NARAYANA
IIT-JEE/NEET/FOUNDATION
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46 YEARS OF EXCELLENCE

# SAMPLE PAPER - 3

## NEET (UG) | 2025

Duration : 3 Hrs. | Maximum Marks : 720

## ANSWER KEY

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

# SOLUTION

## PART – I : PHYSICS

**1.** **1**

**Sol.** Moment of inertia of a cylinder about axis passing through its centre and parallel to its length $=\frac{MR^2}{2}$.

Moment of inertia about its centre and perpendicular to its length

$$=M\left(\frac{L^2}{12}+\frac{R^2}{4}\right)$$

Equating both values, we get

$$\frac{MR^2}{2}=\frac{ML^2}{12}+\frac{MR^2}{4}$$

$$\Rightarrow \frac{1}{4}R^2=\frac{1}{12}L^2$$

$$\Rightarrow \sqrt{3}R=L \text{ Or } L=\sqrt{3}R$$

**2.** **3**

**Sol.** If $I_0$ is the intensity after closing one slit, then it satisfies

$I_0 \propto a^2 \Rightarrow I_0=ka^2$ (where, a = amplitude of light wave)

When both slits open, then intensity

$$\therefore I \propto (2a)^2 \propto 4a^2 \Rightarrow I_0=4ka^2$$

$$\therefore I_0=I/4$$

**3.** **3**

**Sol.** Angular momentum, $L=\frac{nh}{2\pi}=\frac{3\times 6.6\times 10^{-34}}{2\times 3.14}$

$$=3.15\times 10^{-34}\ J-s$$

**4.** **4**

**Sol.** As, $I_f=\frac{\Delta V}{R}=\frac{5-(-3)}{800}=10^{-2}\ A=10\,mA$

**5.** **1**

**Sol.** Horizontal range, $R=\frac{u^2\sin 2\theta}{g}$ where u is the velocity of projection and θ is the angle of projection.

Maximum height, $H=\frac{u^2\sin^2\theta}{2g}$

According to question R = H

$$\frac{u^2\sin 2\theta}{g}=\frac{u^2\sin^2\theta}{2g}$$

$$\therefore \tan\theta=4$$

$$\Rightarrow \theta=\tan^{-1}(4)$$

**6.** **1**

**7.** **2**

**8.** **1**

**9.** **4**

**10.** **1**

**Sol.** Energy stored per unit volume

$$=\frac{1}{2}Y(\text{ strain })^2=\frac{1}{2}Y\left(\frac{\Delta L}{L}\right)^2$$

Given, elongation strain = 2%

$$\Rightarrow Y=\frac{1}{2}\times 5\times 10^{10}\times\left(\frac{2L}{100L}\right)^2$$

$$=10^7\ Jm^{-3}$$

**11.** **1**

**Sol.** Given E = 13.2 keV

$$\lambda(\text{in Å})=\frac{hc}{E(eV)}$$

$$=\frac{12400}{13.2\times 10^3}=0.939Å\approx 1Å$$

X-rays covers wavelengths ranging from about $10^{-8}$ m (10 nm) to $10^{-13}$ m ($10^{-4}$ nm).

An electromagnetic radiation of energy 13.2 keV belongs to X-ray region of electromagnetic spectrum

**12.** **4**

**Sol.** Fall in temperature of brass sphere, $\Delta T=500-0=500^{\circ}C$

Heat loss by sphere, $Q=ms\Delta T=5\times 500\times 500$ = 1250 kJ

Heat for melting $m_2$ kg of ice, $Q_2 = m_2L = m_2 \times 336$

From principle of calorimetry, $1250 = m_2 \times 336$

$$m_2 = \frac{1250}{336} kg = 3.72 kg$$

**13. 4**

**Sol.** Heat produced in the resistor = Energy of capacitor

$$= \frac{1}{2}CV^2$$

$$= \frac{1}{2} \times 6 \times 10^{-6} \times 360 \times 360 = 0.39 \text{ J}$$

**14. 4**

**15. 3**

**Sol.** We know the relation of gravity, $g = \frac{GM}{R^2}$

$$M = \frac{gR^2}{G}$$

Volume of the earth, $V = \frac{4}{3}\pi R^3$

Let, mean density of earth is d.

