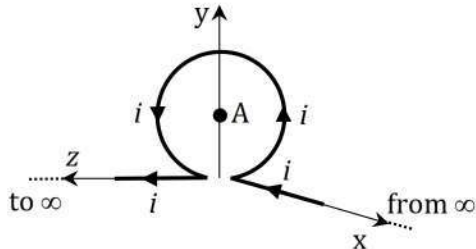
Important Instructions :

1. The Answer Sheet is inside this Test Booklet. When you are directed to open the Test Booklet, take out the Answer Sheet and fill in the particulars on **ORIGINAL Copy** carefully with **blue/black** ball point pen only.
2. The test is of **3 hours** duration and this Test Booklet contains **180** questions. Each question carries **4** marks. For each correct response, the candidate will get **4** marks. For each incorrect response, **one mark** will be deducted from the total scores. The maximum marks are **720**.
3. Use **Blue/Black Ball Point Pen only** for writing particulars on this page/marking responses on Answer Sheet.
4. Rough work is to be done in the space provided for this purpose in the Test Booklet only.
5. On completion of the test, the candidate **must hand over the Answer Sheet (ORIGINAL and OFFICE Copy)** to the Invigilator before leaving the Room/Hall. The candidates are allowed to take away this Test Booklet with them.

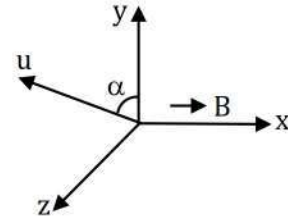
PHYSICS

- $$(3) \frac{P}{2} \qquad (4) \frac{P}{4}$$

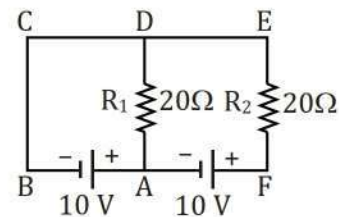
9. Find the magnitude of the magnetic induction B of a magnetic field generated by a system of thin conductors along which a current i is flowing at a point $A(0, R, 0)$, that is the centre of a circular conductor of radius R . The ring is in yz plane.



- (1) $B = \frac{\mu_0 i}{4\pi R} \sqrt{(2\pi^2 - 2\pi + 1)}$
 (2) $B = \frac{\mu_0 i}{4\pi R} \sqrt{2(2\pi^2 - 2\pi + 1)}$
 (3) $B = \frac{\mu_0 i}{2\pi R} \sqrt{(2\pi^2 - 2\pi + 1)}$
 (4) None of these
10. A point charge 2×10^{-2} C is moved from P to S in a uniform electric field of 30 NC^{-1} directed along positive x-axis. If coordinates of P and S are $(1, 2, 0)$ m and $(0, 0, 0)$ m respectively, the work done by electric field will be
 (1) 1200 mJ (2) 600 mJ
 (3) -600 mJ (4) -1200 mJ
11. The potential difference V and current I flowing through the AC circuit is given by $V = 5 \cos(\omega t - \pi/6)$ volt and $I = 10 \sin \omega t$ ampere. The average power dissipated in the circuit is:
 (1) $\frac{25\sqrt{3}}{2}$ W (2) 12.5 W
 (3) 25 W (4) 50 W
12. In a region of space, a uniform magnetic field B exists in the x-direction. An electron is fired from the origin with its initial velocity u making an angle α with the y direction in the y-z plane. In the subsequent motion of the electron,



- (1) y-coordinate of the electron will never be negative
 (2) z-coordinate of the electron will never be negative
 (3) x-coordinate of the electron will never be negative
 (4) trajectory of the electron would be helical
13. **Assertion:** In a nuclear reactor, cadmium rods are used to increase the rate of fission.
Reason: Cadmium has a high cross-section for absorbing neutrons.
 (1) Both A & R are true and R is the correct explanation of A.
 (2) Both A & R are true but R is NOT the correct explanation of A.
 (3) A is true but R is false.
 (4) A is false but R is true.
14. In the given circuit the cells have zero internal resistance. If one of the cell is reversed, the currents (in Amperes) passing through resistance R_1 and R_2 respectively, are:



- (1) 2A, 2A (2) 0A, 1A
 (3) 1A, 2A (4) 0.5A, 0A
15. A bullet of mass 0.01 kg and travelling at a speed of 500 ms^{-1} strikes a block of mass 2 kg which is suspended by a string of length 5m. The centre of gravity of the block is found to raise a vertical distance of 0.2 m. What is the speed of the bullet just after it emerges from the block?
 (1) 15 ms^{-1} (2) 20 ms^{-1}
 (3) 100 ms^{-1} (4) 50 ms^{-1}

16. A medium having dielectric constant $K > 1$ fills the space between the plates of a parallel plate capacitor. The plates have large area, and the distance between them is d . The capacitor is connected to a battery of voltage V as shown in Figure (a). Now, both the plates are moved by a distance of $\frac{d}{2}$ from their original positions, as shown in Figure (b).

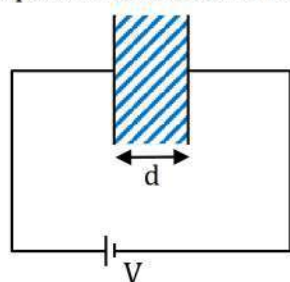


Figure (a)

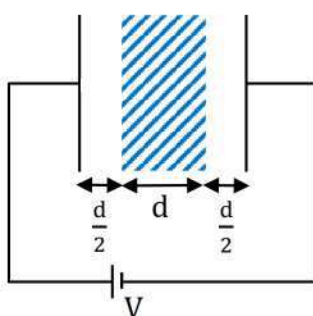


Figure (b)

In the process of going from the configuration depicted in Figure (a) to that in Figure (b), which of

the following statement(s) is(are) correct?

- (1) The electric field inside the dielectric material is reduced by a factor of $2K$.
- (2) The capacitance is decreased by a factor of $\frac{1}{K+1}$.
- (3) The voltage between the capacitor plates is increased by a factor of $(K+1)$.
- (4) The work done in the process **DOES NOT** depend on the presence of the dielectric material.

17. An ideal gas whose adiabatic exponent equals to $\gamma = \frac{7}{5}$ is expanded according to the law $P = 2V$.

The initial volume of the gas is equal to $V_0 = 1$ unit. As a result of expansion the volume increases 4 times. (Take $R = \frac{25}{3}$ units)

Column - I		Column - II	
(A)	Work done by the gas	(P)	25 units
(B)	Increment in internal energy of the gas	(Q)	45 units
(C)	Heat supplied to the gas	(R)	75 units
(D)	Molar heat capacity of the gas in the process	(S)	15 units
		(T)	90 units

- (1) (A) $\rightarrow$ (S); (B) $\rightarrow$ (R); (C) $\rightarrow$ (T); (D) $\rightarrow$ (P)
- (2) (A) $\rightarrow$ (Q); (B) $\rightarrow$ (T); (C) $\rightarrow$ (Q); (D) $\rightarrow$ (P)
- (3) (A) $\rightarrow$ (R); (B) $\rightarrow$ (S); (C) $\rightarrow$ (T); (D) $\rightarrow$ (P)
- (4) None of these

18. The angle of contact between glass and water is 0° and water (surface tension 70 dyne/cm) rises in a glass capillary up to 6 cm. Another liquid of surface tension 140 dyne/cm, angle of contact 60° and relative density 2 will rise in the same capillary up to

- (1) 12 cm
- (2) 24 cm
- (3) 3 cm
- (4) 6 cm

19. An ideal transformer has 500 primary turns and 10 secondary turns. If the secondary has a resistive load of 15Ω , the currents in the primary and secondary coils could be respectively, are

- (1) 0.16 A, 3.2×10^{-3} A
- (2) 3.2×10^{-3} A, 0.16 A
- (3) 0.16 A, 0.16 A
- (4) 3.2×10^{-3} A, 3.2×10^{-3} A

20. An EM wave propagating in +x-direction has a wavelength of 8 mm. The electric field vibrating in y-direction has maximum magnitude of 60 Vm^{-1} . Choose the correct equations for electric and magnetic fields if the EM wave is propagating in vacuum :

(1) $E_y = 60 \sin \left[\frac{\pi}{4} \times 10^3 (x - 3 \times 10^8 t) \right] \text{Vm}^{-1}$

$B_z = 2 \sin \left[\frac{\pi}{4} \times 10^3 (x - 3 \times 10^8 t) \right] \text{T}$

(2) $E_y = 60 \sin \left[\frac{\pi}{4} \times 10^3 (x - 3 \times 10^8 t) \right] \text{Vm}^{-1}$

$B_z = 2 \times 10^{-7} \sin \left[\frac{\pi}{4} \times 10^3 (x - 3 \times 10^8 t) \right] \text{T}$

(3) $E_y = 2 \times 10^{-7} \sin \left[\frac{\pi}{4} \times 10^3 (x - 3 \times 10^8 t) \right] \text{Vm}^{-1}$

$B_z = 60 \sin \left[\frac{\pi}{4} \times 10^3 (x - 3 \times 10^8 t) \right] \text{T}$

(4) $E_y = 2 \times 10^{-7} \sin \left[\frac{\pi}{4} \times 10^4 (x - 4 \times 10^8 t) \right] \text{Vm}^{-1}$

$B_z = 60 \sin \left[\frac{\pi}{4} \times 10^4 (x - 4 \times 10^8 t) \right] \text{T}$

21. A spring is compressed between two toy carts of masses m_1 and m_2 . When the toy carts are released, the spring exerts on each toy cart equal and opposite forces for the same small time t . If the coefficients of friction μ between the ground and the toy carts is same then the magnitude of displacements of the toy carts are in the ratio

(1) $\frac{S_1}{S_2} = \frac{m_2}{m_1}$

(2) $\frac{S_1}{S_2} = \frac{m_1}{m_2}$

(3) $\frac{S_1}{S_2} = \left(\frac{m_2}{m_1} \right)^2$

(4) $\frac{S_1}{S_2} = \left(\frac{m_1}{m_2} \right)^2$

22. The earth is assumed to be a sphere of radius R . A platform is arranged at a height R from the surface of the earth. The escape velocity of a body from this platform is fv , where v is its escape velocity from the surface of the Earth. The value of f is:

(1) $1/2$ (2) $\sqrt{2}$ (3) $1/\sqrt{2}$ (4) $1/3$

23. The mean free path of molecules of a gas at a certain temperature and pressure is λ . If the pressure of the gas is doubled while the temperature remains constant, the collision frequency of the molecules will become

- (1) half times of original value
(2) Equal to the original value
(3) Twice the original value
(4) Four times the original value

24. Given below are two statements : One is labelled as Assertion (A) and other is labelled as Reason (R).

Assertion (A) : Time period of oscillation of a liquid drop depends on surface tension (S), if density of the liquid is ρ and radius of the

drop is r , then $T = k \sqrt{\rho r^3 / S^{3/2}}$ is dimensionally

correct, where K is dimensionless.

Reason (R) : Using dimensional analysis we get R.H.S. having different dimension than that of time period.

In the light of above statements, choose the correct answer from the options given below.

- (1) Both (A) and (R) are true and (R) is the correct explanation of (A)
(2) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(3) (A) is true but (R) is false
(4) (A) is false but (R) is true

25. Calculate the magnitude of the vector $\vec{C}$ that results from the cross product of $\vec{A}$ and $\vec{B}$ (where $\vec{C} = \vec{A} \times \vec{B}$). The vectors are defined as $\vec{A} = 2\hat{i} + 3\hat{j} - \hat{k}$ and $\vec{B} = \hat{i} - \hat{j} + 2\hat{k}$.

(1) $5\sqrt{3}$

(2) $3\sqrt{10}$

(3) $5\sqrt{2}$

(4) 10

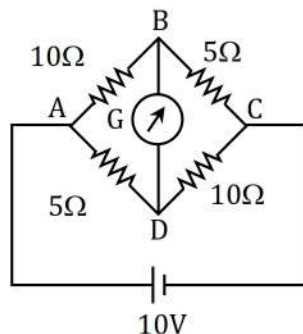
26. A car is moving in a circular horizontal track of radius 10 m with a constant speed of 10 m/sec. A plumb bob is suspended from the roof of the car by a light rigid rod of length 1.00 m. The angle made by the rod with vertical is:

(1) Zero (2) 30° (3) 45° (4) 60°

27. A particle executes simple harmonic motion with an amplitude of 5 cm. When the particle is at 4 cm from the mean position, the magnitude of its velocity in SI units is equal to that of its acceleration. Then, its periodic time in seconds is :

(1) $\frac{7}{3}\pi$ (2) $\frac{3}{8}\pi$ (3) $\frac{4\pi}{3}$ (4) $\frac{8\pi}{3}$

28. The four arms of a Wheatstone bridge have resistances as shown in the figure. A galvanometer of $5\ \Omega$ resistance is connected across BD. The current through the galvanometer when a potential difference of 10V is maintained across AC is:



- (1) $\frac{2}{7}$ A from B to D
 (2) $\frac{2}{7}$ A from D to B
 (3) $\frac{7}{2}$ A from B to D
 (4) $\frac{7}{2}$ A from D to B

29. Two charges of $-4\ \mu\text{C}$ and $+4\ \mu\text{C}$ are placed at the points A(1, 0, 4)m and B(2, -1, 5) m located in an electric field $\vec{E}=0.20\ \hat{i}\ \text{V/cm}$. The magnitude of the torque acting on the dipole is $8\sqrt{\alpha}\times 10^{-5}\ \text{Nm}$, Where $\alpha =$ ____.

- (1) 3 (2) 6 (3) 1 (4) 2

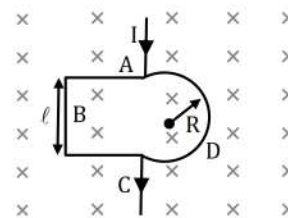
30. A Zener Diode ($V_z = 5\text{V}$) regulates an unregulated 25V input. With a $400\ \Omega$ series resistor, the Zener current is 4 times the load current. Calculate the load resistance R_L .

- (1) $250\ \Omega$ (2) $500\ \Omega$
 (3) $1000\ \Omega$ (4) $125\ \Omega$

31. It is necessary to illuminate the bottom of a well by reflected solar beam when the incident ray is at an angle of 40° to the vertical. At what angle to the horizontal should a plane mirror be placed?

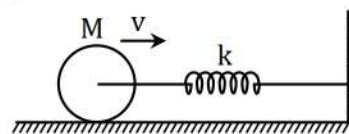
- (1) 90° (2) 40° (3) 70° (4) 20°

32. Figure shows a conducting loop ABCDA placed in a uniform magnetic field (strength B) perpendicular to its plane. The part ABC is the (three-fourth) portion of the square of side length ℓ . The part ADC is a circular arc of radius R. The points A and C are connected to a battery which supplies a current I to the circuit. The magnetic force on the loop due to the field B is



- (1) zero (2) $BI\ell$
 (3) $2BIR$ (4) $\frac{BI\ell R}{I+R}$

33. A solid sphere rolls without slipping and presses a spring of spring constant k as shown in figure. then, the compression in the spring will be:

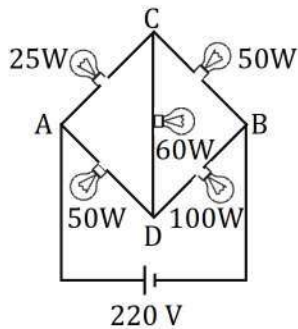


- (1) $v\sqrt{\frac{2M}{3k}}$ (2) $v\sqrt{\frac{2M}{5k}}$
 (3) $v\sqrt{\frac{5k}{7M}}$ (4) $v\sqrt{\frac{7M}{5k}}$

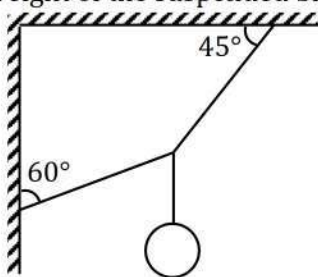
34. The values of measurement of a physical quantity in 5 trials were found to be 1.51, 1.53, 1.53, 1.52 and 1.54. Then

- (1) average absolute error is 0.01
 (2) relative error is 0.02
 (3) percentage error is 0.01%
 (4) percentage error is 1.7%

35. Five bulbs each have same voltage rating 220 V are connected as shown in the figure. The total power consumed in the circuit is



- (1) 20 W (2) 50 W
(3) 60 W (4) 100 W
36. An electric field is applied to a semiconductor. Let the number of charge carriers be n and the average drift speed be v . If the temperature is increased
- (1) Both n and v will increase
(2) n will increase but v will decrease
(3) v will increase but n will decrease
(4) Both n and v will decrease
37. A 10 D lens is used as a magnifier. Where should the object be placed to obtain maximum angular magnification for a normal eye (near point = 25 cm)?
- (1) - 7.1 cm (2) 100/7 cm
(3) 7/50 cm (4) 50/14 cm
38. Find the tension in each cord in given figure, if the weight of the suspended block is w .



