R ANSWER KEY & SOLUTION KEY FINAL ROUND - 15 (PCB) Dt.24.04.2024

PHYSICS

SECTION - A (35 Questions)

01. **(1)** Potential energy in spring $= \frac{1}{2}kx^2$

Now $\frac{1}{2}k(2)^2 = U$ & $\frac{1}{2}k(8)^2 = U'$(say)

$\Rightarrow U' = \frac{64}{4}U = 16U$

Thus, option (1) is correct.

02. **(3)** For equilibrium F = 0 [$\because$ means slope of U *vs* *x* curve]

As $F = -\frac{dU}{dx}$

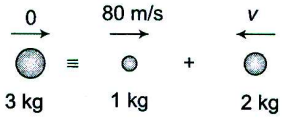
03. **(2)** Tension at B is maximum

$$T = \text{ weight} + \frac{mv^2}{R}$$

So, the string breaks at point B.

04. **(1)** Exact number & Not measure value both have infinite significat figures.

05. **(4)**



$3 \times 0 = 1 \times 80 - 2v$

$\Rightarrow$ v = 40 m/s

$K_f = \frac{1}{2}\times 1\times(80)^2 + \frac{1}{2}\times 2\times(40)^2$

$= 4800$ J $= 4.8$ kJ.

06. **(2)** Given radius vector, $\vec{r} = 2\hat{i} + \hat{j} + \hat{k}$

Linear momentum, $\vec{p} = 2\hat{i} - 3\hat{j} + \hat{k}$

As angular momentum, $\vec{L} = \vec{r} \times \vec{p} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 2 & 1 & 1 \\ 2 & -3 & 1 \end{vmatrix}$

$= \hat{i}(1-(-3)) - \hat{j}(2-2) + \hat{k}(-6-2) = 4\hat{i} - 8\hat{j}$

07. **(2)** Compare $v = 16\sqrt{x}$ with $v = \sqrt{2ax}$

$\Rightarrow 16 = \sqrt{2a}$ or $256 = 2a$ or $a = 128$ m/s^2

08. **(1)**

09. **(1)** As $(V_B - V_A) = \frac{W_{AB}}{q} = \int_A^B \vec{E}.\overrightarrow{d\ell}$

$= kq\left(\frac{1}{r_A} - \frac{1}{r_B}\right)$

Which depends on the initial and final position.

10. **(1)** $E_p = 0$

$\Rightarrow \frac{4}{x^2} = \frac{9}{(20-x)^2} \Rightarrow \frac{20-x}{x} = \frac{3}{2}$

$\Rightarrow 40 - 2x = 3x \Rightarrow x = 8$ cm

11. **(1)** Resistance $\propto \frac{1}{\text{Power}}$. Thus, 40 W bulb has a high resistance, because of which there will be more potential drop across 40 W bulb. Thus 40 W bulb will glow brighter.

12. **(1)** As revolving charge is equivalent to a current loop, so electric current corresponds to the revolution of electron is $I = qf = q \times \frac{\omega}{2\pi}$

But $\omega = \frac{v}{R}$, where R is radius of circle and *v* is uniform speed of charged particle.

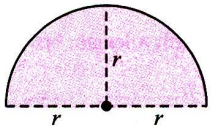
Therefore, $I = \frac{qv}{2\pi R}$

Now, magnetic moment associated with charged particle is given by

$\mu = IA = I \times \pi R^2$

or $\mu = \frac{qv}{2\pi R} \times \pi R^2 = \frac{1}{2}qvR$

13. **(4)** Here, $M = 4\pi$ Am^2



If *l* is the length of wires then its pole strength

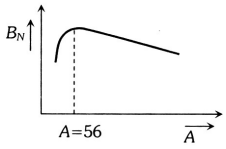
$= \frac{M}{l} = \frac{4\pi}{l}$.Am.

When wire is bent in the form of semicircle of radius r, then $l = \pi r, r = l/\pi$

New magnetic moment, M' = pole strength × $2r$

$= \frac{4\pi}{l} \times \frac{2l}{\pi} = 8\text{Am}^2.$

14. **(1)** The correct graph of B.E./N is



15. **(3)** Energy density =

$$\frac{1}{2}\varepsilon_0 E^2 = \frac{\text{Energy}}{\text{Volume}} = \left[\frac{ML^2T^{-2}}{L^3}\right] = [ML^{-1}T^{-2}]$$

16. **(1)** $\lambda = \frac{h}{mv}$

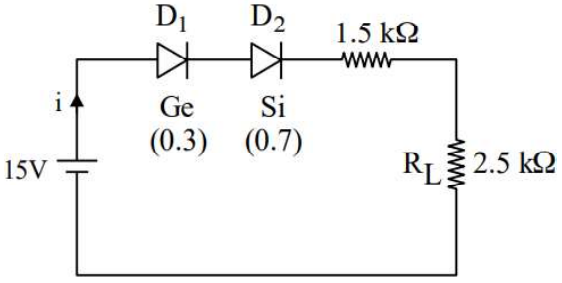
According to Bohr's theory

$$mvr_o = \frac{h}{2\pi}(n=1)$$

or $\frac{h}{mv} = 2\pi r_o$ (r_o = radius of first orbit)

Hence, $\lambda = \frac{h}{mv} = 2\pi r_o =$ circumference of the first orbit.

