# CAREER POINT

# MOCK TEST PAPER for AIPMT

## Physics, Chemistry & Biology

## Solutions

## ANSWER KEY

### PHYSICS

| Ques. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ans. | 1 | 3 | 3 | 1 | 1 | 4 | 3 | 1 | 3 | 2 | 4 | 4 | 3 | 3 | 3 | 1 | 2 | 2 | 2 | 1 | 2 | 4 | 2 | 4 | 1 |
| Ques. | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | | | | | |
| Ans. | 2 | 1 | 3 | 4 | 2 | 3 | 1 | 1 | 1 | 1 | 3 | 3 | 4 | 2 | 3 | 2 | 3 | 1 | 1 | 1 | | | | | |

### CHEMISTRY

| Ques. | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ans. | 3 | 3 | 2 | 2 | 1 | 1 | 2 | 4 | 4 | 1 | 3 | 3 | 2 | 1 | 2 | 4 | 2 | 3 | 2 | 1 | 2 | 3 | 1 | 4 | 1 |
| Ques. | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | | | | | |
| Ans. | 2 | 1 | 1 | 1 | 4 | 1 | 2 | 2 | 2 | 1 | 2 | 4 | 3 | 1 | 3 | 3 | 1 | 1 | 2 | 2 | | | | | |

### BIOLOGY

| Ques. | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ans. | 3 | 4 | 3 | 1 | 4 | 2 | 4 | 1 | 2 | 1 | 2 | 4 | 4 | 3 | 4 | 4 | 4 | 1 | 3 | 1 |
| Ques. | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 |
| Ans. | 1 | 3 | 1 | 2 | 2 | 1 | 2 | 4 | 1 | 2 | 4 | 1 | 3 | 2 | 4 | 3 | 1 | 3 | 1 | 1 |
| Ques. | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 145 | 146 | 147 | 148 | 149 | 150 |
| Ans. | 1 | 3 | 4 | 4 | 4 | 3 | 4 | 2 | 2 | 2 | 2 | 4 | 1 | 2 | 4 | 4 | 2 | 4 | 1 | 4 |
| Ques. | 151 | 152 | 153 | 154 | 155 | 156 | 157 | 158 | 159 | 160 | 161 | 162 | 163 | 164 | 165 | 166 | 167 | 168 | 169 | 170 |
| Ans. | 3 | 4 | 4 | 2 | 2 | 2 | 2 | 3 | 4 | 2 | 3 | 3 | 4 | 4 | 4 | 2 | 4 | 1 | 3 | 1 |
| Ques. | 171 | 172 | 173 | 174 | 175 | 176 | 177 | 178 | 179 | 180 | | | | | | | | | | |
| Ans. | 4 | 4 | 2 | 4 | 4 | 2 | 3 | 3 | 3 | 4 | | | | | | | | | | |

### PHYSICS

**2.[3]** $F = 600 - 2 \times 10^5\, t = 0$

$t = \dfrac{600}{2\times10^5}$

$= 3 \times 10^{-3}$ s

$\text{Impulse} = \int_0^t F\,dt$

**3.[3]** Let m be the mass of the disc. Then translational kinetic energy of the disc is :

$K_T = \frac{1}{2}mv^2$ ... (1)

When it ascends on a smooth track its rotational kinetic energy will remain same while translational kinetic energy will go on decreasing. At highest point.

KT = mgh

or $\frac{1}{2}mv^2 = mgh$

or $h = \frac{v^2}{2g} = \frac{(6)^2}{2\times10} = 1.8$ m

**4.[1]** $P = \frac{\text{Energy}}{\text{time}} = \frac{dm}{dt}gh = 100 \times 10 \times 100$

$= 100$ kW

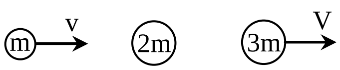
**5.[1]** (i) $W = \Delta U = \left\{\frac{m}{6}g\left(\frac{\ell}{12}\right)\right\} = \frac{mg\ell}{72}$