- (1) $\frac{2w}{\sqrt{3}-1}, \frac{\sqrt{6}w}{\sqrt{3}-1}$
(2) $\frac{w}{\sqrt{3}-1}, \frac{\sqrt{6}w}{\sqrt{3}-1}$
(3) $\frac{2w}{\sqrt{3}-1}, \frac{w}{\sqrt{3}-1}$
(4) $\frac{w}{\sqrt{3}-1}, \frac{\sqrt{3}w}{\sqrt{3}-1}$

39. A simple pendulum oscillating in air has period T . The bob of the pendulum is completely immersed in a non-viscous liquid.

The density of the liquid is $\frac{1}{16}$ th of the material of the bob. If the bob is inside liquid all the time, its period of oscillation in this liquid is :

- (1) $4T\sqrt{\frac{1}{15}}$ (2) $2T\sqrt{\frac{1}{10}}$
(3) $4T\sqrt{\frac{1}{14}}$ (4) $2T\sqrt{\frac{1}{14}}$

40. An electron is accelerated through a potential difference of V volts. Its de Broglie wavelength is λ . If the accelerating potential is increased to $4V$, the new de Broglie wavelength will be:

- (1) 2λ (2) 4λ
(3) $\lambda/2$ (4) $\lambda/4$

41. Which of the following is true for photon

- (1) $E = \frac{hc}{\lambda}$ (2) $E = \frac{1}{2}mu^2$
(3) $p = \frac{E}{2v}$ (4) $E = \frac{1}{2}mc^2$

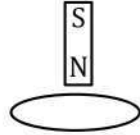
42. In YDSE, water is filled in the space between slits and screen then -

- (1) Fringe pattern shift upwards but fringe width remains unchanged
(2) Fringe width decreases and fringe pattern shifts upwards.
(3) Fringe width remains unchanged and central fringe doesn't shift.
(4) Fringe width decreased and fringe pattern doesn't shift.

43. In a hydrogen-like atom, if the radius of the n^{th} orbit is r_n and the frequency of revolution is f_n , find the value of k if $(r_n \cdot f_n) \propto n^k$.

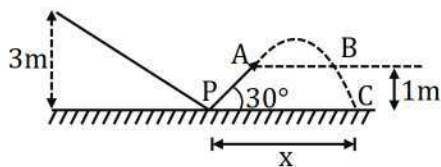
- (1) $k = 1$ (2) $k = -1$
(3) $k = 0$ (4) $k = 2$

44. **Assertion :** A magnet is dropped along the axis of a circular conducting loop as shown in figure. Then acceleration of magnet is always less than g .



Reason : When magnet is above the loop it will repel the magnet and when it is below the loop it will attract the magnet.

- (1) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
- (2) If both Assertion and Reason are true but Reason is not correct explanation of Assertion.
- (3) If Assertion is true but Reason is false.
- (4) If Assertion is false but Reason is true.
45. A 0.098 kg block slides down a frictionless track as shown in fig.



The vertical component of the velocity of block at A is

- (1) $\sqrt{g}$ (2) $2\sqrt{g}$
- (3) $3\sqrt{g}$ (4) $4\sqrt{g}$

CHEMISTRY

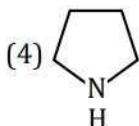
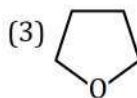
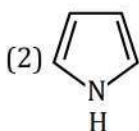
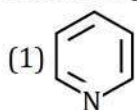
46. Law of multiple proportions is illustrated by one of the following pairs

(1) H_2S and SO_2 (2) NH_3 and NO_2
 (3) Na_2S and Na_2O (4) N_2O and NO

47. Which one of the following statements is true about the structure of PO_4^{3-} ion?

(1) Out of the four P-O bonds, two are longer and one is shorter.
 (2) It has 3 sigma and 4 π -bonds.
 (3) All P-O bonds are equal in length.
 (4) It can be explained by considering sp^2 hybridization.

48. Among the following compounds, the most basic compound is :



49. If 2 mol of N_2 and 3 mol of H_2 mixed together to produce NH_3 then select the correct option.

(1) N_2 is limiting reagent
 (2) 1 mole of NH_3 will be formed
 (3) H_2 is limiting reagent
 (4) 1 mole of H_2 will remain.

50. The IUPAC name of an element with atomic number 120 is

(1) unnilennium (2) unununnium
 (3) ununoctium (4) unbiniium

51. Heat of combustion of two isomer x and y are 17 kJ/mol and 12 kJ/mol respectively. From this information it may be concluded that :

(1) isomer x is 5 kJ/mol more stable
 (2) isomer y is 5 kJ/mol less stable
 (3) isomer y has 5 kJ/mol more potential energy
 (4) isomer x is 5 kJ/mol less stable

52. Formation of SO_3 takes place according to the reaction



Which of the following factors favours the formation of SO_3 ?

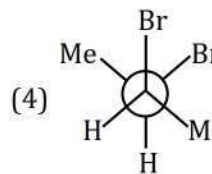
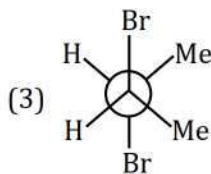
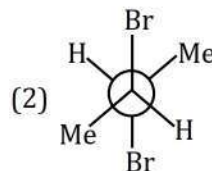
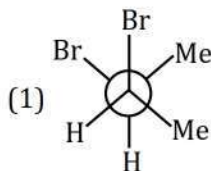
(1) Increase in temperature
 (2) Increase in pressure
 (3) Removal of oxygen
 (4) Increase in volume

53. BF_3 is planar and electron deficient compound.

Which parameter changes in BF_3 after back bonding.

(1) Hybridisation (2) Shape
 (3) Bond angle (4) None of these

54. Among the following the most stable conformation of meso-2,3-dibromobutane is :



55. A solution which is 10^{-3} M each in Mn^{2+} , Fe^{2+} , Zn^{2+} and Hg^{2+} is treated with 10^{-16} M sulphide ion. If K_{sp} of MnS , ZnS and HgS are 10^{-15} , 10^{-23} , 10^{-20} and 10^{-54} respectively, which one will precipitate first?

(1) FeS (2) MnS (3) HgS (4) ZnS

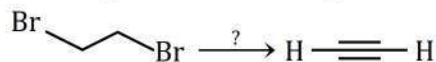
56. Match the following aspects with the respective metal.

	Aspects		Metal
(a)	The 3d series metal which reveals a maximum melting point	(i)	Scandium
(b)	The 6d series metal which shows no color in +3 oxidation state	(ii)	Manganese
(c)	The metal which does not exhibit variable oxidation states	(iii)	Chromium
(d)	The metal which shows reducing behaviour in +3 oxidation state	(iv)	Lanthanum

Select the correct option :

- (1) (a)-(i), (b)-(iv), (c)-(ii), (d)-(iii)
 (2) (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)
 (3) (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)
 (4) (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

57. The reagents for following conversion -



is/are ?

- (1) Alc. KOH
 (2) alc. KOH followed by NaNH_2
 (3) aq. KOH followed by NaNH_2
 (4) $\text{Zn}/\text{CH}_3\text{OH}$

58. The correct order of increasing $[\text{H}_3\text{O}^+]$ in the following aqueous solution is

- (1) $0.01 \text{ M H}_2\text{S} < 0.01 \text{ M H}_2\text{SO}_4 < 0.01 \text{ M NaCl} < 0.01 \text{ M NaNO}_2$
 (2) $0.01 \text{ M NaCl} < 0.01 \text{ M NaNO}_2 < 0.01 \text{ M H}_2\text{S} < 0.01 \text{ M H}_2\text{SO}_4$
 (3) $0.01 \text{ M NaNO}_2 < 0.01 \text{ M NaCl} < 0.01 \text{ M H}_2\text{S} < 0.01 \text{ M H}_2\text{SO}_4$
 (4) $0.01 \text{ M H}_2\text{S} < 0.01 \text{ M NaNO}_2 < 0.01 \text{ M NaCl} < 0.01 \text{ M H}_2\text{SO}_4$

59. Identify the incorrect match :

Name		IUPAC Official Name	
(a)	Unnilunium	(i)	Mendelevium
(b)	Ununtrium	(ii)	Nihonium
(c)	Ununhexium	(iii)	Livermorium
(d)	Unununnium	(iv)	Darmstadtium

- (1) (d), (iv) (2) (a), (i)
 (3) (b), (ii) (4) (c), (iii)

60. In Carius method, halogen containing organic compound is heated with fuming nitric acid in the presence of :

- (1) HNO_3 (2) AgNO_3 (3) CuSO_4 (4) BaSO_4

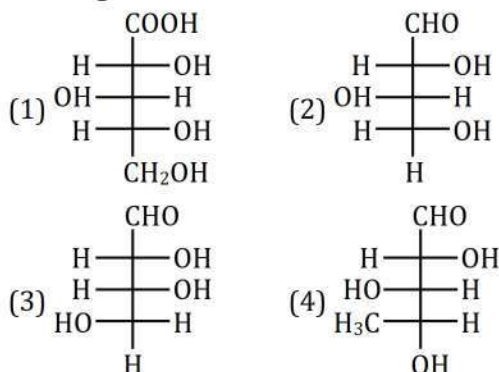
61. When the electron of a hydrogen atom jump from $n = 4$ to $n = 1$ state, the number of spectral lines emitted is

- (1) 15 (2) 9 (3) 6 (4) 3

62. Which of the following species is not stable?

- (1) XeH_4 (2) $[\text{GeCl}_6]^{-2}$
 (3) $[\text{Sn}(\text{OH})_6]^{2-}$ (4) XeOF_4

63. Which of the following compound show L-configuration :-



64. **Assertion (A)** : No two atoms have same sum of protons and neutrons.

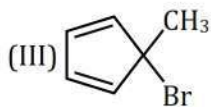
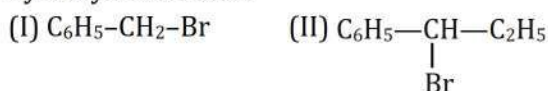
Reason (R) : Atomic number is the characteristic value for each element.

- (1) Both A and R are correct and R is the correct explanation of A.
 (2) Both A and R are correct but R is not the correct explanation of A.
 (3) A is correct but R is wrong.
 (4) A is wrong but R is correct.

65. Among CaH_2 , BeH_2 , BaH_2 , the order of ionic character is

- (1) $\text{BeH}_2 < \text{CaH}_2 < \text{BaH}_2$
 (2) $\text{CaH}_2 < \text{BeH}_2 < \text{BaH}_2$
 (3) $\text{BeH}_2 < \text{BaH}_2 < \text{CaH}_2$
 (4) $\text{BaH}_2 < \text{BeH}_2 < \text{CaH}_2$

66. Arrange the following compounds in decreasing order of their reactivity for hydrolysis reaction



- (1) $\text{I} > \text{II} > \text{III}$ (2) $\text{II} > \text{I} > \text{III}$
 (3) $\text{III} > \text{II} > \text{I}$ (4) $\text{III} > \text{I} > \text{II}$

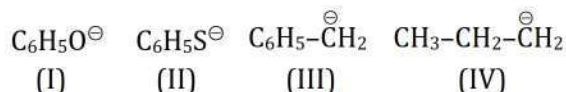
67. Given that $\text{C} + \text{O}_2 \rightarrow \text{CO}_2, \Delta H^\circ = -x \text{ kJ}$



The enthalpy of formation of carbon monoxide will be

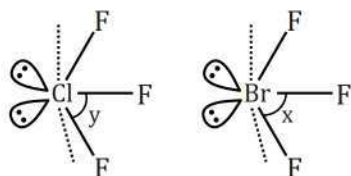
- (1) $y - 2x$ (2) $\frac{2x-y}{2}$
 (3) $\frac{y-2x}{2}$ (4) $2x - y$

68. The reason for greater range of oxidation states in transition elements is attributed to :-
 (1) actinoid contraction
 (2) $(n-1)d$ and ns levels having comparable energies
 (3) $4f$ and $5d$ levels being a larger gap in energies
 (4) the radioactive nature of transition elements
69. Arrange the following in their nucleophilicity order.



- (1) $\text{II} > \text{III} > \text{IV} > \text{I}$ (2) $\text{I} > \text{IV} > \text{II} > \text{III}$
 (3) $\text{II} > \text{IV} > \text{III} > \text{I}$ (4) $\text{III} > \text{IV} > \text{I} > \text{II}$

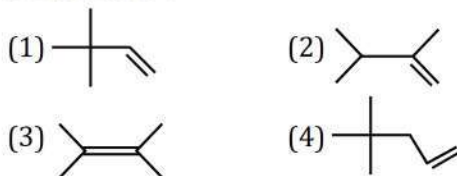
70. The difference in the work done when one mole of $\text{Al}_4\text{C}_3(\text{s})$ reacts with water in a closed vessel at 27°C against atmospheric pressure and that in an open vessel under the same conditions is
 (1) greater in the open vessel by 600 cal
 (2) greater in the closed vessel by 600 cal
 (3) greater in the open vessel by 1800 cal
 (4) greater in the closed vessel by 1800 cal
71. Compare the bond angle from the following molecules



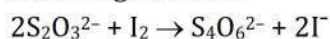
- (1) $x > y$ (2) $y > x$ (3) $x = y$ (4) None

72. $\xrightarrow{\text{Conc. H}_2\text{SO}_4}$ (X) Major product X ;

Product X is :



73. If the molecular wt. of $\text{Na}_2\text{S}_2\text{O}_3$ and I_2 are M_1 and M_2 respectively, then what will be the equivalent wt. of $\text{Na}_2\text{S}_2\text{O}_3$ and I_2 in the following reaction?

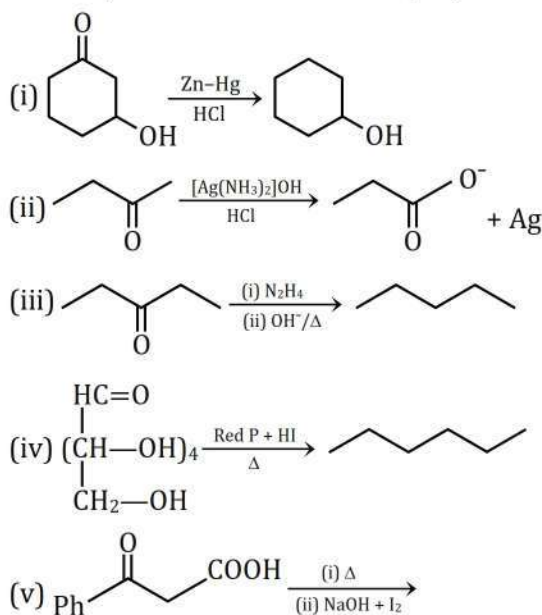


- (1) M_1, M_2 (2) $M_1, M_2/2$
 (3) $2M_1, M_2$ (4) $M_1, 2M_2$

74. The main factor responsible for weak acidic nature of BF_3 is.

- (1) Large EN of F
 (2) $3\text{C} - 2\text{e}^-$ bond in BF_3
 (3) $\text{p}\pi - \text{p}\pi$ back bonding
 (4) $\text{p}\pi - \text{d}\pi$ back bonding

75. How many of the following reactions are correctly matched with their major product -



$\text{PhCOONa}^+ + \text{CHI}_3$ (Final products)

- (1) i, ii are correct (2) i, ii, iii are correct
 (3) iii, iv, ii are correct (4) i, iii, v are correct
76. In order to oxidise one mole of FeC_2O_4 in acidic medium, the number moles of KMnO_4 required is

- (1) 2 (2) $\frac{3}{2}$ (3) $\frac{3}{5}$ (4) 1

77. **Assertion (A)** : Eu^{2+} & Yb^{2+} are reducing agents for their ions.

Reason (R) : Both ions have stable half filled configuration.

- (1) If both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.
 (2) If both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.
 (3) If Assertion is True but Reason is False
 (4) If both Assertion & Reason are false.