17. **(1)**



$i = \frac{14}{4} = 3.5\,\text{mA}$

$V_L = iR_L = 3.5 \times 2.5$ volt

$= 8.75$ volt

18. **(3)** $V_1 = V_0, V_2 = 8V_0, P_1 = (H+h)m$ of water

$P_1 = H$

$P_1V_1 = P_2V_2$

$(H+h)V_0 = H.8V_0$

$h = 7H.$

19. **(2)** Equation of SHM is $3\frac{d^2x}{dt^2} = -48x$

or $\frac{d^2x}{dt^2} = -\frac{48}{3}x = -16x$

Comparing it with, $\frac{d^2x}{dt^2} = -\omega^2 x$, we get

$\omega^2 = 16$ or $\omega = 4$ or $\frac{2\pi}{T} = 4$ or $T = \frac{2\pi}{4} = \frac{\pi}{2}s.$

20. **(4)** The given equation is

$y(x, t) = 0.005 \cos(\alpha x - \beta t)$

Compare it with the standard form of equation

$y(x,t) = A\cos(kx - \omega t)$

$k = \alpha = \frac{2\pi}{0.08} = 25.00\,\pi m^{-1}$

$\beta = \omega = \frac{2\pi}{T} = \frac{2\pi}{2.0} = \pi\,\text{rad}$

21. **(2)** In longitudinal waves, particles of the medium vibrate along the wave propagation. In transverse waves, particles of the medium vibrate perpendicular to the wave propagation.
In beats, two progressive waves of slightly different frequency superpose in the same direction.
In stationary waves, two progressive waves of same frequency superpose in the opposite directions.

22. **(1)** At Brewster's angle reflected light is completely polarised & refracted light is partly polarised.

23. **(3)** As reflected light is completely polarized, therefore, $i_p = 60°$.

$\mu = \tan i_p = \tan 60° = \sqrt{3}$

As $\mu = \frac{c}{v} = \sqrt{3}$

$\therefore\ v = \frac{c}{\sqrt{3}} = \frac{3\times10^8}{\sqrt{3}} = \sqrt{3}\times10^8\,\text{m/s}$

24. **(4)** $U = \frac{1}{2}CV^2 = \frac{1}{2}\frac{\varepsilon_0 A}{d}V^2$

$= \frac{1}{2} \times \frac{8.85\times10^{-12}\times(100\times10^{-4})(200)^2}{2.5\times10^{-3}} = 7.08\times10^{-7}\,\text{J}$

25. **(4)** Two coils carry current in opposite direction, hence net magnetic field at centre will be difference of the two fields.

i.e. $B_{net} = \frac{\mu_0}{4\pi}\cdot 2\pi N\left[\frac{i_1}{r_1} - \frac{i_2}{r_2}\right]$

$= \frac{10\mu_0}{2}\left[\frac{0.2}{0.2} - \frac{0.3}{0.4}\right] = \frac{5}{4}\mu_0$

26. **(2)** The magnitude of electric field vector varies periodically with time as polarized light is a form of electromagnetic wave.

27. **(1)** $E = 8\sin\omega t + 6\sin\omega t$

$\Rightarrow E_{peak} = \sqrt{8^2+6^2} = 10V$

$E_{rms} = \frac{10}{\sqrt{2}} = 5\sqrt{2}\,V$

28. **(4)** Kirchhoff's law of radiation states that the ratio of emissive power to absorptive power is same for all surfaces at the same temperature and is equal to the emissive power of a perfectly black body at that temperature.

29. **(3)** $h_1 = 0 + \frac{1}{2}\times 10\times 60^2 = 18km$

$v_1 = 0 + 10\times 60 = 600$ m/s

$h_1 = \frac{v_1^2 - 0}{2g} = \frac{600^2}{2\times 9.8} = 18.4\,km$

$h = h_1 + h_2 = 36.4$ km

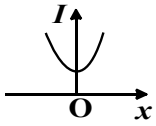
30. **(3)** When two holes are made in the tin, air keeps on entering through the other hole. Due to this the pressure inside the tin does not become less than atmospheric pressure which happens only when one hole is made.