**6.[4]** From conservation of linear momentum

$8 \times 6 = 4 \times v \Rightarrow v = 12\ ms^{-1}$

As kinetic energy $= \frac{1}{2}mv^2$

**7.[3]**




Initial momentum = mv

final momentum = 3mV

mv = 3mV

$\Rightarrow V = v/3$

**8.[1]** $y_{cm} = \frac{m_1y_1 + m_2y_2}{m_1 + m_2}$

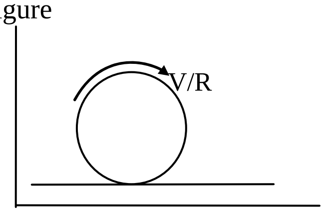
$0 = \frac{\left(\frac{m}{4}\right)(15) + \left(\frac{3m}{4}\right)y}{\frac{m}{4} + \frac{3m}{4}}$

y = –5 cm

**9.[3]** $\frac{2}{5}MR^2$

**10.[2]** $k = \frac{I}{2}\omega^2$

**12.[4]** From figure




$V_{net}$ (for lowest point) = v – Rω = v – v = 0

and Acceleration $= \frac{v^2}{R} + O = \frac{v^2}{R}$

(Since linear speed is constant) Hence (D)

**13.[3]** $U = -\frac{GMm}{r}$ ; $K = \frac{GMm}{2r}$ ; $E = \frac{-GMm}{2r}$

**14.[3]** $Y = \frac{F/A}{\frac{\Delta x}{L}} \Rightarrow F = \frac{YA}{L}\Delta x \propto \frac{A}{L}$

$V = AL \Rightarrow L \propto \frac{1}{A}$

$F \propto A^2$

**15.[3]** $\theta = mS\,\Delta T$

$\frac{\Delta\theta}{\Delta t} = P$

(P) (1) = 50 × 0.6 × 50 Cal

**16.[1]** $B_\phi = \gamma P$ ; $B_\theta = P$

**17.[2]**

**18.[2]** $C_{V_{min}} = \frac{n\frac{3R}{2} + n\frac{5R}{2}}{n+n} = 2R$

$C_p = nC_pdT$

$Q = n(p\lambda)$

$= n3R(2T - T)$

$Q = 3nRT$

**19.[2]** $T_1 = 2$ sec

$T_2 = 2\pi\sqrt{\frac{16}{g}}$

$= 4\left(2\pi\sqrt{\frac{1}{g}}\right) = 8$ sec

$t = \frac{T_1T_2}{T_2 - T_1} = \frac{(8)(2)}{8-2}$

$t = \frac{8}{3}$

Number of oscillation of shorter pendulum

$n = \frac{t}{T_1} = \frac{4}{3}$

**20.[1]** $K = \frac{\pi}{20} \Rightarrow \frac{2\pi}{\lambda} = \frac{\pi}{20}$

$\lambda = 40$ cm

Ans. $\Rightarrow \lambda/2 = 20$ cm

**21.[2]** $v = \sqrt{\frac{T}{\mu}} \Rightarrow v = \sqrt{\frac{1.6\times0.4}{10^{-2}}} = 8$ m/s

$\Delta t = \frac{2L}{v} \Rightarrow \Delta t = \frac{2\times0.4}{8} = 0.1$ sec.

**22.[4]** By theory.

**23.[2]** $W_{A\to B} = q\,(V_B - V_A)$

$= q \int_{B}^{A} E.dr$

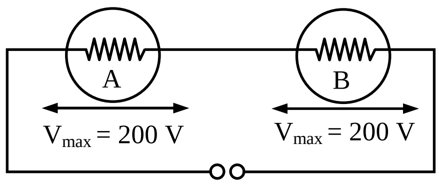
$= q_0 \int_{2a}^{3a} \frac{\lambda}{2\pi\varepsilon_0 r}.dr$