78. Match List-I with List-II

List-I Name of reaction		List-II Reagent Used	
A	Hell-Volhard Zelinsky reaction	I.	NaOH + I ₂
B	Iodoform reaction	II.	(i) CrO ₂ Cl ₂ , CS ₂ (ii) H ₂ O
C	Etard reaction	III.	(i) Br ₂ /Red phosphorus (ii) H ₂ O
D	Gattermann- Koch reaction	IV.	CO, HCl, anhyd. AlCl ₃

Choose correct answer from options given below:-

(1) A - III, B - II, C - I, D - IV

(2) A - III, B - I, C - II, D - IV

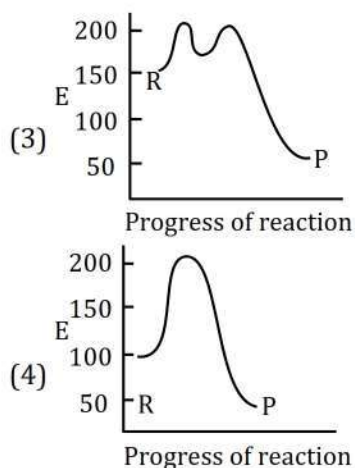
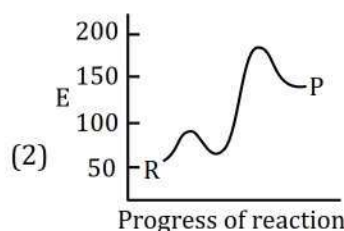
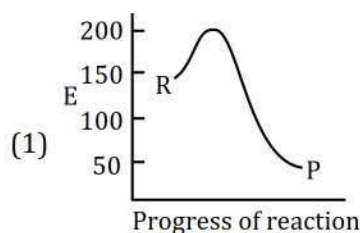
(3) A - III, B - I, C - IV, D - II

(4) A - I, B - II, C - III, D - IV

79. An exothermic chemical reaction proceeds by two stages.

Reactants $\xrightarrow{\text{stage 1}}$ intermediate $\xrightarrow{\text{stage 2}}$ products

The activation energy of stage 1 is 50 kJ mol⁻¹. The overall enthalpy change of the reaction is -100 kJ mol⁻¹. Which diagram could represent the energy level diagram for the reaction ?



80. Cr²⁺ is reducing in nature because-

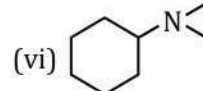
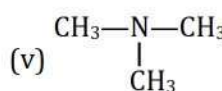
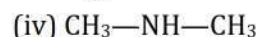
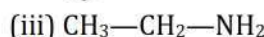
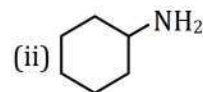
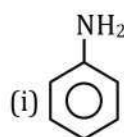
(1) In Cr²⁺, configuration changes from d⁴ to d³ to achieve half filled t_{2g}.

(2) Cr²⁺ gain an electron to achieve d⁵ configuration

(3) Cr²⁺ is more stable than Cr³⁺

(4) In Cr²⁺ configuration changes from d⁴ to d³ to achieve half filled d-subshell.

81. How many amines give carbylamine test.



(1) 4 (2) 3 (3) 1 (4) 5

82. Kinetics of the reaction A(g) → 2B(g) + C(g) is followed by measuring the total pressure at different times. It is given that Initial pressure of A = 0.5 atm.

Total pressure of mixture after 2 hours = 0.7 atm. Rate constant of the reaction = 1 × 10⁻³ s⁻¹

What is the rate of reaction $-\frac{d[A]}{dt}$ when the total pressure is 0.7 atm?

(1) 2.0 × 10⁻⁴ M s⁻¹ (2) 4.0 × 10⁻⁴ M s⁻¹

(3) 5.0 × 10⁻⁴ M s⁻¹ (4) 7.0 × 10⁻⁴ M s⁻¹

83. The one that does not stabilize 2° and 3° structures of proteins is

(1) H-bonding

(2) -S-S-linkage

(3) -O-O-linkage

(4) Vander Walls forces

84. The resistance of a 0.10 M weak acid HA in a conductivity cell is 2.0×10^3 ohm. The cell constant of the cell is 0.78 cm^{-1} and Λ_0 of the acid is $390 \text{ S cm}^2 \text{ mol}^{-1}$.

Consider the following statements:

1. pH of the acid solution = 3
2. pK_a of the acid = 5
3. Degree of dissociation of the acid = 0.01

Which of the statements given above are correct?

- (1) 1 and 2 only (2) 1 and 3 only
(3) 2 and 3 only (4) 1, 2 and 3

85. Given below are two statements:

Statement I :- Crystal Field Stabilization Energy (CFSE) of $[\text{Cr}(\text{H}_2\text{O})_6]^{2+}$ is greater than that of $[\text{Mn}(\text{H}_2\text{O})_6]^{2+}$.

Statement II :- Potassium ferricyanide has a greater spin-only magnetic moment than sodium Ferrocyanide.

In the light of the above statements, choose the correct answer from the options given below:

- (1) Both Statement I and Statement II are true
(2) Both Statement I and Statement II are false
(3) Statement I is true but Statement II is false
(4) Statement I is false but Statement II is true

86. Match the laws given in column I with expressions given in column II.

Column-I		Column-II	
(i)	Raoult's law	(a)	$\Delta T_f = K_f m$
(ii)	Henry's law	(b)	$\pi = CRT$
(iii)	Elevation of boiling point	(c)	$p = x_1 p_1^0 + x_2 p_2^0$
(iv)	Depression in freezing point	(d)	$\Delta T_b = K_b m$
(v)	Osmotic pressure	(e)	$p = K_H \cdot x$

- (1) (i) $\rightarrow$ (b), (ii) $\rightarrow$ (e), (iii) $\rightarrow$ (d), (iv) $\rightarrow$ (a), (v) $\rightarrow$ (c)
(2) (i) $\rightarrow$ (c), (ii) $\rightarrow$ (a), (iii) $\rightarrow$ (d), (iv) $\rightarrow$ (e), (v) $\rightarrow$ (b)
(3) (i) $\rightarrow$ (c), (ii) $\rightarrow$ (e), (iii) $\rightarrow$ (d), (iv) $\rightarrow$ (a), (v) $\rightarrow$ (b)
(4) (i) $\rightarrow$ (d), (ii) $\rightarrow$ (b), (iii) $\rightarrow$ (c), (iv) $\rightarrow$ (a), (v) $\rightarrow$ (e)

87. Given below are two statements :

Statement I :- Cross aldol condensation between two different aldehydes will always produce four different products.

Statement II :- When semicarbazide reacts with a mixture of benzaldehyde and acetophenone under optimum pH, it forms a condensation product with acetophenone only. In the light of the above statements, choose the correct answer from the options given below :

- (1) Both Statement I and Statement II are false
(2) Statement I is false but Statement II is true
(3) Both Statement I and Statement II are true
(4) Statement I is true but Statement II is false

88. Two liquids Z and Y form an ideal solution. The mixture has a vapour pressure of 400 mm at 300 K when mixed in the molar ratio of 1 : 1 and a vapour pressure of 350 mm when mixed in the molar ratio of 1 : 2 at the same temperature. The vapour pressures of the two pure liquids X and Y respectively are
(1) 250 mm, 550 mm (2) 350 mm, 450 mm
(3) 350 mm, 700 mm (4) 550 mm, 250 mm

89. Given below are two statements:

Statement-I :- The correct order in terms of atomic/ionic radii is $\text{Al} > \text{Mg} > \text{Mg}^{2+} > \text{Al}^{3+}$.

Statement-II :- The correct order in terms of the magnitude of electron gain enthalpy is $\text{Cl} > \text{Br} > \text{S} > \text{O}$.

In the light of the above statements, choose the correct answer from the options given below:

- (1) Both Statement I and Statement II are false
(2) Statement I is false but Statement II is true
(3) Statement I is true but Statement II is false
(4) Both Statement I and Statement II are true

90. Which of the following solutions will exhibit the highest boiling point?

- (1) 0.01 M Na_2SO_4
(2) 0.01 M KNO_3
(3) 0.015 M urea
(4) 0.015 M glucose

BIOLOGY

- 91.** Read the following six statements regarding taxonomic categories and choose the correct option.
- (A) An order is an assemblage of related families that show a few similar characters.
- (B) The number of similar characters increases as we move from species to kingdom.
- (C) Convolvulaceae and Solanaceae are placed under the order Polymoniales mainly based on floral characters.
- (D) The order Carnivora includes families such as Felidae and Canidae.
- (E) Classes including fishes, amphibians, reptiles, birds, and mammals are placed under the phylum Chordata due to the presence of a notochord and a dorsal hollow neural system.
- (F) Kingdom is the lowest taxonomic category in biological classification.
- Options:**
- (1) A, C, D and E are correct
- (2) A, B, C and F are correct
- (3) B, D, E and F are correct
- (4) A, C and F are correct
- 92.** Which of the following statements about protists is correct?
- (1) All protists are multicellular.
- (2) Slime moulds produce sporangia during favorable conditions.
- (3) Dinoflagellates have a cellulose-based cell wall.
- (4) Euglenoids have peptidoglycan in their cell walls.
- 93.** Members of Phycomycetes are found in:
- (i) Aquatic habitats
- (ii) On decaying wood
- (iii) Moist and damp places
- (iv) As obligate parasites on plants
- (1) i and ii only
- (2) i, ii and iii only
- (3) All of the above
- (4) None of the above
- 94.** Which of the following statements is correct for *Selaginella*?
- (1) *Selaginella* is homosporous
- (2) It is monoecious
- (3) Microspores produce male gametophytes; megaspores produce female gametophytes
- (4) Gametes are non-motile
- 95.** Which statement is not correct about liverworts?
- (1) Gametophyte dominant
- (2) Motile sperm required water for fertilization
- (3) Sporophyte dependent
- (4) Gemmae are produced by sporophytes
- 96.** Most decisive evolutionary advantage of seed plants is:
- (1) Vascular tissue
- (2) Dominant sporophyte
- (3) Independence from water for fertilization
- (4) Reduction of gametophyte
- 97.** (A) Cells of root meristematic zone has dense cytoplasm.
- (B) *Chrysanthemum*, Pineapple and *jasmine* are examples of sucker.
- (C) A fleshy bud is called bulbil.
- (D) Root cap thimble-like structure, it protects the tender apex
- (1) All are correct
- (2) All are correct, except B
- (3) A & B are correct
- (4) B & C are correct
- 98.** Select the families in which members have bicarpellary, syncarpous, gynoecium and superior ovary.
- Solanaceae, Brassicaceae, Liliaceae, Fabaceae, Malvaceae, Asteraceae.
- Choose the correct option
- (1) Three (2) Two
- (3) Four (4) Five
- 99.** (A) Leaves originate from shoot apical meristems and are arranged in an basipetal order.
- (B) The arrangement of veins and the veinlets in the lamina of leaf is termed as inflorescence.
- (C) Generally, the fruit consists of a wall or pericarp and seeds.
- (D) In mango the pericarp is well differentiated into an outer thick epicarp, a middle fleshy edible mesocarp and an inner stony hard endocarp.

- (1) All are incorrect
- (2) All are incorrect except A
- (3) All are incorrect except B
- (4) All are incorrect except C

100. Select the mismatch.

- (1) Metaxylem – Later formed secondary xylem
- (2) Endarch condition – Seen in stems
- (3) Sclereids – Highly thickened dead cells
- (4) Protophloem – Narrow sieve tubes

101. State **true (T)** or **false (F)** to the following statements and select the **correct** option.

- A. When bulliform cells are flaccid, they make the leaves curl inwards to minimize water loss.
- B. In dicot leaves, the size of the vascular bundles is dependent on the size of the veins.
- C. The abaxial epidermis bears more stomata than the adaxial epidermis in dicot leaves.

- (1) A = T, B = F, C = T
- (2) A = F, B = F, C = T
- (3) A = T, B = T, C = T
- (4) A = F, B = T, C = T

102. In chloroplast electron transport chain is located in :

- (1) Outer membrane
- (2) Thylakoid lumen
- (3) Thylakoid membrane
- (4) Stroma

103. Consider the following statements regarding the Chemiosmotic Hypothesis of ATP synthesis in chloroplasts:

- I. The splitting of the water molecule takes place on the inner side of the membrane, leading to an accumulation of protons and dissolved oxygen in the lumen.
- II. As electrons move through the photosystems, protons are transported across the membrane because the primary acceptor of electrons transfers its electron to an electron carrier, not a hydrogen carrier.
- III. The NADP reductase enzyme is located on the stroma side of the membrane, and its function leads to the removal of protons from the stroma.
- IV. The breakdown of the proton gradient provides energy to cause a conformational change in the CF₁ particle of the ATP synthase.

Which of the statements given above are correct?

- (1) I, II, and III only
- (2) I, III, and IV only
- (3) II and IV only
- (4) I, II, III, and IV

104. **Assertion (A):** The productivity and yield are better in C₄ plants compared to C₃ plants.

Reason (R): C₄ plants lack photorespiration and have a mechanism to increase the concentration of CO₂ at the enzyme site.

- (1) Both (A) and (R) are true and (R) is the correct explanation of (A).
- (2) Both (A) and (R) are true but (R) is not the correct explanation of (A).
- (3) (A) is true but (R) is false.
- (4) (A) is false but (R) is true.

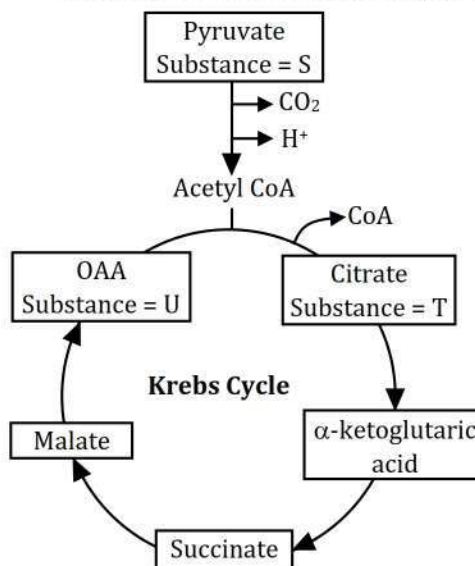
105. First stable product of C₄ pathway is :

- (1) PGA
- (2) Oxaloacetic acid
- (3) Pyruvate
- (4) Malate

106. In Krebs cycle

- (1) Acetyl coenzyme A undergoes four oxidations and two decarboxylations
- (2) Pyruvic acid undergoes four oxidations and two decarboxylations
- (3) Tricarboxylic acid undergoes four oxidations and four decarboxylations
- (4) Oxaloacetic acid undergoes four oxidations and two decarboxylations

107.



How many carbon atoms are in S, T and U ?

- | | S | T | U |
|-----|---|---|---|
| (1) | 3 | 6 | 4 |
| (2) | 4 | 6 | 3 |
| (3) | 6 | 3 | 4 |
| (4) | 6 | 3 | 3 |

108. Which ion acts as cofactor for pyruvate kinase

- (1) Potassium
- (2) Magnesium
- (3) Manganese
- (4) Zinc

109. N⁶ furfuryl amino purine is also called :-

- (1) Kinetin
- (2) Ethylene
- (3) GA
- (4) Indole compound

110. Select the incorrect statement :

- (1) Plant growth is unique because plants retain the capacity for unlimited growth throughout their life.
- (2) Growth wherein new cells are always being added to the plant body by the activity of the meristem is called the open form of growth.
- (3) Increase in girth of plant is secondary growth.
- (4) One single Maize root apical meristem can give rise to more than 18,500 new cells per hour.

111. The body of ovule fuses with funicle in the region called :-

- (1) Raphe
- (2) Integument
- (3) Hilum
- (4) Placenta

112. *Amorphophallus* flower provide floral rewards to the pollinator in the form of :-

- (1) Beautiful colour
- (2) Providing safe place to lay eggs
- (3) Nectar
- (4) Providing safe place for asexual reproduction

113. Which of the following group of plants is characterised by having residual, persistent nucellus ?

- (1) Black pepper and Beet
- (2) Wheat and Maize
- (3) Sunflower and Castor
- (4) Brassica and Barley

114. Match the Following:

Column I (Parental Genotypes)		Column II (Possible Gametes)	
A.	RrYy	a.	RY, Ry, rY, ry
B.	RRYY	b.	RY
C.	rryy	c.	ry
D.	RRYy	d.	RY, Ry

Select the correct match:

- (1) A-a, B-b, C-c, D-d
- (2) A-b, B-a, C-d, D-c
- (3) A-d, B-c, C-b, D-a
- (4) A-a, B-a, C-c, D-a

115. The F₁ generation obtained after crossing tall and dwarf pea plants was:

- (1) All dwarf
- (2) All tall
- (3) Tall and dwarf in 1:1 ratio
- (4) Intermediate height

116. Alleles are:

- (1) Different genes on same chromosome
- (2) Same gene controlling different traits
- (3) Different forms of the same gene
- (4) Genes located on different chromosomes

117. A Punnett square is used to:

- (1) Study mutation
- (2) Calculate probability of genotypes
- (3) Identify chromosomes
- (4) Detect linkage

118. Assertion (A): In co-dominance, the F₁ generation expresses traits of both parents.

Reason (R): Both alleles express themselves equally.