Hence, the correct answer is option (3)

31. **(3)** $Y = \overline{\overline{A}\cdot\overline{B}} = \overline{\overline{A}} + \overline{\overline{B}} = A + B$

(De-Morgan's law)

32. **(3)** Comparing $y = 4ax^2 + c \Rightarrow$



33. **(3)** $E_n = -\frac{13.6}{n^2} \Rightarrow E_2 = -\frac{13.6}{2^2} = -3.4eV.$

34. **(1)** Here, $M = ?,\ d\phi = 2\times 10^{-2} Wb, dI = 0.01A$

As $\phi = MI$

$\therefore M = \frac{\phi}{I} = \frac{d\phi}{dt} = \frac{2\times 10^{-2}}{0.01} = 2H.$

35. **(2)** $\vec{F}_1 = ma\hat{i} \Rightarrow 60\hat{i}$

$\vec{F}_2 = N = ma\hat{j} \Rightarrow 600\,\hat{j}$

$\left|\vec{F}_{net}\right| = \sqrt{F_1^2 + F_2^2} = \sqrt{60^2 + 600^2} = 603$ N

SECTION - B (Attempt Any 10 Questions)

36. **(3)** $Pf = \frac{R}{\sqrt{R^2 + X^2}} = \frac{1}{\sqrt{2}}$

$\Rightarrow \frac{R^2}{R^2 + X^2} = \frac{1}{2} \Rightarrow R = X$

As frequency is doubled $\therefore\ X' = 2X$

$Pf' = \frac{R}{\sqrt{R^2 + (X')^2}} = \frac{X}{\sqrt{X^2 + (2X)^2}} = \frac{1}{\sqrt{5}}$

37. **(1)** Slope of line passing gas, heat is given out by the gas Slope of B: $\left(\frac{P}{T}\right)_B = \frac{nR}{V} = \frac{(3m/M_0)R}{V}$

Slope of A: $\left(\frac{P}{T}\right)_A = \frac{n'R}{V} = \frac{(m/M_0)R}{V}$

$\frac{(P/T)_B}{(P/T)_A} = \frac{3m}{m} = \frac{3}{1}.$

38. **(4)** Let k' be the of spring constant of each part of spring. The original spring spring constant k can be taken as a combination of 4 springs in series each of spring constant k'. So

$\frac{1}{k} = \frac{1}{k'} + \frac{1}{k'} + \frac{1}{k'} + \frac{1}{k'} = \frac{4}{k'}$ or $k' = 4k$

Time period, $T = 2\pi\sqrt{\frac{m}{k}}$

and $T' = 2\pi\sqrt{\frac{m}{k'}} = 2\pi\sqrt{\frac{m}{4k}} = 2\pi\sqrt{\frac{m}{k}\times\frac{1}{2}} = \frac{T}{2}.$

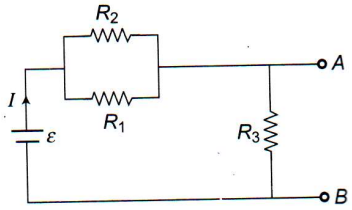
39. **(2)** For characteristic X-rays, $\frac{1}{\lambda} \propto (Z_{eff})^2$

So as atomic number increases, wavelength decreases, so option (1) is correct.

For continuous X-rays, cut-off wavelength is given by, $\lambda_o = \frac{hc}{eV}$ which is independent of atomic number of target material. so (2) is wrong. Option (3) is the standard correct statement and option (4) could be clearly understood by $\lambda_o = \frac{hc}{eV}$.

40. **(4)** At t = ∞, the equivalent circuit is

$I = \frac{\varepsilon}{R_3 + \frac{R_1R_2}{R_1 + R_2}} = \frac{10}{1 + \frac{(2)(2)}{2+2}} = \frac{10}{1+1} = 5\text{A}$



Also, $I_{R_1}R_1 = I_{R_2}R_2 \Rightarrow \frac{I_{R_1}}{I_{R_2}} = \frac{R_2}{R_1} = \text{constant}$

41. **(1)** Let r be radius of each small drop and R be radius of bigger drop

As the volume remains constant

$\therefore \frac{4}{3}\pi R^3 = n\times\frac{4}{3}\pi r^3$

$R = n^{1/3}r$

Capacitance of each small drop, $C = 4\pi\varepsilon_0 r$

Capacitance of bigger drop,

$C' = 4\pi\varepsilon_0 R = 4\pi\varepsilon_0 R = 4\pi\varepsilon_0 n^{1/3} r = n^{1/3}C$