$\Rightarrow M = d \times V$

Solving Eqs. (i) and (ii), we get

$$\Rightarrow d = \frac{3g}{4\pi RG}$$

**16. 2**

**Sol.** Let a be the acceleration of each block, then

$T_3 = (m_1 + m_2 + m_3)\, a$ ...(i)

and $T_2 = (m_1 + m_2)\, a$ ...(ii)

From Eqs. (i) and (ii), we get

$$T_2 = \left(\frac{m_1 + m_2}{m_1 + m_2 + m_3}\right) \times T_3$$

$$= \left(\frac{10+6}{10+6+4}\right) \times 40 = 32\, N$$

**17. 1**

**Sol.** Induced emf is given by

$$E_{ind} = \frac{\Delta\phi}{\Delta t}$$

$$I = \frac{E}{R}$$

$$I = \frac{\Delta\phi}{R\Delta t}$$

Current, $I = \frac{Q}{\Delta t} \Rightarrow Q = \frac{\Delta\phi}{R}$

**18. 2**

**Sol.** Given, i = 2 + 4t

$$\Rightarrow \frac{dq}{dt} = 2 + 4t \Rightarrow dq = (2 + 4t)\, dt$$

$$\int dq = \int_2^4 (2+4t)dt = \left[2t + 2t^2\right]_2^4$$

$$= \left(2\times 4 + 2\times 4^2\right) - \left(2\times 2 + 2\times 2^2\right)$$

= 40 – 12 = 28 C

**19. 3**

**Sol.** We know that,

$$E = \frac{\Delta V}{l} = \frac{100}{I} = 100 Vm^{-1}$$

$$\therefore n = 8.5 \times 10^{28}\, m^{-3}$$

$$\therefore v_d = \frac{I}{neA} = \frac{J}{en} = \frac{\sigma E}{en} \qquad \left[\begin{array}{l} \because J = \sigma E \\ \text{and } J = \dfrac{I}{A} \end{array}\right]$$

$$= \frac{5.81 \times 10^7 \times 100}{1.6 \times 10^{-19} \times 8.5 \times 10^{28}}$$

$$\simeq 0.43 ms^{-1}$$

**20. 3**

**Sol.** Speed of walking $= \frac{h}{t_1} = v_1$

Speed of escalator $= \frac{h}{t_2} = v_2$

Time taken when she walks over running escalator,

$$\Rightarrow t = \frac{h}{v_1 + v_2}$$

$$\Rightarrow \frac{1}{t} = \frac{v_1}{h} + \frac{v_2}{h} = \frac{1}{t_1} + \frac{1}{t_2}$$

$$\Rightarrow t = \frac{t_1 t_2}{t_1 + t_2}$$

**21. 4**

**Sol.** Using equation of motion,

$$s = ut + \frac{1}{2}gt^2$$

$$h = 0 + \frac{1}{2}gT^2$$

$\Rightarrow 2h = gT^2$ ...(i)

After (T / 3) s,

$$s = 0 + \frac{1}{2} \times g(T/3)^2 = \frac{gT^2}{18}$$

$18s = gT^2$ ...(ii)

From Eqs. (i) and (ii), we get

$18s = 2h$

$s = \left(\frac{h}{9}\right)$m from top

Height from ground $= h - h/9 = \left(\frac{8h}{9}\right)$m

**22.** **2**

**23.** **2**

**24.** **4**

**Sol.** We know that, velocity of EM wave is equal to $\frac{1}{\sqrt{\mu_0\varepsilon_0}}$

i.e., $c = \frac{1}{\sqrt{\mu_0\varepsilon_0}} \Rightarrow c^2 = \frac{1}{\mu_0\varepsilon_0}$

$\Rightarrow \mu_0\varepsilon_0 = \frac{1}{c^2}$

$\Rightarrow [\mu_0\varepsilon_0] = \frac{1}{[c^2]} = \frac{1}{[LT^{-1}]^2} = [L^{-2}T^2]$