- (1) Both A and R are true and R is the correct explanation of A.
- (2) Both A and R are true but R is not the correct explanation of A.
- (3) A is true but R is false
- (4) A is false but R is true

119. Match the Column :

Column I (Genotype)		Column II (Blood group)	
A.	I ^A I ^A	1.	AB
B.	I ^B I ^B	2.	O
C.	I ^A I ^B	3.	B
D.	II	4.	A

Correct matching is:

- (1) A-4, B-3, C-1, D-2
- (2) A-3, B-4, C-1, D-2
- (3) A-4, B-1, C-3, D-2
- (4) A-1, B-3, C-4, D-2

120. Statement I: In deoxyribonucleotides, the second carbon atom of the sugar lacks an oxygen atom.

Statement II: This absence of oxygen distinguishes deoxyribonucleotides from ribonucleotides.

- (1) Statement I is correct and Statement II is incorrect.
- (2) Statement I is incorrect and Statement II is correct.
- (3) Both Statement I and II are correct.
- (4) Both Statement I and II are incorrect.

121. Assertion: Purines are larger than pyrimidines.

Reason: Purines contain a double ring structure whereas pyrimidines contain a single ring structure.

- (1) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
- (2) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
- (3) Assertion is true but Reason is false.
- (4) Assertion is false but Reason is true.

122. Identify the correct statements regarding DNA double helix:

- I. The two strands are coiled in right-handed fashion.
 - II. Bases project to the outside and phosphate backbone remains inside.
 - III. The pitch of the helix is 3.4 nm.
 - IV. One complete turn contains approximately 10 base pairs.
- (1) I, III, IV are correct
 - (2) II and III are correct
 - (3) I and II are correct
 - (4) All four statements are correct

123. Match the columns :

Column I		Column II	
A.	Capping	i.	Addition of poly A tail
B.	Tailing	ii.	Removal of introns
C.	Splicing	iii.	Addition of methyl guanosine
D.	hnRNA	iv.	Primary transcript

- (1) A-iii, B-i, C-ii, D-iv
- (2) A-ii, B-iii, C-iv, D-i
- (3) A-iii, B-ii, C-i, D-iv
- (4) A-iv, B-iii, C-ii, D-i

124. Assertion: tRNA has an anticodon loop.

Reason: Anticodon loop helps in recognizing the specific lipids.

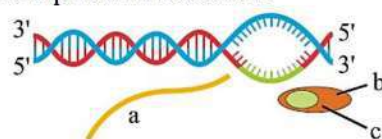
- (1) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
- (2) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
- (3) Assertion is true but Reason is false.
- (4) Assertion is false but Reason is true.

125. Identify the **correct statements** regarding RNA World:

- A. RNA molecules acted as catalysts
- B. RNA served as genetic material
- C. DNA evolved first, then RNA
- D. Protein enzymes appeared later

- (1) A, B, and D only
- (2) A and B only
- (3) B and C only
- (4) A, B, C, and D

126. The given figure represents the process of transcription in bacteria :-



Select the option which correctly labels a, b and c.

- (1) a-DNA, b-RNA, c-Promoter
- (2) a-RNA, b-RNA polymerase, c-Rho factor
- (3) a-RNA, b-RNA polymerase, c-Sigma factor
- (4) a-DNA, b-DNA polymerase, c-RNA

127. Lichen, fig-wasp, mycorrhiza, *pronuba* moth-*yucca* plant, Epiphyte-mango, Barnacle - whale, sea anemone - clownfish

How many of above showing mutualism ?

- (1) Four
- (2) Five
- (3) Six
- (4) Two

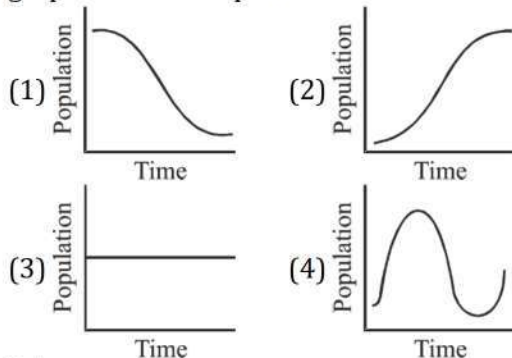
128. Regarding life history variations. Which among the following is incorrect ?

- (1) Breeding once in life time — Bamboo
- (2) Breeding many times in life time — Birds
- (3) Production of large number of small size offspring — Mammals
- (4) Production of small number of large size organisms — Birds

129. A process in which the fitness of one species is significantly increased in the presence of another species can be defined as :-

- (1) Predation
- (2) Parasitism
- (3) Competition
- (4) Commensalism

130. In a given population of 2000 individuals, 80 births and 125 deaths were reported over a given period of time. Which of the following graphs will correspond to it ?



131. Post-Reproductive, Reproductive, Pre-Reproduction. A, B, C.

In these population growth curve find possible changes in population in future & choose the correct option ?

	A	B	C
(1)	Stable growth	Rapid growth	Negative growth
(2)	Rapid growth	Stable growth	Negative growth
(3)	Negative growth	Stable growth	Rapid growth
(4)	Rapid growth	Negative growth	Stable growth

132. An inverted pyramid of biomass can be found in which ecosystem?

- (1) Forest
- (2) Marine
- (3) Grass land
- (4) Tundra

133. Stratification occurred in :

- (1) tropical rainforests
- (2) deciduous forest
- (3) desert
- (4) Both (1) and (2)

134. Which of the following statements is correct?

- (1) *Parthenium* is an endemic species of our country.
- (2) African catfish is not a threat to indigenous catfishes.
- (3) Steller's sea cow is an extinct animal.
- (4) Lantana is popularly known as carrot grass.

135. Introduction of alien species into new area poses a threat to extinction of indigenous species due to :

- (1) Their high nutrient requirement
- (2) Their symbiotic relationship
- (3) Absence of their natural predators
- (4) More intraspecific competition

136. Select the incorrect pair with respect to recent extinctions :

- (1) Steller's sea cow — Indonesia
- (2) Thylacine — Australia
- (3) Quagga — Africa
- (4) Dodo — Mauritius

137. **Assertion (A):** Annelids, molluscs, arthropods, echinoderms, hemichordates and chordates are coelomates.

Reason (R): The body cavity is not lined by mesoderm, instead, the mesoderm is present as scattered pouches in between the ectoderm and endoderm.

In the light of the above statements, choose the correct answer from the options given below:

- (1) Both A & R are true and R is the correct explanation of A.
- (2) Both A & R are true but R is not the correct explanation of A.
- (3) A is true but R is false.
- (4) A is false but R is true.

138. Parapodia are:

- A. Lateral appendages
- B. Found in earthworms
- C. Present in aquatic annelids
- D. Help in swimming
- E. Paired jointed appendages

Choose the correct answer from the options given below:

- (1) A, C and E
- (2) A, B, C and D
- (3) A, C and D
- (4) C, B, D and E

139. All the following characters are common to both Arthropoda and Mollusca, except:

- (1) Bilateral symmetry
- (2) Triploblastic body organization
- (3) Presence of haemocoel
- (4) Jointed appendages

140. Choose the incorrect statements from the following :

- A. Hemichordates have a rudimentary structure in the collar region.
- B. Vertebrates have a ventral muscular heart.
- C. Well developed muscular pharynx is present in Cnidarians.
- D. The space between the mantle and shell is called mantle cavity.

Option:

- (1) A and B
- (2) B, C and D
- (3) Only A
- (4) C and D

141. The (A) is the outermost non-living layer of the plant cell and is primarily made up of (B). It provides (C) protection and helps in (D). The (E) is a layer found between the walls of adjacent plant cells and is mainly composed of (F).

Options:

- (1) (A) Cell membrane, (B) Cellulose, (C) Chemical, (D) Osmosis, (E) Plasmodesmata, (F) Pectin
- (2) (A) Cell wall, (B) Cellulose, (C) Turgor, (D) Cell-to-cell communication, (E) Middle lamella, (F) Calcium carbonate
- (3) (A) Cell wall, (B) Cellulose, (C) Mechanical, (D) Cell-to-cell interaction, (E) Middle lamella, (F) Calcium pectate
- (4) (A) Middle lamella, (B) Pectin, (C) Mechanical, (D) Cell division, (E) Cell wall, (F) Cellulose

142. Given below is the list of different cell organelles and their function. Select the correct match.

Cell organelle		Function	
A.	Endoplasmic Reticulum	1	Have digestive enzymes in them
B.	Ribosomes	2.	Packaging of products
C.	Golgi complex	3.	Means of quick intracellular transport
D.	Lysosomes	4.	Protein factories

Codes:

- (1) A-2, B-1, C-3, D-4
- (2) A-3, B-4, C-2, D-1
- (3) A-4, B-2, C-3, D-1
- (4) A-1, B-2, C-3, D-4

143. Which of the following statements regarding the cell cycle checkpoints is **correct**?

- (1) The G_1 checkpoint ensures that DNA replication is completed before the cell enters the S phase.
- (2) The G_2/M checkpoint checks for DNA damage and ensures all DNA is replicated before mitosis begins.
- (3) The Spindle Assembly Checkpoint (M-checkpoint) occurs during Prophase to ensure spindle fiber formation.
- (4) Cells that fail the G_1 checkpoint immediately undergo apoptosis without any chance of repair.

144. **Assertion:** Meiosis II is often called an equational division.

Reason: The number of chromosomes in the daughter cells after Meiosis II remains the same as that in the haploid cells produced after Meiosis I.

- (1) Both Assertion and Reason are true, and the Reason is the correct explanation of the Assertion.
- (2) Both Assertion and Reason are true, but the Reason is not the correct explanation of the Assertion.
- (3) Assertion is true, but Reason is false.
- (4) Both Assertion and Reason are false.

145. How many of the following statements are **correct** regarding Prophase I of Meiosis?

- A. Synapsis occurs during the Zygotene stage.
- B. The recombination nodule is formed during the Pachytene stage.
- C. Chiasmata are first visible during the Diakinesis stage.
- D. The synaptonemal complex dissolves during the Diplotene stage.
- E. Terminalisation of chiasmata is completed in Pachytene.

- (1) Two
- (2) Three
- (3) Four
- (4) Five

146. "G₀" state of cells in eukaryotic cell cycle denotes -

- (1) Check point before entering the next phase.
- (2) Pausing in the middle of a cycle to cope with a temporary delay.
- (3) Death of a cell.
- (4) Suspension of cells from cell cycle.

147. A closer examination reveals that the relative abundance of _____ and _____ with respect to other elements is higher in any living organism than in earth's crust.

- (1) carbon and hydrogen
- (2) carbon and oxygen
- (3) oxygen and hydrogen
- (4) carbon and nitrogen

148. **Statement I:** Gingelly oil has lower melting point and remain as oil in winters.

Statement II: Glycerol is a complex lipid which is trihydroxy propane.

- (1) Both statements I and II are correct.
- (2) Both statements I and II are incorrect.
- (3) Statement I is incorrect, but Statement II is correct.
- (4) Statement I is correct, but Statement II is incorrect.

149. Haem is the _____ and it is a part of the active site of enzyme.

- (1) Coenzyme
- (2) Prosthetic group
- (3) Metal ion
- (4) Apoenzyme

150. Which of the following statements regarding connective tissues is correct?

- (1) Adipose tissue is a type of dense connective tissue located beneath the skin.
- (2) In dense regular connective tissue, collagen fibres are oriented differently to provide strength.
- (3) Tendons attach one bone to another, while ligaments attach skeletal muscles to bones.
- (4) Areolar tissue contains fibroblasts, macrophages, and mast cells, and serves as a support framework for epithelium.

151. Match the mouthparts in Column I with their common names/functions in Column II.

Column I	Column II
(A) Labrum	(i) Lower lip
(B) Labium	(ii) Upper lip
(C) Hypopharynx	(iii) Biting and chewing
(D) Mandibles	(iv) Acts as a tongue

Options:

- (1) (A)-(i), (B)-(ii), (C)-(iv), (D)-(iii)
- (2) (A)-(ii), (B)-(i), (C)-(iii), (D)-(iv)
- (3) (A)-(ii), (B)-(i), (C)-(iv), (D)-(iii)
- (4) (A)-(iv), (B)-(iii), (C)-(ii), (D)-(i)

152. Consider the following flowchart representing the flow of blood into and out of the frog's heart. Identify the structures labeled as **(P)**, **(Q)**, and **(R)**.

Vena Cava ----- (P) ----- Right Atrium ---
----- Ventricle ----- (Q) ----- (R)

	(P)	(Q)	(R)
(1)	Sinus venosus	Conus arteriosus	Arterial system
(2)	Conus arteriosus	Sinus venosus	Venous system
(3)	Sinus venosus	Pericardium	Arterial system
(4)	Hepatic portal system	Conus arteriosus	Renal portal system

153. A chronic smoker shows damaged alveolar walls leading to reduced respiratory surface. Which disease is this condition called?

- (1) Asthma
- (2) Bronchitis
- (3) Emphysema
- (4) Pneumonia

154. **Statement I:** Serum differs from plasma by absence of fibrinogen.

Statement II: Serum cannot participate in coagulation reactions.

- (1) Both statements I and II are correct.
- (2) Both statements I and II are incorrect.
- (3) Statement I is incorrect, but Statement II is correct.
- (4) Statement I is correct, but Statement II is incorrect.

155. Which of the following statements regarding regulation of cardiac activity in humans is correct?

- (1) Parasympathetic nerves increase heart rate and cardiac output.
- (2) Sympathetic stimulation decreases strength of ventricular contraction.
- (3) Adrenal medullary hormones increase cardiac output.
- (4) Cardiac activity is regulated only by nervous control.

156. Urine is stored in bladder until:

- (1) Involuntary CNS signal.
- (2) Voluntary CNS signal.
- (3) Hormonal signal.
- (4) Stretch receptors inhibit.

157. Consider the following statements regarding skeletal muscle fibre:

- A. Muscle fibre is a syncytium as it is multinucleated.
- B. Sarcolemma is a thin membrane enclosing the sarcoplasm.
- C. Sarcoplasmic reticulum is continuous with T-tubules.
- D. Myofibrils show alternate dark A bands and light I bands.
- E. H zone disappears during muscle contraction.

Which of the above statements are correct?

- (1) A, B, D and E
- (2) A, B, C and D
- (3) A, B, C, D and E
- (4) B, C and E

158. Which of the following statements are Correct?

1. Vertebral column consists of 26 vertebrae in humans.
2. Cervical vertebrae are seven in number.
3. Intervertebral discs are absent between sacral vertebrae.
4. Thoracic vertebrae articulate directly with sternum.

- (1) 1 and 2 only
- (2) 1, 2 and 3 only
- (3) 2, 3 and 4 only
- (4) 1, 2, 3 and 4

159. A neuron receives repeated stimuli but generates an action potential only after a certain threshold is crossed.

Statements:

1. Action potential is an all-or-none phenomenon.
2. Threshold potential is caused by opening of potassium channels.
3. Depolarization occurs due to influx of sodium ions.
4. Repolarization is due to efflux of potassium ions.
5. Sodium-potassium pump restores ionic distribution using ATP.

Options:

- (1) 1 and 2 only
- (2) 1, 2 and 5 only
- (3) 2, 3 and 4 only
- (4) 1, 3, 4 and 5

160. Which hormone is secreted by the posterior pituitary gland?

- (1) Prolactin
- (2) Oxytocin
- (3) Growth hormone
- (4) ACTH

161. A patient shows **low blood pressure, low sodium level, dehydration, and muscle weakness**. Which hormone deficiency is most likely responsible?