Charge on each small drop, $Q = CV$

Charge on bigger drop, $Q' = nQ$

Potential of bigger drop,

$$V' = \frac{Q'}{C'} = \frac{nQ}{n^{1/3}C} = n^{2/3}V$$

42. **(4)** $U_h = -\frac{GMm}{R+h}$ for $h = 2R$,

$$U_h = -\frac{GMm}{3R}$$

Kinetic energy of the satellite moving with velocity v at a distance $h = 2R$ from the surface of earth is

$$K_h = \frac{1}{2}mv^2 = \frac{GMm}{2r} \quad \left(\because \frac{mv^2}{r} = \frac{GMm}{r^2}\right)$$

$$= \frac{GMm}{2(R+h)} = \frac{GMm}{2(R+2R)} = \frac{GMm}{6R}$$

$$E_h = U_h + K_h = -\frac{GMm}{3R} + \frac{GMm}{6R} = -\frac{GMm}{6R}$$

Since total energy remains conserved,

$$K_R + U_R = K_h + U_h$$

$$\Rightarrow K_R - \frac{GMm}{R} = -\frac{GMm}{6R}$$

$$\Rightarrow K_R = \frac{GMm}{R} - \frac{GMm}{6R} = \frac{5}{6}\frac{GMm}{R}.$$

43. **(2)** $T\cos 37^0 = \mu(100g - T\sin 37^0)$

$$\frac{4T}{5} = \frac{1}{3}\left(100g - T \times \frac{3}{5}\right) \Rightarrow T = \frac{100g}{3}$$

$$m_A a = T - m_A g$$

$$25a = \frac{100g}{3} - 25g \quad \Rightarrow a = \frac{g}{3}$$

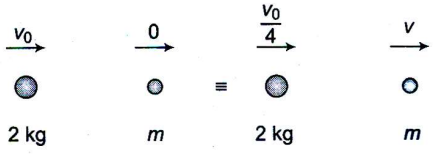
44. **(2)** $I = (P_r)c = (u)c = \left[\epsilon_0 E_{rms}^2\right]c$

$$= \left[\frac{1}{2}\epsilon_0 E_0^2\right]c$$

$$= \frac{1}{2} \times 8.85 \times 10^{-12} \times (200)^2 \times 3 \times 10^8$$

$$= 53.1 \text{ Wm}^{-2}$$

45. **(2)**



$$2v_0 = \frac{2v_0}{4} + mv \Rightarrow mv = \frac{3v_0}{2} \quad \text{.....(i)}$$

$$e = 1 = \frac{v - v_0/4}{v_0 - 0}$$

$$\frac{v_0}{4} + v_0 = v + 0 \Rightarrow v = \frac{5v_0}{4} \quad \text{.....(ii)}$$

$$mv = \frac{3v_0}{4} \Rightarrow m \times \frac{5v_0}{4} = \frac{3v_0}{2} \quad \therefore m = 1.2kg.$$

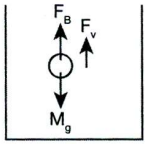
46. **(3)** For no deviation, the mean deviation for both the prism must be same.

$$D_{m_1} = D_{m_2}$$

or $(\mu_1 - 1)A_1 = (\mu_2 - 1)A_2$

$$A_2 = \frac{(\mu_1 - 1)}{(\mu_2 - 1)}A_1 = \frac{(1.54-1)}{(1.72-1)} \times 4^\circ = 3^\circ.$$

47. **(1)**



Given, Mass of the ball = M, Density of ball = d,

Density of glycerine = $\frac{d}{2}$

Buoyancy force is $F_B = V_s \rho_\ell g = V\frac{d}{2}g$ and

Force of gravity is $F_g = Mg = v\,d\,g$

For constant velocity, $F_{\text{net}} = 0, \therefore F_B + F_v = Mg$

$$\therefore F_v = Mg - F_B = Vdg - \frac{Vdg}{2} = \frac{Mg}{2}$$

Hence, the correct option (1)

48. **(1)** During change of state, $\Delta T = 0$

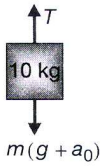
$$\therefore c = \frac{\Delta Q}{m\Delta T} = \infty.$$

49. **(4)** Here, $T = m(g + a_0)$

$= 10\ (10 + 2) = 120$ N

$$\therefore \text{Stress} = \frac{T}{A} = \frac{120}{2 \times 10^{-4}}$$

$= 60 \times 10^4$ N/m^2



$$\therefore \text{Y} = \frac{\text{Stress}}{\text{Strain}}$$

$$\therefore \text{Strain} = \frac{\text{Stress}}{\text{Y}} = \frac{60 \times 10^4}{2 \times 10^{11}} = 3 \times 10^{-6}.$$