$= \frac{\lambda q_0}{2\pi\varepsilon_0} \ell n \frac{3}{2}$

**24.[4]** $(n \times 1\ \mu F)\ 500 = 10^6\ \mu C$

$n = \frac{10^6}{500} = 2000$

**25.[1]** $R_A = \frac{200 \times 200}{40} = 1000\Omega,\ R_B = \frac{200 \times 200}{100} = 400\Omega$




$V_1 = \frac{V \times R_1}{R_1 + R_2} = 200$

[considering that bulb A will not fuse]

$\frac{V \times 1000}{1400} = 200$

$V = \frac{200 \times 1400}{1000} = 280$ V

$V_2 = \frac{V \times R_2}{R_1 + R_2} = 200$

$V = \frac{200 \times 1400}{400} = 700$ V

If 700 volt is applied Bulb A will fuse.
Hence correct answer is 280 volt

**26.[2]** By symmetry $R_{AB} = \frac{3R}{2}$.

**27.[1]** $\frac{3R}{R} = \frac{\ell}{100 - \ell} \Rightarrow 300 - 3\ell = \ell$

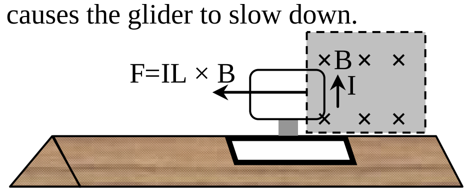
$\Rightarrow \ell = 75$ cm

**28.[3]** There will be no force on the loop due to horizontal current carrying wires because forces acting on these wires will be equal and opposite. Further, $F_{AD} > F_{BC}$. $F_{AD}$ is directed towards left hand side and $F_{BC}$ towards right hand side (according right hand rule). Therefore, the net force acting on the loop will be towards wire.

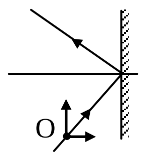
**29.[4]** $\varepsilon = VB\ell$

$= 4 \times 1.25 \times 10^{-4} \times 2 = 10^{-3}$V

**30.[2]** The correct answer is b. A counterclockwise current will be induced in the wire as the front edge enters the coil. This can be deduced by applying the Right Hand Rule to the free charges in the length of wire as they travel trough the magnetic field, or by using Faraday's Law to examine the increasing magnetic flux through the area of the loop as it enters the magnetic field. This current-carrying wire, exposed to the external magnetic field B, experiences a magnetic force $F_B$ in a direction opposite v, again determined using the Right Hand Rule and it is this magnetic force that causes the glider to slow down.




**31.[3]**

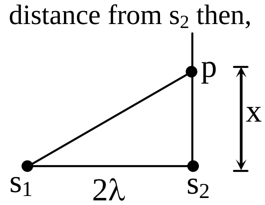



$\vec{v}_O = \frac{5}{\sqrt{2}}\hat{i} + \frac{5}{\sqrt{2}}\hat{j}$

$\vec{v}_I = -\frac{5}{\sqrt{2}}\hat{i} + \frac{5}{\sqrt{2}}\hat{j}$

$\vec{v}_{I/O} = -\frac{10}{\sqrt{2}}\hat{i}\ ;\ |\vec{v}_{I/O}| = 5\sqrt{2}$ m/s

**32.[1]** Path difference at $s_2$ is is $2\lambda$. Therefore, for minimum intensity at P, let x be the minimum distance from $s_2$ then,




$s_1P - s_2P = \frac{3\lambda}{2} \neq \frac{\lambda}{2}$

or $\sqrt{4\lambda^2 + x^2} - x = \frac{3\lambda}{2}$

Solving Eq. (1), we get $x = \frac{7\lambda}{12}$

Note that if we substitute $s_1P - s_2P = \lambda/2$ in Eq. (1), we get

$x = \frac{15\lambda}{4}$ which is greater than $\frac{7\lambda}{12}$.