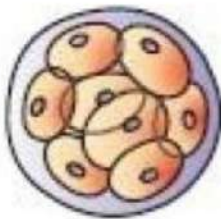
- (1) Deficiency of cortisol from adrenal cortex affecting carbohydrate metabolism.
- (2) Deficiency of aldosterone causing reduced sodium reabsorption and water loss.
- (3) Deficiency of ADH leading to excessive urination and diabetes insipidus.
- (4) Deficiency of insulin causing abnormal glucose metabolism.

162. In the given columns, column I contain structures of male reproductive system and column II contains its feature. Select the correct match from the options given below.

Column I		Column II	
A.	Seminiferous tubule	I.	Network of seminiferous tubule
B.	Rete testis	II.	Secondary sexual characters
C.	Leydig cells	III.	Meiosis and sperm formation occurs
D.	Prepuce	IV.	Place of implantation
		V.	Terminal skin of penis

Option:

- (1) A – I; B – II; C – III; D – V
 (2) A – III; B – I; C – II; D – V
 (3) A – III; B – I; C – IV; D – II
 (4) A – II; B – IV; C – III; D – V
163. **Statement 1:** Human chorionic gonadotropin (hCG) is secreted by the embryo after implantation.
Statement 2: hCG maintains the corpus luteum during early pregnancy.
 (1) Both statements are true.
 (2) Both statements are false.
 (3) Statement 1 is true but Statement 2 is false
 (4) Statement 1 is false but Statement 2 is true
164. The given figure represent a stage of embryonic development. Identify the stage with its feature.



- (1) Blastocysts, ready to fertilize with sperm.
 (2) Secondary oocyte, implants on endometrial layer of uterus.
 (3) Morula, formed by cleavage division of zygote.
 (4) Ovary, produce female gamete and secretes hormones like estrogen etc.

165. A school plans an awareness program on reproductive health. Which goal best reflects a comprehensive and age-appropriate approach?
- (1) Teaching only the biological process of reproduction in science class.
 (2) Focusing mainly on abstinence and avoiding any discussion of contraception.
 (3) Inviting outsiders to give a one-time lecture without follow-up activities.
 (4) Providing accurate information on puberty, emotions, consent, contraception, and STDs.

166. Refer to the given diagram of *in vitro* fertilisation technique used to help couples with fertility.

Comment upon the appropriateness of the Assertion and the Reason.



Assertion: IVF is one of the widely known types of ART.

Reason: It guarantees the chance of conceiving and thereby pregnancy.

- (1) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
 (2) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.
 (3) Assertion is true, but Reason is false.
 (4) Assertion is false, but Reason is true.

167. Which bacterium causes typhoid fever by invading the intestinal mucosa and spreading via blood?

- (1) *Salmonella typhi*
- (2) *Streptococcus pneumoniae*
- (3) *Plasmodium vivax*
- (4) *Entamoeba histolytica*

168. In Miller's experiment, the mixture simulating primitive atmosphere contained which gases?

- (1) Methane, ammonia, hydrogen, water vapour
- (2) Oxygen, nitrogen, carbon dioxide
- (3) Methane, oxygen, nitrogen
- (4) Ammonia, oxygen, hydrogen

169. Column-I lists the components of body defence and Column II lists the corresponding descriptions. Match the two columns and choose the correct option from codes given below.

Column I		Column II	
A.	Active natural immunity	1.	Injection of gamma globulins
B.	First line of defence	2.	Complement proteins and interferons
C.	Passive natural immunity	3.	Direct contact with the pathogens that have entered inside the body
D.	Second line of defence	4.	Surface barriers
		5.	Antibodies transferred through the placenta

Codes:

- (1) A-4, B-3, C-5, D-2
- (2) A-3, B-4, C-2, D-5
- (3) A-3, B-4, C-5, D-2
- (4) A-5, B-3, C-2, D-1

170. **Statement I:** Vaccines introduce antigens to build memory.

Statement II: They provide passive immunity.

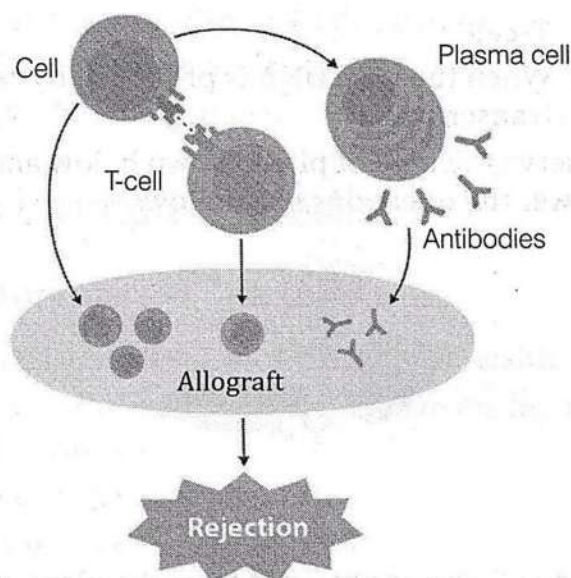
- (1) Both statements I and II are correct.
- (2) Statement I is correct, but Statement II is incorrect.
- (3) Statement I is incorrect, but Statement II is correct.
- (4) Both statements I and II are incorrect.

171. Alcohol abuse primarily damages which organ?

- (1) Heart
- (2) Liver
- (3) Kidneys
- (4) Brain

172. Given below is the schematic representation of transplant rejection. When a person receives an organ from someone else, his body may recognise this foreign organ and attacks them.

Study the figure given below and comment upon the appropriateness of the Assertion and Reason.



Assertion (A): In organ transplantation, donor and recipient should be genetically as close as possible.

Reason (R): Cell-mediated immune response is responsible for such graft rejection.

- (1) Both Assertion and Reason are true and Reason is a correct explanation of Assertion.
- (2) Both Assertion and Reason are true but Reason is not a correct explanation of Assertion.
- (3) Assertion is true and Reason is false.
- (4) Assertion is false and Reason is true.

173. Which one of the following statement regarding BOD is true?

- (1) The greater the BOD of waste water, more is its polluting potential.
- (2) The greater the BOD of waste water, less is its polluting potential.
- (3) The lesser the BOD of waste water, more is its polluting potential.
- (4) The lesser the BOD of waste water, zero is its polluting potential.

174. Match the following columns and select correct option.

Column-I		Column-II	
(a)	Biogas plant	(i)	Ministry of environment & forests
(b)	Sewage treatment plant	(ii)	Clot buster
(c)	<i>Streptococcus</i>	(iii)	KVIC
(d)	<i>Trichoderma</i>	(iv)	Immuno suppressive agent
(e)	<i>Aspergillus</i>	(v)	Citric acid

- (1) a-iii, b-i, c-iv, d-ii, e-v
 (2) a-iii, b-i, c-ii, d-iv, e-v
 (3) a-i, b-iii, c-ii, d-iv, e-v
 (4) a-ii, b-iii, c-i, d-iv, e-v

175. What is elution in recombinant DNA technology?

- (1) Cutting DNA
 (2) Extracting DNA bands from agarose gel
 (3) Amplifying genes
 (4) Ligating vectors

176. Why do non-recombinants grow on both ampicillin and tetracycline media in pBR322 selection?

- (1) They have inactivated genes
 (2) They retain both resistance genes intact
 (3) They lack ori
 (4) They are transformed

177. In bioreactors, what systems ensure optimal conditions?

- (1) Agitator, oxygen delivery, foam control, temperature, pH, sampling
 (2) Only stirring
 (3) Gel matrix
 (4) Primers and polymerase

178. In DNA spooling, what is observed?



- (1) Blue bands under UV
 (2) Fine threads of precipitated DNA
 (3) Sticky ends
 (4) Amplified copies

179. Match column I with column II :-

Column I		Column II	
(a)	Lepidopterans	(i)	Armyworm
(b)	Coleopterans	(ii)	Mosquitoes
(c)	Dipterans	(iii)	Tobacco bud worm
		(iv)	Flies
		(v)	Beetles

Codes:

- (1) (a)-(i), (iii); (b)-(ii); (c)-(iv), (v)
 (2) (a)-(i), (iii); (b)-(v); (c)-(ii), (iv)
 (3) (a)-(i), (ii); (b)-(iv); (c)-(iii), (v)
 (4) (a)-(i), (iv); (b)-(v); (c)-(i), (iii)

180. In 1997, the first transgenic cow, Rosie produced :

- (1) human protein enriched milk (2.4 g/L)
 (2) human protein enriched milk (2.8 g/L)
 (3) human calcium enriched milk (2.4 g/L)
 (4) human calcium enriched milk (2.8 g/L)

Course : Re-NEET (TARGET - 2026)**Test Pattern
NEET (UG)****Sample Paper - 1****Answer Key**

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	4	1	3	4	3	3	3	4	2	3	2	3	4	4	3
Question	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Answer	2	1	3	2	2	3	3	3	4	1	3	4	2	4	2
Question	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Answer	1	2	4	1	2	2	1	1	1	3	1	4	2	1	1
Question	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Answer	4	3	4	3	4	4	2	4	2	3	2	2	3	1	2
Question	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Answer	3	1	2	4	1	2	3	2	1	3	2	3	2	3	3
Question	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
Answer	3	3	2	3	1	2	2	3	4	1	3	1	4	2	1
Question	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105
Answer	1	3	3	3	4	3	2	2	4	1	3	3	2	1	2
Question	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
Answer	1	1	2	1	4	3	2	1	1	2	3	2	1	1	3
Question	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135
Answer	1	1	1	3	1	2	1	3	4	1	2	2	4	3	3
Question	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
Answer	1	3	3	4	4	3	2	2	1	2	4	1	4	2	4
Question	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165
Answer	3	1	3	1	3	2	1	2	4	2	2	2	1	3	4
Question	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
Answer	3	1	1	3	2	2	2	1	2	2	2	1	2	2	1

PHYSICS

1. **Ans. (4)**

$$(a) i = \frac{V_R}{R} = \frac{(2.0V) \sin(10^3 \text{ rad/s})t}{100}$$

$$(2.0 \times 10^{-2} A) \sin(10^3 \text{ rad/s})t$$

$$(b) X_L = \omega L = (10^3 \text{ rad/s})(4H) = 4.0 \times 10^3 \text{ ohm}$$

$$(c) \text{ The amplitude of voltage across inductor, } V_0 = i_0 X_L = (2.0 \times 10^{-2} A)(4.0 \times 10^3 \text{ ohm}) = 80 \text{ volt}$$

In an ac voltage across the inductor leads the current by 90° or $\pi/2$ rad.

$$\text{Hence, } V_L = V_0 \sin(\omega t + \pi/2)$$

$$V_L = (80) \sin\left(10^3 t + \frac{\pi}{2}\right)$$

2. **Ans. (1)**

$$\text{Given that } x = 40 \cos(50\pi t - 0.02\pi y)$$

Therefore, particle velocity can be given as

$$v_p = \frac{dx}{dt} = (40 \times 50\pi) \{-\sin(50\pi t - 0.02\pi y)\}$$

$$\text{Putting } y = 25 \text{ and } t = \frac{1}{200} \text{ s,}$$

$$v_p = -(2000\pi \text{ cm/s})$$

$$\sin\left[50\pi\left(\frac{1}{200}\right) - 0.02\pi(25)\right] \text{ m/s}$$

3. **Ans. (3)**

$$\text{Mass of the removed portion} = M \times \frac{60^\circ}{360} = \frac{M}{6}$$

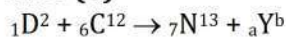
$$\text{Its M.I. } I_1 = \frac{1}{2} \frac{M}{6} R^2$$

$$\text{M.I. of the complete disc } I_2 = \frac{1}{2} MR^2$$

$$\text{M.I. of the remaining portion}$$

$$= I_2 - I_1 = \frac{5}{12} MR^2$$

4. **Ans. (4)**



$$a = 6 + 1 - 7 = 0$$

$$b = 12 + 2 - 13 = 1$$

5. **Ans. (3)**

Velocity of car is

$$v = 6 + 8t - t^2$$

$$a = \frac{dv}{dt} = \frac{d}{dt}(6 + 8t - t^2)$$

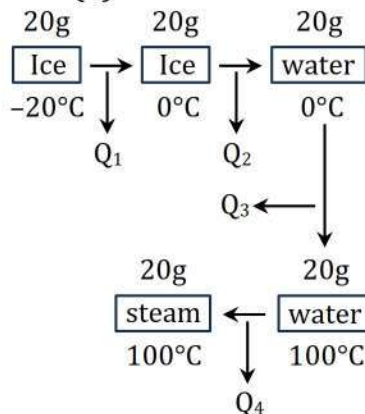
$$a = 8 - 2t$$

Instantaneous acceleration at $t = 4.5s$,

$$\left. \frac{dv}{dt} \right|_{t=4.5s} = 8 - 2(4.5)$$

$$a = -1 \text{ m/s}^2$$

6. **Ans. (3)**



$$Q_T = Q_1 + Q_2 + Q_3 + Q_4 + Q_h$$

$$Q_T = 20 \times \frac{1}{2} \times 20 + 20 \times 80 + 20 \times 1 \times 100$$

$$+ 20 \times 540 + 20 \times 1 \times 120$$

$$= (200 + 1600 + 2000 + 10800 + 2400) \text{ Cal}$$

$$= 17000 \text{ Cal} = 17 \text{ K Cal}$$

7. **Ans. (3)**

$$10 \text{ MSD} = 1 \text{ cm; } 1 \text{ MSD} = 0.1 \text{ cm}$$

$$7 \text{ MSD} = 10 \text{ VSD}$$

$$1 \text{ VSD} = 0.07 \text{ cm}$$

$$\text{L.C.} = 0.03 \text{ cm}$$

$$D = 0.1 + 1 \times 0.03$$

$$D = 0.13 \text{ cm}$$

8. **Ans. (4)**

$$Q = \frac{\pi P r^4}{8 \eta L}$$

$$Q \propto \frac{P r^4}{L}$$

$$\frac{Q_1}{Q_2} = \frac{P_1}{P_2} \left(\frac{r_1}{r_2} \right)^4 \times \frac{L_2}{L_1}$$

$$\frac{Q}{2Q} = \frac{P}{P_2} \left(\frac{r}{2r} \right)^4 \times \frac{2L}{L}$$

$$P_2 = \frac{P}{4}$$

9. **Ans. (2)**

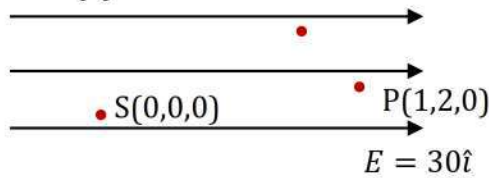
$$\vec{B}_A = \frac{\mu_0 i}{4\pi R} (-\hat{i}) + \frac{\mu_0 i}{4\pi R} (-\hat{k}) + \frac{\mu_0 i}{2R} \hat{i}$$

$$\vec{B}_A = \frac{\mu_0 i}{4\pi R} [(2\pi - 1)\hat{i} - \hat{k}]$$

$$B_A = \frac{\mu_0 i}{4\pi R} \sqrt{(2\pi - 1)^2 + (1)^2}$$

$$= \frac{\mu_0 i}{4\pi R} \sqrt{2(2\pi^2 - 2\pi + 1)}$$

10. Ans. (3)



$$\omega_E = q \vec{E} \cdot \vec{S}$$

$$= 2 \times 10^{-2} [30\hat{i} \cdot (-\hat{i})]$$

$$= 2 \times 10^{-2} (-30)$$

$$= -60 \times 10^{-2}$$

$$= -\frac{60}{100} = -0.6\text{J}$$

$$= -600\text{mJ}$$

11. Ans. (2)

$$V = 5 \cos\left(\omega t - \frac{\pi}{6}\right)$$

$$I = 10 \cos\left(\frac{\pi}{2} - \omega t\right) \text{ or } I = 10 \cos\left(\omega t - \frac{\pi}{2}\right)$$

$$\Delta\phi = \phi_V - \phi_I$$

$$= -\frac{\pi}{6} - \left(-\frac{\pi}{2}\right)$$

$$= -\frac{\pi}{6} + \frac{\pi}{2} = \frac{-\pi + 3\pi}{6} = \frac{\pi}{3} = 60^\circ$$

$$P = V_{\text{rms}} I_{\text{rms}} \cos\phi$$

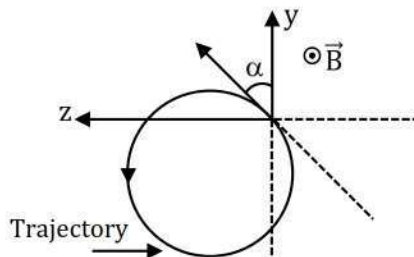
$$= \frac{5}{\sqrt{2}} \times \frac{10}{\sqrt{2}} \cos 60^\circ$$

$$= 5 \times 5 \times \left(\frac{1}{2}\right)$$

$$= \frac{25}{2} = 12.5\text{watt}$$

12. Ans. (3)

We can see from trajectory that both y- and z-coordinates can become negative.