50. **(1)** Total kinetic energy of the ring when it rolls without slipping,

$$K_{\text{ring}} = K_T + K_R = \frac{1}{2}mv^2 + \frac{1}{2}I,\omega^2$$

$$= \frac{1}{2}mv^2 + \frac{1}{2}mr^2 \times \frac{v^2}{r^2} = mv^2$$

$$\left(\because I_r = mr^2 \text{ and } \omega = \frac{v}{r}\right)$$

But $K_{ring} = 4\ J$ (given) $\therefore mv^2 = 4\ J$

Similarly, $K_{disc} = \frac{1}{2}mv^2 + \frac{1}{2}I_d\omega^2$

$= \frac{1}{2}mv^2 + \frac{1}{2} \times \frac{mr^2}{2} \times \frac{v^2}{r^2} \quad \left(\because I_d = \frac{mr^2}{2}\right)$

$= \frac{3}{4}mv^2 = \frac{3}{4} \times 4\ J = 3\ J$ (Using (i))

CHEMISTRY

SECTION - A (35 Questions)

51. **(2)** $HCHO + KOH \xrightarrow{\text{cannizzaro reaction}} CH_3OH + HCO_2K$

52. **(3)** $C_6H_5CHO \xrightarrow[(ii)\ H^+/H_2O]{(i)\ CH_3MgBr} \underset{2^o\ \text{alcohol}}{C_6H_5CH(OH)CH_3}$

53. **(3)** Number of orbitals in a shell = n^2.

54. **(1)** Slope of adiabatic curve is greater than isothermal curve.

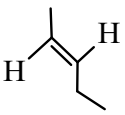
55. **(2)** Stability of +2 oxidation state in carbon family increases with increase in atomic number due to inert pair effect.

56. **(1)** As we move down the group from O to Te, the size of the central atom goes on increasing and its electronegativity goes on decreasing. Consequently, the position of bond pairs of electrons shifts more and more away from the central atom in moving from H_2O to H_2Te, For example, the bond pair in O–H bond is closer to oxygen than the bond pair in S–H bond. As a result, the force of repulsion between bonded pairs of electrons in H_2O is more than in H_2S. In general, the force of repulsion between the bonded pairs of electrons decreases as we move from H_2O to H_2Te and therefore, the bond angle decreases in the same order as:

$H_2O > H_2S > H_2Se > H_2Te$

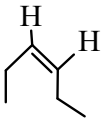
Bond angle: 104.5^o 92.1^o 91^o 90^o

57. **(4)**



trans pent-2-ene

$\mu \neq 0$



cis-hex-3-ene

$\mu \neq 0$

58. **(4)** A-iii, B-i, C-ii, D-iv

59. **(2)** $CH_{4(g)} \rightarrow C_{(g)} + 4H_{(g)}$

60. **(3)** In case of dilute solution of acids, $[H^+]$ of water cannot be neglected or dilute acidic solution cannot have pH in basic range i.e., > 7.

61. **(3)** Assertion is false but Reason is true.

The correct form of Assertion is:

MnO is basic whereas Mn_2O_7 is acidic.

62. **(2)** Statement-1 is true but Statement-2 is false.

The correct form of R is:

Ethylenediamine is a strong field ligand and form stable complexes.

63. **(4)**

Element	%	At. mass	Relative number of atoms	Simplest Ratio
Xe	53.5	131	0.408	1
F	46.5	19	2.44	6

$\therefore$ The empirical formula is XeF_6.

$\therefore$ Oxidation state of Xe is +6.

64. **(4)** $(meq)_{FeSO_4} = \frac{1}{10} \times 1 \times 10 = 1$

$(meq)_{KMnO_4} = 0.02 \times 5 \times 10 = 1$

65. **(1)** Only HBr-follows Anti Markownikoffs rule.

66. **(3)** A is false but R is true. The correct form of A is, Isopropyl carbocation formed in S_N1 reaction undergoes rearrangement.

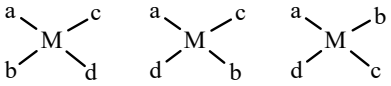
67. **(3)** Dissolution of a gas in a liquid is an exothermic process. Gas + liquid solvent $\rightleftharpoons$ solution + heat

Hence, reaction is favoured at low temperature.

68. **(2)** The complex is of the type [Mabcd]

M = metal

a, b, c, d = Monodentate ligands.



3 geometrical isomers

69. **(3)** Statement-1 is false, Statement-2 is true

70. **(3)** $ClH_2C–CH_2Cl$ is ethylene chloride (ethylene dichloride) which is example of dihalogen derivative.

71. **(2)** 31.75 g copper i.e. 0.5 mole of Cu gets deposited at cathode on passing 96500 coulomb charge.

72. **(3)** $(CH_3)_2C(OH)CN$, $(CH_3)_2C(OH)COOH$

73. **(2)** As a very high temperature is produced in Bredig's arc method, It can be used only for those metals, with does not react with water at that high temperature.

Pt, Ag and Au does not react with water but Fe can.

74. **(3)** +3 and +4 oxidation states are shown by Ce in aqueous solution.