**34.[1]** M.P. = $m_0 \times m_e$

$32 = m_0 \times 4$

$\therefore m_0 = 8$

**35.[1]** $I_{min} \propto (a - a)^2$

$I_{min} \propto (2a - a)^2$

Clearly, the intensity of minima increases. Again

$I_{max} \propto (a + a)^2$

$I_{max} \propto (2a + a)^2$

Clearly, the intensity of maxima increases

**36.[3]** $p' = 1.25\, p$ & $\lambda = \dfrac{h}{p}$

$$\frac{\lambda' - \lambda}{\lambda} \times 100 = \left(\frac{\lambda'}{\lambda} - 1\right) \times 100$$

$$= \left(\frac{p}{p'} - 1\right) \times 100$$

$$= \left(\frac{1}{1.25} - 1\right) \times 100$$

$$= -20\ \%$$

**37.[3]** use, $\lambda = \dfrac{h}{\sqrt{2mqV_0}}$

**38.[4]** F = 2hp

**39.[2]** $F = -\dfrac{dU}{dr} = -m\omega^2 r$

$m\omega^2 r = \dfrac{mv^2}{r}$

Also, $v = \omega r$ $\quad mvr = \dfrac{nh}{2\pi}$

$r = \sqrt{\dfrac{nh}{2\pi m\omega}}$

**40.[3]** $A = \dfrac{A_0}{2^{\frac{t}{T_{1/2}}}}$

$2000 = \dfrac{16000}{2^{12/T_{1/2}}}$

**41.[2]** $\alpha = 0.9$

$\dfrac{\Delta I_C}{\Delta I_E} = 0.9$

**42.[3]** $\overline{A} + \overline{B} = 4$

**43.[1]** Virtual, Inverted

**44.[1]** $g_d = g\left(1 - \dfrac{d}{R}\right) = g\left(1 - \dfrac{R}{2R}\right) = \dfrac{g}{2}$

**45.[1]** $\dfrac{MR^2}{4} + \dfrac{ML^2}{12}$

## CHEMISTRY

**46.[3]** atom of X = $3 \times 10^{23}$

Mole atom of X = 0.5

Atomic wt. of X = $\dfrac{80}{0.5} = 160$

**47.[3]** Number of electrons

$= 2 \times 10^{-3} \times 6.02 \times 10^{23} \times 10$

$= 1.2 \times 10^{22}$

**48.[2]** $T = 1.52 \times 10^{-16}\, \dfrac{n^3}{Z^2}$ sec.

$\dfrac{T_1}{T_2} = \dfrac{(2)^3}{(1)^2} \times \dfrac{(2)^2}{(3)^3} = \dfrac{32}{27}$

**49.[2]** $M_{av.} = \dfrac{M_1x_1 + M_2X_2 + M_3x_3}{x_1 + x_2 + x_3}$

According to option (2)

$(M + 0.5) = \dfrac{M \times 4 + (M+1) \times 1 + (M+2) \times 1}{4+1+1}$

then L.H.S. = R.H.S

**50.[1]** $\Delta E \propto \dfrac{1}{n_1^2} - \dfrac{1}{n_2^2}$

**51.[1]** Boiling moles the bond strianed

**52.[2]** $w = -2.303\, nRT \log \dfrac{V_2}{V_1}$

**53.[4]** $\frac{1}{2} N_2(g) + O_2(g) \rightleftharpoons NO_2(g)$ ... (1)

$2NO_2(g) \rightleftharpoons N_2O_4(g)$ ... (2)

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$\frac{1}{2} N_2(g) + O_2(g) \rightleftharpoons N_2O(g)$ ... (3)

i.e. (3) = (1) × 2 + (2)

$K_3 = K_1^2 K_2$

$K_3' = \dfrac{1}{K_3}$

**54.[4]** $K_{sp} = (S^2) + 10^{-4}S$

$S = \dfrac{K_{sp}}{10^{-4}} = \dfrac{10^{-16}}{10^{-4}} = 10^{-12}$

**55.[1]** After mixing

$[Ag^+] = \frac{1}{2} \times 10^{-4} = 5 \times 10^{-5}$ M

$[Cl^-] = \frac{1}{2} \times 10^{-4} = 5 \times 10^{-5}$ M

$K_{ip} = [Ag^+][Cl^-] = (5 \times 10^{-5})^2$

$= 2.5 \times 10^{-9}$

Since ionic product is greater than Ksp hence precipitation will take place.