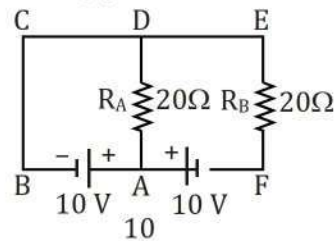


This trajectory lies in y-z plane.
So, x-coordinate is always zero

13. Ans. (4)

The assertion is false. Cadmium rods (control rods) **decrease** the rate of fission by absorbing neutrons. The reason is true; cadmium is used specifically because it is a great neutron absorber.

14. Ans. (4)



Assume $V_F = 0$

$$V_E = V_F = 0$$

$\Rightarrow$ Current in R_B is zero

$$V_A - V_D = 10\text{V}$$

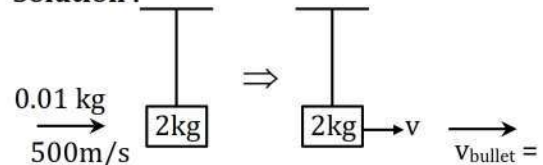
$$\Rightarrow I = \frac{10}{20} = \frac{1}{2} \text{ A from A to D.}$$

15. Ans. (3)

Explanation : Find speed of bullet just after it emerges from the block-

Concept : Apply conservation of linear momentum and conservation of mechanical energy.

Solution :



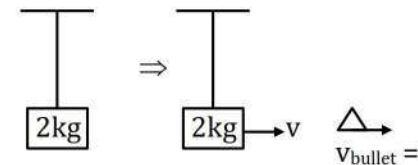
By C.O.L.M.

$$0.01 \times 500 + 0 = 2 \times 2 + 0.01 v_{\text{bullet}}$$

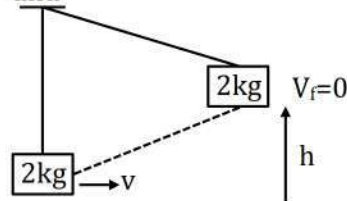
$$5 = 4 + 0.01 v_{\text{bullet}}$$

$$v_{\text{bullet}} = 100 \text{ m/s}$$

and



and



By C.O.M.E

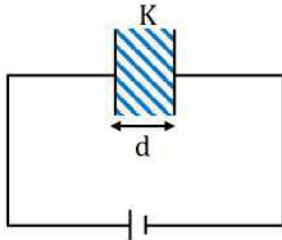
$$\frac{1}{2} \times 2 \times v^2 = 2 \times g \times h$$

$$v^2 = 2 \times 10 \times 0.2$$

$$v = 2 \text{ m/s}$$

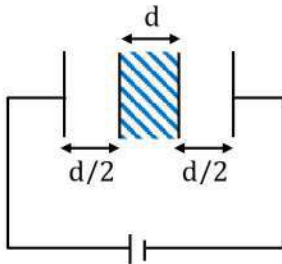
16. **Ans. (2)**

For figure(a)



$$E_0 = \frac{V}{d}; C = \frac{K\epsilon_0 A}{d}$$

For figure(b)



$$C' = \frac{\epsilon_0 A}{2d - d + d/K};$$

$$C' = \frac{K\epsilon_0 A}{(K+1)d}; C' = \frac{C}{K+1}$$

17. **Ans. (1)**

$$W = \int P dv = \int_1^4 2V dV = 15 \text{ units}$$

$$\Delta U = \frac{nR\Delta T}{\gamma - 1} = \frac{2(\Delta V)^2}{\gamma - 1} = 75 \text{ units}$$

$$Q = \Delta U + W = 75 + 15 = 90 \text{ units}$$

$$C = C_v + \frac{R}{1-x} = \frac{5R}{2} + \frac{R}{2} = 3R = 3 \times \frac{25}{3} = 25 \text{ units.}$$

18. **Ans. (3)**

$$\frac{h_2}{h_1} = \frac{\sigma_2 \cos \theta_2}{\rho_2} \times \frac{\rho_1}{\sigma_1 \cos \theta_1}$$

$$\text{or } \frac{h_2}{h_1} = \frac{140 \times \frac{1}{2}}{2} \times \frac{1}{70 \times 1}$$

$$\text{or } h_2 = \frac{h_1}{2} = \frac{6}{2} \text{ cm} = 3 \text{ cm}$$

19. **Ans. (2)**

We have,

$$\frac{N_s}{N_p} = \frac{i_p}{i_s}$$

$$\frac{10}{500} = \frac{i_p}{i_s}$$

$$\Rightarrow \frac{i_p}{i_s} = \frac{1}{50}$$

$$\Rightarrow i_s = 50 i_p$$

This condition is satisfied only when current in primary $3.2 \times 10^{-3} \text{ A}$ and in secondary 0.16 A .

20. **Ans. (2)**

$$B_0 = \frac{E_0}{c} = \frac{60}{3 \times 10^8} = 2 \times 10^{-7} \text{ T}$$

$E \times B$ must be direction of propagation.

So, $B \rightarrow z\text{-axis}$

$$k = \frac{2\pi}{\lambda} = \frac{\pi}{4} \times 10^3 \text{ m}^{-1}$$

$$E_y = 60 \sin \left[\frac{\pi}{4} \times 10^3 (x - 3 \times 10^8 t) \right] \hat{j} \text{ Vm}^{-1}$$

$$B_z = 2 \times 10^{-7} \sin \left[\frac{\pi}{4} \times 10^3 (x - 3 \times 10^8 t) \right] \hat{k} \text{ T}$$

21. **Ans. (3)**

Explanation : Find the ratio of displacements of toy cart

$$\text{Concept : K.E.} = \frac{p^2}{2m}$$

$$W = \vec{f} \cdot \vec{d}$$

$$W_{\text{net}} = k_f - k_i$$

Solution :

Minimum stopping distance = S

Work done against the friction = $W = \mu mgs$

Initial momentum gained by both toy carts will be same because same force acts for same time

$$\text{Initial kinetic energy of the toy cart} = \left(\frac{p^2}{2m} \right)$$

$$\text{Therefore, } \mu mgs = \frac{p^2}{2m} \text{ or } S = \left(\frac{p^2}{2\mu m^2 g} \right)$$

For the two toy carts, momentum is numerically the same.

Further μ and g are the same for the toy carts

$$S \propto \frac{1}{m^2}.$$

$$\text{So, } \frac{S_1}{S_2} = \left(\frac{m_2}{m_1} \right)^2$$

22. **Ans. (3)**

Escape velocity of the body from the surface of earth is $v = \sqrt{2gR}$

For escape velocity of the body from the platform, potential energy + kinetic energy = 0

$$-\frac{GMm}{2R} + \frac{1}{2}mv^2 = 0$$

$$\Rightarrow fv_{\text{escape}} = \sqrt{\frac{GM}{R^2}} \times R = \sqrt{gR} = fv$$

From the surface of the earth, $v_{\text{escape}} = \sqrt{2gR}$

$$\therefore fv_{\text{escape}} = \frac{v_{\text{escape}}}{\sqrt{2}}$$

$$\therefore f = \frac{1}{\sqrt{2}}$$

23. **Ans. (3)**

$$\lambda(\text{mean free path}) = \frac{kT}{\sqrt{2}\lambda d^2 P}$$

$$\lambda \propto \frac{1}{P}$$

if $P \rightarrow 2P$

$$\lambda' \rightarrow \frac{1}{2}$$

Collision frequency (2)

$$Z = \frac{V_{\text{rms}}}{\lambda}$$

V_{rms} (same at constant)

$$\lambda' \rightarrow \frac{\lambda}{2}$$

$z' \rightarrow 2z$ (Twice)

24. **Ans. (4)**

$$T = k \sqrt{\frac{\rho r^3}{s^{3/2}}}$$

Dimensions of

$$\text{RHS} = \frac{[M^{1/2}L^{-3/2}][L^{3/2}]}{[MT^{-2}]^{3/4}} = M^{-1/4} L^0 T^{3/2}$$

Dimensions of L.H.S $\neq$ Dimensions of R.H.S

$\therefore$ option (4)

25. **Ans. (1)**

Explanation: The cross product (vector product) of two vectors results in a new vector that is perpendicular to the plane containing the original vectors.

Concept: Cross Product and its application.

Solution: First, compute the cross product $\vec{C} = \vec{A} \times \vec{B}$ using the determinant:

$$\vec{C} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 2 & 3 & -1 \\ 1 & -1 & 2 \end{vmatrix}$$

$$= \hat{i}(6-1) - \hat{j}(4-(-1)) + \hat{k}(-2-3)$$

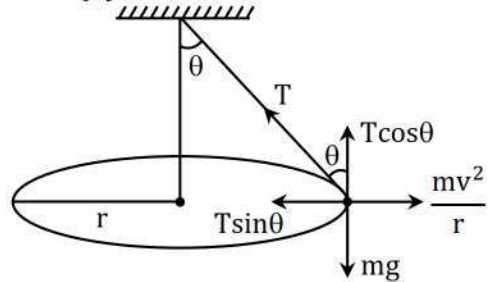
$$= 5\hat{i} - 5\hat{j} - 5\hat{k}.$$

The magnitude

$$C = \sqrt{5^2 + (-5)^2 + (-5)^2} = \sqrt{25+25+25}$$

$$= \sqrt{75} = 5\sqrt{3}.$$

26. **Ans. (3)**



$$T \cos \theta = mg \text{ and } T \sin \theta = \frac{mv^2}{r}$$

$$\tan \theta = \frac{v^2}{rg} \Rightarrow \tan \theta = \frac{(10)^2}{10(10)} \Rightarrow \theta = 45^\circ$$

27. **Ans. (4)**

$$v = \omega \sqrt{A^2 - x^2} \quad \dots(1)$$

$$a = -\omega^2 x \quad \dots(2)$$

$$|v| = |a| \quad \dots(3)$$

$$\omega \sqrt{A^2 - x^2} = \omega^2 x$$

$$A^2 - x^2 = \omega^2 x^2$$

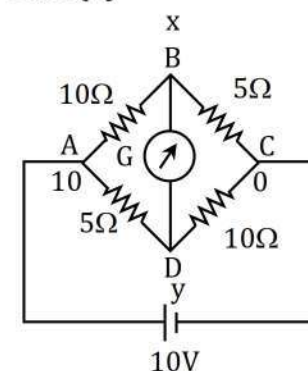
$$5^2 - 4^2 = \omega^2 (4^2)$$

$$\Rightarrow 3 = \omega \times 4 \Rightarrow \omega = \frac{3}{4}$$

$$T = 2\pi/\omega$$

$$\Rightarrow T = \frac{8\pi}{3}$$

28. **Ans. (2)**



$$\frac{X-10}{10} + \frac{X-Y}{5} + \frac{X-0}{5} = 0$$

$$5X - 2Y = 10 \quad \dots(1)$$

$$\frac{Y-10}{5} + \frac{Y-X}{5} + \frac{Y-0}{10} = 0$$

$$5Y - 2X = 20 \quad \dots(2)$$

on solving (1) & (2)

$$x = 30/7 \text{ V}$$

$$y = 40/7 \text{ V}$$

Change in Potential $\Delta V = Y - X = 10/7 \text{ V}$

$i = 2/7 \text{ A}$ from D to B

29. **Ans. (4)**

$$(1, 0, 4) \quad (2, -1, 5)$$

A

B

$$-4\mu\text{C}$$

$$4\mu\text{C}$$

$$\vec{\tau} = \vec{p} \times \vec{E}$$

$$\vec{p} = q\vec{\ell}$$

$$\vec{E} = 0.2 \frac{\text{V}}{\text{cm}} = 20 \frac{\text{V}}{\text{m}}$$

$$\vec{p} = 4 \times (\hat{i} - \hat{j} + \hat{k})$$

$$= (4\hat{i} - 4\hat{j} + 4\hat{k}) \mu\text{C} \cdot \text{m}$$

$$\vec{\tau} = (4\hat{i} - 4\hat{j} + 4\hat{k}) \times (20\hat{i}) \times 10^{-6} \text{ Nm}$$

$$= (8\hat{k} + 8\hat{j}) \times 10^{-5} = 8\sqrt{2} \times 10^{-5}$$

$$\alpha = 2$$

30. **Ans. (2)**

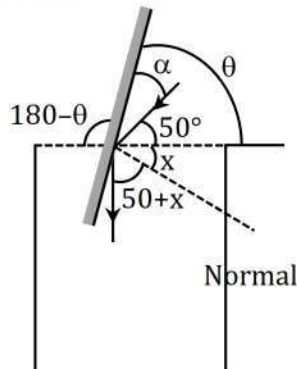
$$\text{Total current } I_s = \frac{V_{in} - V_z}{R_s} = \frac{25 - 5}{400} = 50 \text{ mA}$$

KCL: $I_s = I_z + I_L$. Since $I_z = 4I_L$, we have $5I_L = 50 \text{ mA} \Rightarrow I_L = 10 \text{ mA}$.

$$R_L = \frac{V_z}{I_L} = \frac{5}{0.01} = 500 \Omega$$

31. **Ans. (1)**

Let the plane mirror be placed at an angle θ as shown below



$$50 + x + \alpha = 90^\circ$$

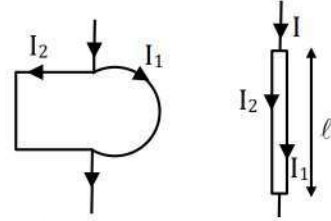
$$\text{As } x = \alpha \text{ so } 50 + 2x = 90^\circ$$

$$\Rightarrow x = 20^\circ = \alpha$$

$$\text{So } \theta = \alpha + 50 = 70^\circ$$

32. **Ans. (2)**

$$F = BI_1 \ell + BI_2 \ell$$



$$\Rightarrow F = B\ell(I_1 + I_2) = BI\ell$$

33. **Ans. (4)**

$$\frac{7}{5} \left(\frac{1}{2} Mv^2 \right) = \frac{1}{2} kx_{\text{max}}^2$$

$\therefore$ The compression of the spring,

$$x_{\text{max}} = v \sqrt{\frac{7M}{5k}}$$

34. **Ans. (1)**

Mean value

$$= \frac{1.51 + 1.53 + 1.52 + 1.54}{5} = 1.53$$

Absolute errors are : $(1.53 - 1.51 = 0.02)$,

$(1.53 - 1.53 = 0.00)$, $(1.53 - 1.53 = 0.00)$,

$(1.53 - 1.52 = 0.01)$ and $(1.54 - 1.53 = 0.01)$

Mean absolute error

$$= \frac{0.02 + 0.00 + 0.00 + 0.01 + 0.01}{5} = \frac{0.04}{5}$$

$$= 0.008 \approx 0.01$$

So, choice (1) is correct.

$$\text{Relative error} = \frac{0.01}{1.53} = 0.00653 \approx 0.01$$

$$\% \text{ Error} = \frac{0.01}{1.53} \times 100 = 1\%$$

35. **Ans. (2)**

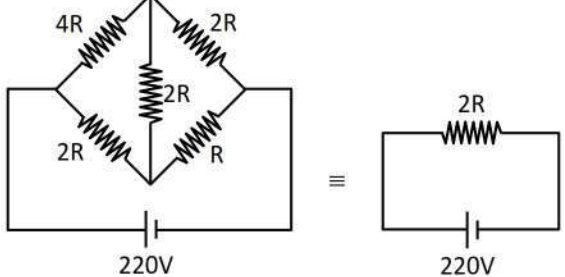
Let the resistance of 100W bulb is R

$$\text{then } R = \frac{(220)^2}{100}$$

then resistance of 50W bulb = $2R$

& resistance of 25W bulb = $4R$

then equivalent circuit will be balanced what stone bridge.



Total power consumed in circuit will be

$$= \frac{(220)^2}{2R} = \frac{(220)^2}{2 \times \frac{(220)^2}{100}} = 50 \text{ W}$$

36. Ans. (2)

Effect of temperature on carrier concentration (n) and drift speed (v) in semiconductors.