75. **(2)** II > III > I

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

77. **(2)** Among the given statements, statement A, C and D are correct whereas B and E are incorrect. Their correct form is :

A spontaneous process is a process which take place by itself.

Spontaneous reaction occurs at constant temperature and pressure, when $\Delta H < 0$ and $\Delta S > 0$.

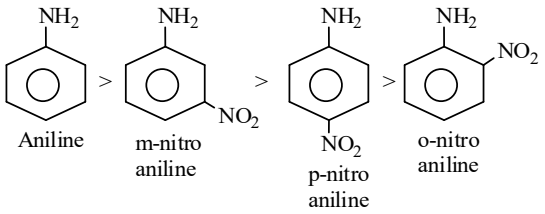
78. **(4)** For nitrogen, formal charge $= 5 - \frac{1}{2}(8) = +1$.

For oxygen, formal charge $= 6 - 6 - \frac{1}{2}(2) = -1$.

79. **(3)** Configuration of C_2 molecule is

$\sigma 1s^2\ \sigma^* 1s^2\ \sigma 2s^2 \sigma^* 2s^2 \pi 2p_x^2\ \pi 2p_y^2$.

80. **(3)** The decreasing order of basic character



$\Rightarrow$ Electron withdrawing group decreases basic strength at ortho & para position NO_2 show –M & –I & at meta position NO_2 –I only.

81. **(2)** Phosphorus

82. **(4)** All of these

83. **(2)** En for any one electron species $= \frac{E_1 \times Z^2}{n^2}$

where E_1 is ground state energy of H-atom.

For He^+, $E_n = \frac{E_1 \times 2^2}{n^2}$

As given, $\frac{E_1 \times 2^2}{n^2} = E_1$

$\therefore\ n = 2$

Thus 2nd energy level of He^+ has energy equal to ground state energy of H-atom.

84. **(2)** In the compound M–O–H, if IE or E.N. of M is low, the compound will act as a base and if the IE or E.N. of M is high, the compound will behave as an acid. Therefore, M–O–H will act as an acid as E.N. of M is high (3.5) and M'–O–H will act as a base as E.N. of M' is low (1.72).

85. **(2)** NH_3, $[PtCl_4]^{2-}$, PCl_5 and BCl_3 have sp^3, dsp^2, sp^3d and sp^2 hybridisation respectively.

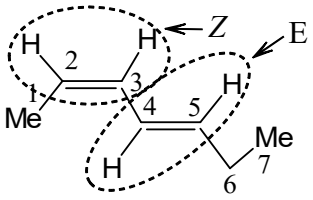
SECTION - B (Attempt Any 10 Questions)

86. **(3)** The incorrect reaction of methane is

$$CH_4 + O_2 \longrightarrow HCOOH + 2H_2O(l)$$

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

88. **(4)**



Hence the correct name is (4)

89. **(3)** A is false but R is true.

The correct from of A is :

Since, $2p_x$ and $2p_y$ orbitals are degenerate orbitals, hence, there is no possibility of transition of electron.

90. **(1)** $CH_3–CH_2–NH_2$

91. **(3)** $t_{3/4} = \frac{2.303}{k}\log\frac{a}{1/4a} = \frac{2.303}{k}\log 4$

$t_{1/2} = \frac{2.303}{k}\log\frac{a}{1/2a} = \frac{2.303}{k}\log 2$

$\frac{t_{3/4}}{t_{1/2}} = \frac{\log 4}{\log 2} = 2 \Rightarrow t_{1/2} = \frac{t_{3/4}}{2} = \frac{32\,\text{min}}{2} = 16\,\text{min}$

92. **(1)** Strong field ligands cause greater splitting which leads to pairing of electrons.

d f block

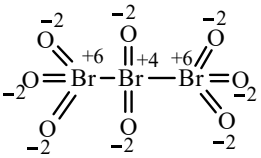
93. **(1)** (**a** $\rightarrow$ **s**) Definition of 1° structure of protein

(**b** $\rightarrow$ **p**) Definition of structure of protein

(**c** $\rightarrow$ **q**) Definition of structure of protein

(**d** $\rightarrow$ **r**) Definition of structure of protein

94. **(2)**



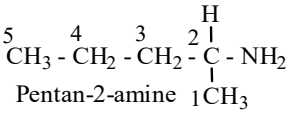
Oxidation states of three bromines are +6, +4, +6.

95. **(4)** The correct match is A-IV, B-I, C-II, D-III.

96. **(2)** HNO_2 reacts to give an alcohol means the compound is primary amine.

$C_5H_{13}N$ means $C_5H_{11}NH_2$ (primary amine)

Optically active alcohol means C_5H_{11} segment contain a chiral carbon.