**57.[3]** FCC lattice have six face and each face is shared by one other unit cell.

**58.[2]** ($\pi \propto$ No. of particel)

**59.[1]** $y_A = \frac{P_A^0 X_A}{P_A^0 X_A + P_B^0 X_B}$

$y_A = \frac{1}{1+\frac{P_B^0 X_B}{P_A^0 X_A}}$

$y_A = \frac{1}{1+(3)(3)} = \frac{1}{10} = 0.1$

**60.[2]** Fact

$\lambda_M\, NaNO_3 = \lambda_M\, KNO_3 - \lambda_M\, KCl$

$= 128 + 111 - 152 = 87$ S $cm^2\ mol^{-1}$

**61.[4]** $E_{cell} = E^o_{Cell} - \frac{0.0591}{6} \log \frac{(Cr^{+3})^2}{(Fe^{+2})^3}$

$= (-0.42-(-0.72)) - \frac{0.0591}{6} \log \frac{(0.1)^2}{(0.01)^3}$

$= 0.30 - \frac{0.0591}{6} \log 10^{+4}$

$= 0.30 - 0.04$

$= 0.26$ V

**62.[2]** $\frac{R_A}{4} = \frac{R_B}{1} = \frac{R_C}{2} = \frac{R_D}{2}$

**63.[3]** $K = \frac{R}{[A]} = \frac{7.5\times10^{-4}}{0.5}$

$= 1.5 \times 10^{-3}\ sec^{-1}$

**67.[3]** $\beta$-keto acid.

**68.[1]** Include stereo isomers.

**69.[4]** It has localised *l*.p.

**72.[1]** Intramolecular Cannizzaro.

**74.[1]** Nucleophilicity $\propto K_b$.

**76.[1]** $Ph–NO_2 \rightarrow Ph–NH_2 \rightarrow Ph–N\equiv C \rightarrow Ph–NH–CH_3$

**79.[2]** Intramolecular E.S.R.

## BIOLOGY

**91.[3]** NCERT-XI, page No. 47

**92.[4]** NCERT-XI, page No. 49

**93.[3]** NCERT-XI, page No. 50

**94.[1]** NCERT-XI, page No. 56-57

**95.[4]** NCERT-XI, page No. 50

**96.[2]** NCERT-XI, page No. 51

**97.[4]** NCERT-XI, page No. 57

**98.[1]** NCERT-XI, page No. 59

**100.[1]** No. of bp = $\frac{\text{length of DNA (Å)}}{3.4\text{Å}}$

**101.[2]** Base ratio is constant for a species.

**132.[3]** Cat – Felidae
Dog – Canidae

**133.[4]** All were included in Plantae.
[NCERT, Class XI, Page no.16]

**134.[4]** Floridean starch is branched carbohydrate similar to amylopectin and glycogen.

**135.[4]** Orange rot is caused by Alternaria.

**139.[2]** A– *Selaginella*, B– *Equisetum*, C– Fern,
D– *Salvinia*

**140.[2]** Lignified cell wall is not present in meristematic tissue.

**142.[4]** Heart wood

**143.[1]** Still root

**146.[4]** NCERT XI page no. 96

**148.[4]** NCERT-XI, Page No. 132, 8.5.1

**150.[4]** Mitosis can not occur without DNA replication.

**151.[3]** Meiosis always occurs in diploid cell.

**152.[4]** Cell wall consists of lignin, hemicellulose, pectin and cellulose.

**154.[2]** NCERT-XI, Page No. 166, 10.2.4

**155.[2]** NCERT-XI, Page No. 133, 8.5.3

**157.[2]** Both show saturation effect.

**158.[3]** Nucleolus disappear, astral ray formation,