Thermal generation of carriers and lattice scattering.

n increases, v decreases

37. Ans. (1)

Maximum angular magnification is achieved when the final image is formed at the near point. Thus, $v = -25$ cm. The focal length is

$$f = \frac{1}{10} \text{ m} = 10 \text{ cm}.$$

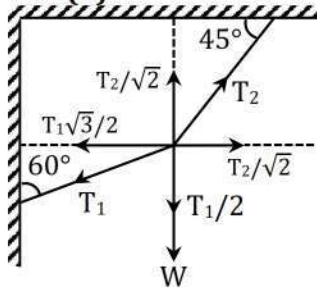
$$\text{We have, } \frac{1}{v} - \frac{1}{u} = \frac{1}{f}$$

$$\text{or, } -\frac{1}{25 \text{ cm}} - \frac{1}{u} = \frac{1}{10 \text{ cm}}$$

$$\text{or, } \frac{1}{u} = -\frac{1}{25 \text{ cm}} - \frac{1}{10 \text{ cm}}$$

$$\text{or, } u = -\frac{50}{7} \text{ cm} = -7.1 \text{ cm}$$

38. Ans. (1)



$$T_1 \frac{\sqrt{3}}{2} = \frac{T_2}{\sqrt{2}}$$

$$T_2 = \sqrt{\frac{3}{2}} (T_1)$$

$$W + \frac{T_1}{2} = \frac{T_2}{\sqrt{2}}$$

$$W = T_1 \frac{\sqrt{3}}{2} - \frac{T_1}{2} = \frac{T_1}{2} (\sqrt{3} - 1)$$

$$T_1 = \frac{2W}{\sqrt{3} - 1}$$

$$T_2 = \sqrt{\frac{3}{2}} \times \frac{2W}{\sqrt{3} - 1} = \frac{\sqrt{6}W}{\sqrt{3} - 1}$$

39. Ans. (1)

$$\text{For a simple pendulum } T = 2\pi \sqrt{\frac{L}{g_{\text{eff}}}}$$

situation 1 : when pendulum is in air

$$\rightarrow g_{\text{eff}} = g$$

situation 2 : when pendulum is in liquid

$$\rightarrow g_{\text{eff}} = g \left(1 - \frac{\rho_{\text{liquid}}}{\rho_{\text{body}}} \right) = g \left(1 - \frac{1}{16} \right) = \frac{15g}{16}$$

$$\text{So, } \frac{T'}{T} = \frac{2\pi \sqrt{\frac{L}{15g/16}}}{2\pi \sqrt{\frac{L}{g}}} \Rightarrow T' = \frac{4T}{\sqrt{15}}$$

40. Ans. (3)

$$\text{The de Broglie wavelength is } \lambda = \frac{h}{\sqrt{2mqV}}.$$

Therefore, $\lambda \propto 1/\sqrt{V}$. If V becomes $4V$, λ

becomes $1/\sqrt{4} = 1/2$ of the original value.

41. Ans. (1)

$$\text{By Quantum theory } E = \frac{hc}{\lambda}.$$

42. Ans. (4)

$$\text{Fringe width} = \frac{\lambda_{\text{medium}} D}{d} = \frac{\lambda D}{\mu d} \text{ [in some}$$

medium]

$\mu > 1$ so fringe width decreases.

Fringe pattern doesn't shift because same path length change is introduced in both waves.

43. Ans. (2)

In Bohr's model, $r_n \propto n^2$ and $v_n \propto 1/n$.

$$\text{Frequency } f_n = \frac{v_n}{2\pi r_n} \propto \frac{1/n}{n^2} = 1/n^3.$$

$$\text{Product } r_n \cdot f_n \propto n^2 \cdot \frac{1}{n^3} = n^{-1}. \text{ So } k = -1.$$

44. Ans. (1)

Lenz Law

45. Ans. (1)

$$\frac{1}{2}mv^2 = mg(3-1) = 2gm$$

(From conservation of energy)

or

$$v = \sqrt{4g} = 2\sqrt{g}$$

$$\text{Vertical component at A is } 2\sqrt{g} \sin 30^\circ = \sqrt{g}$$

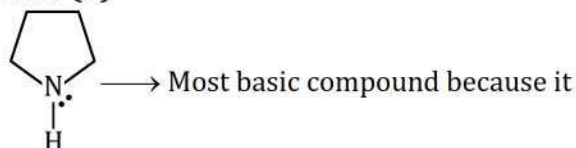
CHEMISTRY

46. **Ans. (4)**

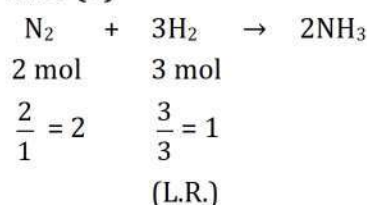
N and O combine to form two different compounds.

47. **Ans. (3)**

All P-O bonds are equal in length due to resonance.

48. **Ans. (4)**

has sp^3 hybridised 'N' atom and has localised lone pair.

49. **Ans. (3)**50. **Ans. (4)**

IUPAC nomenclature

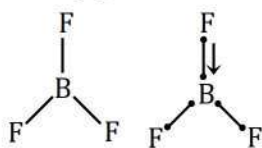
120 → Unbinilium → Ubn

51. **Ans. (4)**

Stability $\propto \frac{1}{\text{heat of combustion}}$

52. **Ans. (2)**

Increase in pressure.

53. **Ans. (4)**

sp^2 , Trigonal planar.

54. **Ans. (2)**

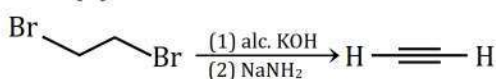
Sol. In 2nd option, two bulkier groups (Br) are 180° apart, which minimizes steric strain. Methyl groups are also anti to each other so it is most stable conformation.

55. **Ans. (3)**

The one with lowest value of K_{sp} , i.e., HgS will precipitate out first.

56. **Ans. (2)**

The 3d series metal which reveals a maximum melting point →	Chromium
The 6d series metal which shows no color in +3 oxidation state →	Lanthanum
The metal which does not exhibit variable oxidation states →	Scandium
The metal which shows reducing behaviour in +3 oxidation state →	Manganese

57. **Ans. (2)**58. **Ans. (3)**

H_2S = weak acid, H_2SO_4 = strong acid, NaCl = neutral, NaNO_2 = basic. Hence $[\text{H}_3\text{O}^+]$ will be in the order : $\text{NaNO}_2 < \text{NaCl} < \text{H}_2\text{S} < \text{H}_2\text{SO}_4$.

59. **Ans. (1)**

Ununium ($Z = 111$) it is Rontgenium (Rg) not darmstadtium.

60. **Ans. (2)**

In Carius method, halogen containing organic compound is heated with fuming nitric acid in the presence of AgNO_3 .

61. **Ans. (3)**

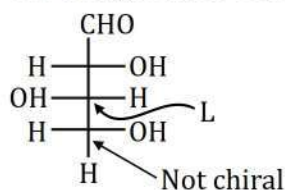
$$\Sigma(n_2 - n_1) = \Sigma(4 - 1) = \Sigma 3 = 3 + 2 + 1 = 6$$

62. **Ans. (1)**

Due to 'd' orbital contraction

63. **Ans. (2)**

See configuration of last chiral carbon



64. Ans. (4)

Correct A. Two atoms may have the same sum of neutrons and protons (e.g. $^{14}_6\text{C}$ and $^{14}_7\text{N}$) called isobars.

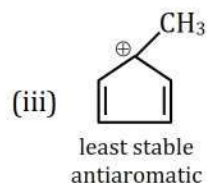
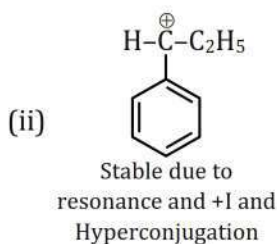
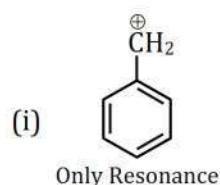
65. Ans. (1)



Smaller the size of cation, more will be its polarising power. Hence BeH_2 will be least ionic.

66. Ans. (2)

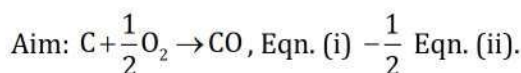
The reactivity for hydrolysis $\propto$ stability of carbocation.



So, decreasing order of stability

So, decreasing order of reactivity $\text{II} > \text{I} > \text{III}$

67. Ans. (3)



68. Ans. (2)

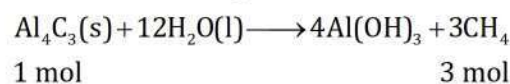
Minimum energy gap between orbitals

69. Ans. (1)

Nucleophilicity of S^- is more as it is weak base.

70. Ans. (3)

Reaction occurring is :



When the vessel is closed, volume = constant, i.e., $\Delta V = 0$. Hence, $w = -P\Delta V = 0$

When vessel is open, initial volume, $V_1 = 0$

(as no gas is present)

Final volume, $V_2 = \text{Volume of 3 mole of CH}_4$

$$PV_2 = nRT$$

$$\therefore V_2 = \frac{nRT}{P}$$

$$\therefore w = -P(V_2 - V_1) = -PV_2$$

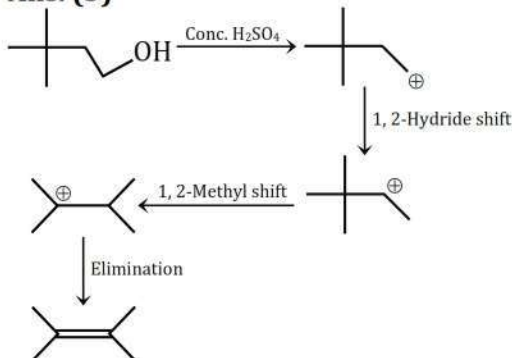
$$= -P \times \frac{nRT}{P} = -nRT$$

$$= -3 \times 2 \times 300 = -1800 \text{ cal}$$

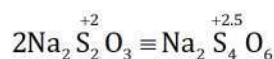
71. Ans. (2)

E.N. of central atom $\uparrow$, Bond angle $\uparrow$

72. Ans. (3)



73. Ans. (2)



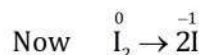
Total increase is O.N. of S for two molecules of $\text{Na}_2\text{S}_2\text{O}_3$

$$= 4 \times 2.5 - 2[2(+2)] = 2$$

$\therefore$ Total increase in O.N. of S per molecule of



$$\therefore \text{Eq. mass} = M_1/1 = M_1$$



Total decrease is O.N. per molecule of I_2

$$= 0 - 2(-1) = 2$$

$$\therefore \text{Eq. mass of } \text{I}_2 = M_2/2$$

74. Ans. (3)

$p\pi - p\pi$ back bonding

75. Ans. (3)

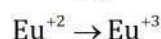
Reaction (iii), (iv), (v) are correct

76. Ans. (3)

The total moles of KMnO_4 needed to oxidise

$$1 \text{ mole of FeC}_2\text{O}_4 = \frac{3}{5} \text{ mol.}$$

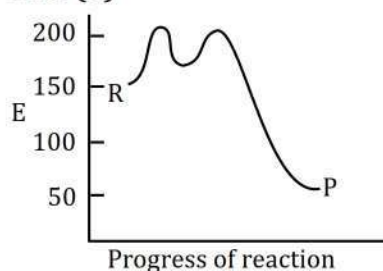
77. Ans. (3)



78. Ans. (2)

A	Hell-Volhard Zelinsky reaction	III.	(i) Br ₂ /Red phosphorus (ii) H ₂ O
B	Iodoform reaction	I.	NaOH + I ₂
C	Etard reaction	II.	(i) CrO ₂ Cl ₂ , CS ₂ (ii) H ₂ O
D	Gattermann-Koch reaction	IV.	CO, HCl, anhyd. AlCl ₃

79. Ans. (3)



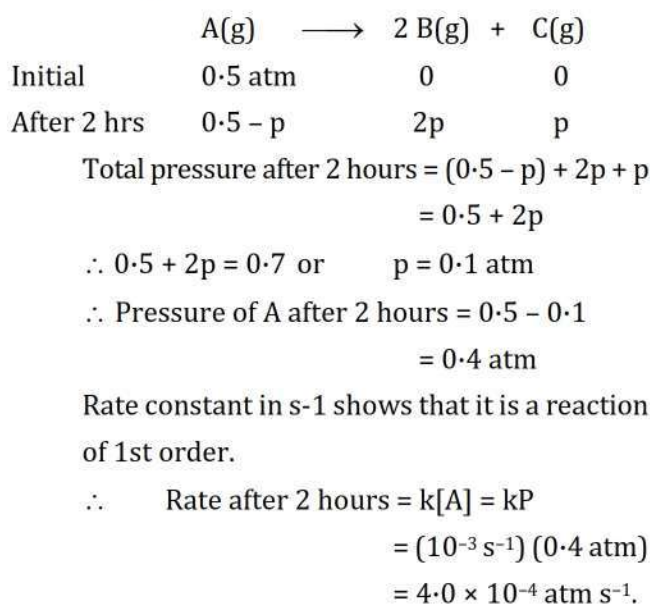
80. Ans. (1)

In Cr²⁺, configuration changes from d⁴ to d³ to achieve half filled t_{2g}.

81. Ans. (2)

Only primary aromatic/aliphatic amines give this test, so (i), (ii) and (iii) will give carbylamine test.

82. Ans. (2)



83. Ans. (3)

-O-O-linkage (Peroxide linkage) is not found in natural structure of proteins and does not contribute to their stabilization.

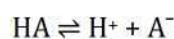
84. Ans. (4)

κ = Conductance (G) $\times$ Cell constant (G*)

$$= \frac{1}{2.0 \times 10^3} \times 0.78 = 3.9 \times 10^{-4} \Omega^{-1} \text{ cm}^{-1}$$

$$\begin{aligned}
 \Lambda &= \frac{1000\kappa}{\text{Molarity}} = \frac{1000 \times 3.9 \times 10^{-4}}{0.10} \\
 &= 3.9 \text{ S cm}^2 \text{ mol}^{-1}
 \end{aligned}$$

$$\therefore \alpha = \frac{\Lambda}{\Lambda_0} = \frac{3.9}{390} = 10^{-2}$$



$$[H^+] = C \alpha = (0.10) (10^{-2}) = 10^{-3} \text{ M}$$

$$\therefore \text{pH} = 3$$

$$K_a = \frac{[H^+][A^-]}{[HA]} = \frac{10^{-3} \times 10^{-3}}{0.1} = 10^{-5}$$

$$\text{pK}_a = 5.$$

85. Ans. (1)

[Mn(H₂O)₆]²⁺ $\Rightarrow$ CFSE value is zero because of d⁵ configuration with WFL in coordination number 6 [Cr(H₂O)₆]²⁺.

[Cr(H₂O)₆]²⁺ $\Rightarrow$ CFSE value is $-0.6\Delta_0$ because of d⁴ configuration with WFL in coordination number 6.

$$\text{For : } K_3[\text{Fe}(\text{CN})_6], \mu = \sqrt{1(1+2)} = \sqrt{3} \text{ B.M.}$$

$$\text{For : } \text{Na}_4[\text{Fe}(\text{CN})_6], \mu = \sqrt{0} \text{ B.M.}$$

86. Ans. (3)

(i) $\rightarrow$ (c), (ii) $\rightarrow$ (e), (iii) $\rightarrow$ (d), (iv) $\rightarrow$ (a), (v) $\rightarrow$ (b)

87. Ans. (1)

Statement I : False

Cross aldol can give 2 or 4 products

Statement II : False

Benzaldehyde & Acetone both react with semi carbazide.

88. Ans. (4)

Molar ratio of 1 : 1 means $x_X = x_Y = 0.5$

$$P_{\text{total}} = x_X p_X^{\circ} + x_Y p_Y^{\circ}$$

$$\therefore 400 = 0.5 p_X^{\circ} + 0.5 p_Y^{\circ}$$

$$\text{or } p_X^{\circ} + p_Y^{\circ} = 800 \quad \dots(i)$$

Molar ratio of 1 : 2 means, $x_X = \frac{1}{3}$, $x_Y = \frac{2}{3}$

$$\therefore 350 = \frac{1}{3} p_X^{\circ} + \frac{2}{3} p_Y^{\circ}$$

$$\text{or } p_X^{\circ} + 2p_Y^{\circ} = 1050 \quad \dots(ii)$$

Eqn. (ii) - Eqn. (i) gives $p_Y^{\circ} = 250$ mm Putting

in (i), we get $p_X^{\circ} = 550$ mm

89. Ans. (2)

Correct order of size is $\text{Mg} > \text{Al} > \text{Mg}^{2+} > \text{Al}^{3+}$

Atomic size depends mainly upon $Z_{\text{effective}}$ and shell number.