97. **(1)**

	N_2	+	$3H_2$	$\rightleftharpoons$	$2NH_3$
Initial moles	2		6		0

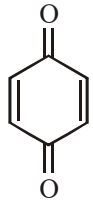
Final moles $2-2\times\frac{50}{100}$

$=2-1$ $\quad =6-3\times1$ $\quad =2\times1$

$$K_c=\frac{[NH_3]^2}{[N_2][H_2]^3}=\frac{(2)^2}{(1)\times(3)^3}=\frac{4}{27}$$

98. **(1)** More electronegative elements form more strong acid. Electronegativity of nitrogen and chlorine is almost same still $HClO_4$ is stronger acid than HNO_3 becuase of higher oxidation state of Cl in $HClO_4$. H_2CO_3 is a stronger acid than $B(OH)_3$ but weaker than HNO_3.

99. **(1)**



100. **(1)** Mass of one molecule of water

$$=\frac{18}{6.023\times10^{23}}\approx3\times10^{-23}\,g$$

BOTANY

Section - A (35 Questions)

101. **(4)** [NCERT 11th, Page no. 87 (Subpoint 6.1.2.2)
102. **(3)** [NCERT 11th, Page no. 89, Second paragraph]
103. **(1)** [NCERT 11th Page 248, First paragraph (Line no. 01-02)]
104. **(1)** (NCERT 11th Pg.226, 4th Para, 2nd line)
105. **(3)** (NCERT 11th Pg.233, Fig 14.4)
106. **(4)** (NCERT 11th PK Bry. to Angio. concept based)
107. **(4)** (NCERT 12th Page no.31 to 41 concept based.)
108. **(2)** (NCERT 11th Para10.4.1, Page no. 168)
109. **(2)** (NCERT 11th 8.5.1 Page no. 132)
110. **(4)** (NCERT 11th Para 8.5.10, Page no.139/ bot.)
111. **(4)** (NCERT 11th, Page No.71: sub-topic 5.3.3)
112. **(1)**(NCERT 11th, Page no-11, Table- 1.1, Concept based)
113. **(1)** (NCERT 12th Page No. 80 Structure of Polynucleotide chain)
114. **(2)** (NCERT 12th Pg 88, Para 6, Line 1, Pg.89, para 2, Line 11-12)
115. **(1)** (NCERT 12th Pg. 115, Para-2, Line 10)
116. **(4)** (NCERT 11th, Page no- 19, Paragraph-2.1.1, Line no- 1-8)
117. **(2)** (NCERT 12th, Pg 85- polygenic inh- line 11, Pg 86- Para 1- last lines, Pg 87- Sex Determination in Honey Bee- Last line)
118. **(3)** (NCERT 12th Pg 111, Para 3, Line 4)
119. **(2)** (NCERT 12th Pg 116, Para 2, Line 6,7,8)
120. **(2)** (NCERT 11th, para10.2.5, page no. 166)
121. **(1)** (NCERT 11th, Page No.69: sub-topic 5.2.1)
122. **(3)** (NCERT 12th Page no.249 fig.14.4)
123. **(2)** (NCERT 11th, Page No.78, 79 and 80)
124. **(2)** (NCERT 11th page no. 222, 13.10.1, 10th line)
125. **(1)** (NCERT 11th page no. 216, 13.7.2, 1 – 4th and 5th line)
126. **(1)** (NCERT 11th , Page no- 21, Paragraph-2.2.3, Line no- 1,2)
127. **(4)** (NCERT 12th, Page no- 34, Paragraph-2.3, Conceptual)
128. **(3)** (NCERT 12th Pg. 92, Figure 5.16, Down's syndrome)
129. **(1)** (NCERT 12th Pg 106, The Machinery and the Enzymes , para 2, Line 7)
130. **(2)** (NCERT 11th Para 10.4.1, Page no.168)
131. **(4)** (NCERT 12th, Page no- 34, Paragraph-2.3, Line no- 2-7)
132. **(4)** (NCERT 12th, Page no- 24, 1st paragraph, Line no- 2-4)
133. **(3)** (NCERT 11th Page No.78 : sub-topic 5.8)
134. **(3)** (NCERT 12th Pg 90- Hemophilia)
135. **(3)** (NCERT 12th, Pg 83, Para 4, Line 16,17,18)

SECTION - B (Attempt Any 10 Questions)

136. **(3)** (NCERT 11th Para 8.5.3, Page no.133,134,135)
137. **(2)** (NCERT 11th page no. 212, 13.6.1, 1ST paragraph)
138. **(3)** (NCERT 11th, Page no-10, Paragraph-1.3.4, Line no- 5,6)
139. **(1)** (NCERT 11th, Biological classification, Based on whole chapter knowledge)
140. **(2)** (NCERT 12th, Page no- 28, 3rd paragraph, Line no- 1-3)
141. **(4)** [NCERT 11th, Page no. 93, Point no. 6.3.4]

142. **(1)** [NCERT 11th, Page 250, Point 15.4.3.4 (First paragraph)]
143. **(1)** (NCERT 11th Pg.235, 14.6)
144. **(4)** (NCERT 11th Page no.36,3.2.2 2nd line concept.)
145. **(2)** (NCERT 11th Page no.38 1st para, concept)
146. **(4)** (NCERT 12th Page no.244,14.3,2nd para 4th line)
147. **(2)** (NCERT 12th Pg 77, based on Table 5.2)
148. **(1)** (NCERT 12thPg 110, para 2, Line 4,5,6)
149. **(3)** (NCERT 11th Para 8.5.4, Page no.133, 135)
150. **(2)** (NCERT 11th, Page no- 19, Paragraph- 2.1.2, Line no- 13-18)

ZOOLOGY

Section - A (35 Questions)

151. **(3)** (NCERT 11th Conceptual)
152. **(2)** (NCERT 12th, p.no47, para2, line 7)
153. **(2)** (NCERT 12th, p.no62, para3, line3)
154. **(4)** (NCERT 12th Page no.233 (i) concept based)
155. **(4)** (NCERT 12th Page no.237 (v) 1st line)
156. **(1)** (NCERT 12th, p.no62, para1, line1)
157. **(1)** (NCERT 12th, p.no61, para1, line4)
158. **(4)** (NCERT 11th, p no119, line9)
159. **(2)** (NCERT based extra)
160. **(4)** [NCERT 11th No.305, 10th Line]
161. **(3)** [NCERT 11th P.No.303, Last 2 para & 304, 1st para]
162. **(2)** (NCERT 11th, p no114, line12)
163. **(1)** (NCERT based extra)
164. **(3)** (NCERT Page No - 194 formed elements)
165. **(3)**(NCERT 11th Page No - 201 - Double circulation)
166. **(1)** (NCERT concept)
167. **(1)** [NCERT 12th P.No.211, last para 10th Line]
168. **(1)** (NCERT 12th, Page no- 133, 1st Paragraph, Line no- 8-11)
169. **(3)** (NCERT 11th, p no104, para3, line3)
170. **(2)** (NCERT 12th para 10.5 / Page no.186,187)
171. **(2)** (NCERT 12th Para 10.2.3, Page no. 183)
172. **(2)** (NCERT 12th, Page no- 134, Last paragraph, Line no-1,2)
173. **(3)** [NCERT 11th P.No.312,Cartilaginous Joint]
174. **(3)** [NCERT 11th P.No.320, First para Last line]
175. **(4)** [NCERT 11th P.No.321, Midbrain]
176. **(1)** (NCERT 12th, Evolution Conceptual)
177. **(4)** (NCERT 11th, Page no- 156, Last line)
178. **(4)** (NCERT 12th Page no.233, (i) concept based)
179. **(1)** (NCERT 11th Page No. 57; Class-Amphibia)
180. **(3)** (NCERT 11th Page No. 54; Phylum - Echinodermata.)
181. **(3)** (NCERT 11th, Page no- 156, 1st paragraph, conceptual)
182. **(1)** [NCERT 12th P.No.204 Last para , 205, First para]
183. **(2)** [NCERT 12th P.No.209, Last para]
184. **(2)** (NCERT 11th Page No. 290; 2nd paragraph 1st line)
185. **(1)** (NCERT 11th Page No. 331, last line of 1st paragraph)

SECTION - B (Attempt Any 10 Questions)

186. **(2)** [NCERT 12th P.NO.318, LAST 5 LINES APPLIED]
187. **(3)** [NCERT 11th P.No.311, Pelvic Girdle]
188. **(2)** (NCERT 12th Page No - 159 Cannabinoids)
189. **(2)** (NCERT 11th Page No. 282)
190. **(4)** (NCERT 12th Page No - 156 Cancer)
191. **(2)** (NCERT 12th, Page no- 131, Last paragraph, Line no- 1-7)
    NCERT 12th, Page no-132, 1st paragraph
192. **(3)** (NCERT 11th, Page no- 158, 159, Paragraph- 9.12.5)
193. **(3)** (NCERT 12th Page no.234 (ii) 1st para)
194. **(2)** (NCERT 11th Page No. 292, 2nd paragraph)
195. **(3)** (NCERT 11th Page No. 57 (Class - Amphibia)
196. **(3)** (NCERT 12th, p.no50, fig. 3.9)
197. **(3)** (NCERT 12th, p.no54, para3)
198. **(3)** (NCERT 12th 10.1 BIOTECHNOLOGICAL APPLICATIONS IN AGRICULTURE)
199. **(2)** (NCERT 11th Page No - 187 - Respiratory volume & capacities)
200. **(2)** [NCERT P.No.212, 2nd and 3rd para]