Generally on moving down the group electron affinity decreases and on moving across the period electron affinity increase.

In the periodic table Cl has maximum electron affinity. Halogen has higher electron affinity than Chalcogen.

$\text{Cl} > \text{Br} > \text{S} > \text{O}$

90. Ans. (1)

$$\text{Na}_2\text{SO}_4 \quad i \times m = 3 \times 0.01 = 0.03$$

$$\text{KNO}_3 \quad i \times m = 2 \times 0.01 = 0.02$$

$$\text{Urea} \quad i \times m = 1 \times 0.015 = 0.015$$

$$\text{Glucose} \quad i \times m = 1 \times 0.015 = 0.015$$

$i \times m$ of Na_2SO_4 is highest, hence its boiling point will also be highest.

BIOLOGY

91. (1)
Statement 1 – Correct: An order consists of related families that share a few similar characteristics.
Statement 2 – Incorrect: As we move from species to kingdom, the number of common characteristics **decreases**, not increases.
Statement 3 – Correct: Convolvulaceae and Solanaceae are grouped in Polymoniales mainly based on floral similarities.
Statement 4 – Correct: Carnivora includes families like Felidae (cats) and Canidae (dogs).
Statement 5 – Correct: Classes such as fishes, amphibians, reptiles, birds, and mammals are included in Chordata due to the presence of a notochord and dorsal hollow nerve cord.
Statement 6 – Incorrect: Kingdom is the **highest**, not the lowest, taxonomic category.
92. (3)
 Slime moulds form sporangia for spore dispersal in harsh conditions.
93. (3)
 All of the above.
94. (3)
Selaginella is heterosporous; microspores → male gametophytes, megaspores → female gametophytes. B is not always true; gametes are motile in pteridophytes.
95. (4)
 Gemmae are produced by gametophytes.
96. (3)
 Independence from water for fertilization.
97. (2)
Sucker – In mint, pineapple, *Chrysanthemum*, banana, the lateral branches originate from the basal and underground portion of the main stem, grow horizontally beneath the soil and then come out obliquely upward giving rise to leafy shoots.
Stolon – In plants like jasmine, peppermint, a lateral branch arises from the base of the main axis and after growing aerially for some time arch downwards to touch the ground.
98. (2)
Solanaceae: This family is characterized by a bicarpellary, syncarpous gynoecium with a superior ovary. The ovary is typically bilocular and often placed obliquely.
Brassicaceae (Cruciferae): This family also features a bicarpellary, syncarpous gynoecium and a superior ovary. Although the ovary is initially unilocular, it becomes bilocular due to the formation of a false septum called the replum.
99. (4)
 Leaves originate from shoot apical meristems and are arranged in an acropetal order. The arrangement of veins and the veinlets in the lamina of leaf is termed as venation. In mango the pericarp is well differentiated into an outer thin epicarp, a middle fleshy edible mesocarp and an inner stony hard endocarp.
100. (1)
 Metaxylem is later formed primary xylem.
101. (3)
 $A = T, B = T, C = T$
102. (3)
 Electron transport components are embedded in thylakoid membrane.
103. (2)
Statement I is correct: Water splitting is associated with PS II on the inner side of the thylakoid membrane.
Statement II is incorrect: Protons are transported because the primary acceptor transfers its electron to an H carrier (hydrogen carrier), not an electron carrier. This molecule removes a proton from the stroma while transporting an electron.
Statement III is correct: NADP reductase is on the stroma side and protons are removed from the stroma to reduce NADP^+ .
Statement IV is correct: The breakdown of the gradient causes a conformational change in the CF_1 particle.

- 104. (1)**
C₄ plants eliminate the wasteful process of photorespiration by concentrating CO₂ in bundle sheath cells (via decarboxylation of C₄ acids). This maximizes RuBisCO efficiency, leading to higher productivity.
- 105. (2)**
PEP carboxylase fixes carbon dioxide forming oxaloacetic acid.
- 106. (1)**
In Krebs cycle acetyl coenzyme A enters the cycle. During one complete turn it undergoes four oxidation reactions producing reduced NAD and FAD and two decarboxylation reactions releasing carbon dioxide.
- 107. (1)**
In respiration the three carbon compound is pyruvic acid the six carbon compound is glucose and the four carbon compound is oxaloacetic acid. Thus S has three carbons T has six carbons and U has four carbons.
- 108. (2)**
Magnesium ion stabilises the enzyme substrate complex of pyruvate kinase.
- 109. (1)**
N⁶ furfuryl amino purine is also called Kinetin.
- 110. (4)**
One single maize root apical meristem can give rise to more than 17,500 new cells per hour.
- 111. (3)**
Hilum represents the junction between ovule and funicle.
- 112. (2)**
Amorphophallus flower provide safe place to lay eggs to the pollinator.
- 113. (1)**
In some seeds the nucellus is not completely consumed during development and remains as perisperm. Typical examples of plants having persistent nucellus (perisperm) are black pepper and beet.
- 114. (1)**
Gamete formation in dihybrid crosses.
 - RrYy → 4 types of gametes (RY, Ry, rY, ry)
 - RRYy → RY only
 - rryy → ry only
 - RRYy → RY, Ry
- 115. (2)**
Concept: Monohybrid cross F₁ result.
All F₁ plants were tall, showing dominance.
- 116. (3)**
Concept: Definition of alleles.
Alleles are slightly different forms of the same gene.
- 117. (2)**
Concept: Punnett square usage.
It predicts possible genotypes of offspring in a cross.
- 118. (1)**
Concept: Co-dominance
Both alleles express independently, explaining co-dominance.
- 119. (1)**
Correct genotype–phenotype mapping.
- 120. (3)**
Ribose has hydroxyl at the second carbon atom, whereas deoxyribose lacks it, creating the structural difference.
- 121. (1)**
Purines (adenine, guanine) are double-ringed and larger; pyrimidines (cytosine, thymine, uracil) are single-ringed. The reason correctly explains the assertion.
- 122. (1)**
Base pairs lie inside; sugar-phosphate backbone is external. So statement II is incorrect. Remaining I, III, IV are correct.
- 123. (1)**
Capping = methyl guanosine addition,
Tailing = poly A addition,
Splicing = removal of introns,
hnRNA = primary transcript
- 124. (3)**
Anticodon loop recognizes codon on mRNA. Amino acid recognition occurs by acceptor arm, not anticodon loop.
- 125. (1)**
RNA is considered primitive genetic material and catalytic molecules; proteins evolved later; DNA is believed to have evolved subsequently.

- 126. (2)**
This shows termination of transcription which requires Rho factor.
- 127. (1)**
Lichen (algae + fungus): Mutualism, where both the fungus and algae benefit from the association. The algae perform photosynthesis and provide food, while the fungus offers a suitable habitat.
- Fig-wasp: Mutualism, as the fig tree is pollinated by the wasp, and the wasp larvae use the fig for development.
 - Mycorrhiza: Mutualism, where fungi assist in nutrient and water absorption for plants, and in return, the plants provide carbohydrates to the fungi.
 - Pronuba moth-yucca plant: Mutualism, as the moth pollinates the yucca while laying its eggs inside the plant's flowers, providing reproductive benefits for both.
- 128. (3)**
Mammals produces small numbers of large size offspring.
- 129. (4)**
In commensalism the fitness of one species is significantly increased in the presence of another species i.e. Host
- 130. (1)**
As the death and birth both are same so there will be no change in the size of population, thus answer will be (3).
- 131. (2)**
A = Rapid growth, B = Stable growth,
C = Negative growth
- 132. (2)**
An inverted pyramid of biomass can be found in marine environment.
- 133. (4)**
Stratification is observed in all the given ecosystems however well developed is seen in the tropical rain forests.
- 134. (3)**
Parthenium hysterophorus (commonly called Congress grass) is not endemic. It is native to Central and South America and is an invasive species in many countries.
- African catfish is an invasive species and poses a serious threat to native fish due to its predatory and highly adaptable nature. Steller's sea cow became extinct in the 18th century due to overhunting.
"Carrot grass" actually refers to *Parthenium*.
- 135. (3)**
When an alien (exotic) species is introduced into a new habitat, it often becomes invasive because:
1. It lacks natural predators, parasites, or diseases that would normally control its population in its native range.
 2. This allows it to reproduce rapidly and outcompete indigenous species for resources.
- As a result, native species may decline or even go extinct.
- 136. (1)**
Steller's sea cow lived in the Bering Sea near the Commander Islands (Russia), not Indonesia. It became extinct in the 18th century due to overhunting.
- 137. (3)**
Reason (R) is false because it describes a pseudocoelomate condition, in which the body cavity is not lined by mesoderm and mesoderm occurs as scattered pouches (e.g., in *Aschelminthes/Nematoda*), not in coelomates.
- 138. (3)**
Parapodia are lateral appendages of aquatic annelids, aid in swimming. They are absent in earthworms and are not jointed.
- 139. (4)**
Arthropoda and Mollusca both show bilateral symmetry, are triploblastic, and possess a haemocoel. Jointed appendages are a characteristic feature of Arthropoda only, not Mollusca.
- 140. (4)**
Well developed muscular pharynx is present in *Aschelminthes*.
The space between visceral hump and mantle is called mantle cavity.

141. (3)

The **(A) Cell wall** is the outermost layer of a plant cell. It is made of **(B) cellulose**, hemicellulose, pectin, and proteins.

- It provides **(C) mechanical** protection against infection and helps in **(D) cell-to-cell interaction** and acts as a barrier.
- The **(E) Middle lamella** is the layer that glues adjacent plant cells together.
- The middle lamella is predominantly made up of **(F) Calcium pectate**.

142. (2)

A-3, B-4, C-2, D-1

- A. Endoplasmic Reticulum — Means of quick intracellular transport
- B. Ribosomes — Protein factories
- C. Golgi complex — Packaging of products
- D. Lysosomes – Have digestive enzymes in them

143. (2)

The **G₂/M checkpoint** is responsible for ensuring that the genome is intact, and that DNA replication is fully completed before the cell enters the mitotic phase.

Statement 1 is incorrect because DNA replication happens during the S phase, not before it.

Statement 3 is incorrect because the Spindle Checkpoint occurs at **Metaphase** to ensure all chromosomes are attached to the spindle fibers.

Statement 4 is incorrect because cells can enter a quiescent stage (G₀) or attempt repair before apoptosis is triggered.

144. (1)

Meiosis II is termed "equational" because, like mitosis, it does not reduce the chromosome number further. Since the cells entering Meiosis II are already haploid (n), and the cells produced are also haploid (n), the division is equational. The Reason correctly explains the terminology.

145. (2)

C - Incorrect: Chiasmata become visible during **Diplotene**, not Diakinesis.

E - Incorrect: Terminalisation is the final stage of Prophase I, occurring in **Diakinesis**.

146. (4)

Cells suspend cell cycle and enter a vegetative phase.

147. (1)

A closer examination reveals that the relative abundance of carbon and hydrogen with respect to other elements is higher in any living organism than in earth's crust.

148. (4)

Glycerol is a simple lipid which is trihydroxy propane.

149. (2)

Haem is the prosthetic group and it is a part of the active site of enzyme.

150. (4)

Statement 1 is incorrect: Adipose tissue is a type of **loose** connective tissue, not dense.

Statement 2 is incorrect: In dense **regular** tissue, fibres are in parallel rows. It is in dense **irregular** tissue that they are oriented differently.

Statement 3 is incorrect: Tendons attach muscle to bone; ligaments attach bone to bone.

151. (3)

The **Labrum** is the upper lip, while the **Labium** is the lower lip. The **Hypopharynx** is the median flexible lobe acting as the tongue. **Mandibles** are specifically for the biting and grinding of food.

152. (1)

According to the text, a triangular structure called the sinus venosus joins the right atrium and receives blood through the vena cava. The ventricle opens into a sac-like conus arteriosus on the ventral side. From there, blood is carried to the body via the arteries (arterial system).

153. (3)

Emphysema involves destruction of alveolar walls, reducing gas exchange.

154. (1)

Serum = plasma **minus clotting factors**, hence **cannot clot**

155. (3)

- Sympathetic nerves ↑ heart rate & force
- Parasympathetic nerves ↓ heart rate
- **Adrenaline & noradrenaline** from adrenal medulla increase cardiac output.
- Heart is **myogenic**, not only neurally controlled.

156. (2)

"Urine is stored till a voluntary signal is given by the central nervous system (CNS)." Stretch receptors send signals to CNS, which passes:

157. (1)

A is correct: Muscle fibre is multinucleated → syncytium.

B is correct: Sarcolemma encloses sarcoplasm

C is incorrect: T-tubules are invaginations of sarcolemma, not continuous with SR.

D is correct: Myofibrils have A and I bands.

E is correct: H zone disappears during contraction.

158. (2)

1 – **Correct:** Total = 33 vertebrae.

2 – **Correct:** Cervical = 7.

3 – **Correct:** Sacral vertebrae are fused.

4 – **Incorrect:** Thoracic vertebrae articulate with **ribs**, not sternum directly.

159. (4)

1 – **Correct:** Action potential obeys all-or-none law.

2 – **Incorrect:** Threshold reached by **Na⁺ channel opening**.

3 – **Correct:** Depolarization = Na⁺ influx.

4 – **Correct:** Repolarization = K⁺ efflux.

5 – **Correct:** Na⁺/K⁺ pump uses ATP.

160. (2)

Posterior pituitary releases **oxytocin and vasopressin (ADH)** which are synthesized in the hypothalamus.

161. (2)

Aldosterone regulates **Na⁺ reabsorption and water balance**.

162. (2)

Seminiferous tubules are located in the testes, which are the specific location of meiosis, and the subsequent formation of sperms. Rete testis is a network of small tubules found in

the part of the testicle that carries sperm. Leydig cells or interstitial cells of Leydig produce the hormone called testosterone which contributes to male secondary sexual characters. Prepuce is the foreskin, skin surrounding and protecting the head of the penis as well as clitoris.

163. (1)

Statement 1 is true: **hCG** is secreted by the trophoblast of the embryo after implantation.

Statement 2 is true: **hCG maintains the corpus luteum** during early pregnancy.

164. (3)

The given figure shows the morula stage of embryonic development. Morula is produced by a series of cleavage (closed mitosis) divisions of the early embryo, starting with the single-celled. Once the embryo has divided into 16 cells, it begins to resemble a mulberry, hence the name.

165. (4)

A comprehensive reproductive health program should include puberty changes, emotions, consent, contraception, and STIs, addressing both knowledge and practical awareness.

166. (3)

IVF is definitely known to increase chances of fertility in couples which fail to be parents however, the technique does not guarantee the pregnancy as the technique does not work for everybody.

167. (1)

Typhoid fever results from bacterial infection that enters through contaminated food or water, leading to high fever, headache, and gastrointestinal issues as the pathogen multiplies in lymphoid tissues and bloodstream.

168. (1)

These reducing gases, when sparked with electric discharge, produced amino acids, simulating chemical evolution of organic molecules.

169. (3)

A-3, B-4, C-5, D-2

- 170. (2)**
Vaccines stimulate active immunity with memory cells; passive comes from pre-formed antibodies.
- 171. (2)**
Chronic intake leads to fatty liver, cirrhosis, and failure due to toxin buildup.
- 172. (2)**
Both Assertion and Reason are true but Reason is not a correct explanation of Assertion.
- 173. (1)**
The greater the BOD of waste water, more is its polluting potential.
- 174. (2)**
Biogas plant → KVIC
Sewage treatment plant → Ministry of environment & forests
Streptococcus → Clot buster
Trichoderma → Immuno suppressive agent
Aspergillus → Citric acid
- 175. (2)**
Separated DNA bands are cut out and extracted (elution) from gel.
- 176. (2)**
Non-recombinants grow on both; recombinants only on ampicillin due to insertion in tetR.
- 177. (1)**
Bioreactors have agitator, oxygen, foam control, temperature, pH systems, and sampling ports.
- 178. (2)**
DNA separates as fine threads in suspension after ethanol addition.
- 179. (2)**
(a)-(i), (iii); (b)-(v); (c)-(ii), (iv)
(a) Lepidopterans — Armyworm, Tobacco bud worm
(b) Coleopterans — Beetles
(c) Dipterans — Mosquitoes, Flies
- 180. (1)**
In 1997, the first transgenic cow, Rosie produced human protein enriched milk (2.4 g/L).