**25.** **3**

**26.** **4**

**27.** **4**

**Sol.** $a = \frac{F}{M} = \frac{12}{8+4} = 1 m/s^2$

$\Rightarrow 12 - N_{AB} = 4(1)$

$\Rightarrow N_{AB} = 8N$

**28.** **2**

**Sol.** Given, $E = E_0 \sin(kx - \omega t)$ and $B = B_0 \sin(kx - \omega t)$

Relation between $E_0$ and $B_0$ is

$E_0 = cB_0$

Velocity of light $(c) = v\lambda = \frac{\omega}{2\pi}\lambda = \frac{\omega}{k}$

(where $k = \frac{2x}{\lambda}$)

Substituting this value of c in Eq. (i), we get

$E_0 = \frac{\omega}{k}B_0$ or $E_0 k = B_0\omega$

**29.** **2**

**30.** **2**

**Sol.** Mass defect is given by

$\Delta m = Zm_p + Nm_n - m(A, Z)$

where, m(A, Z) is the mass of the atom of mass number A and atomic number Z. Hence, the binding energy of nucleus is

$BE = [Zm_p + Nm_n - m(A, Z)]c^2$

$BE = [Zm_p + (A - Z)m_n - m(A, Z)]c^2$

**31.** **2**

**Sol.** Given, magnetic moment, $M = 0.5\ JT^{-1}$

Magnetic field, B = 0.4 T

Now, potential energy, $U = -\mathbf{M}\cdot\mathbf{B} = -MB\cos\theta$

For stable equilibrium, $\theta = 0°$

$\therefore U = -MB = -(0.5) \times (0.4) = -0.2\,J$

**32.** **1**

**Sol.** From the law of Malus, $I = I_0 \cos^2 30° = \frac{3}{4}I_0$

$\therefore$ Percentage of incident light transmitted

$= \frac{I}{I_0} \times 100 = \frac{3}{4} \times 100 = 75\%$

**33.** **1**

**34.** **2**

**Sol.** Velocities of the stones at some instant t can be given as

$\mathbf{v}_1 = u_1\cos\theta_1\hat{\mathbf{i}} + (u_1\sin\theta_1 - gt)\hat{\mathbf{j}}$

and $\mathbf{v}_2 = u_2\cos\theta_2\hat{\mathbf{i}} + (u_2\sin\theta_2 - gt)\hat{\mathbf{j}}$

$\Rightarrow$ Relative velocity,

$\mathbf{v}_1 - \mathbf{v}_2 = (u_1\cos\theta_1 - u_2\cos\theta_2)\hat{\mathbf{i}}$

$+ (u_1\sin\theta_1 - u_2\sin\theta_2)\hat{\mathbf{j}}$ = constant

Since, their relative velocity is constant.

So, the trajectory of path followed by one as seen by other will be straight line, making a constant angle with horizontal.

**35.** **1**

**Sol.** Weight of body in air = 30 N

Weight of body in water = 26 N

Loss in weigh of body = 30 – 26 = 4 N

Relative density

$= \frac{\text{Weight of body in air}}{\text{Loss in weight of body}} = \frac{30}{4} = 7.5$

**36.** **2**

**Sol.** Here displacement is only along z -axis Hence, $\vec{s}=5\hat{k}$ and $\vec{F}=(2\hat{i}+3\hat{j}+4\hat{k})$

$\therefore$ Work done by force $W=\vec{F}\cdot\vec{s}$

$=(2\hat{i}+3\hat{j}+4\hat{k})\cdot 5\hat{k}=20\,J$

**37.** **1**

**Sol.** The maximum acceleration for SHM is given by

$a_{max}=\omega^2 A=(2\pi v)^2 A=4\pi^2 v^2 A$

The block will remains in contact with the piston, if

$a_{max}\le g$ or $4\pi^2 v^2 A\le g$

$\therefore$ Maximum amplitude of piston will be

$$A_{max}=\frac{g}{4\pi^2 v^2}=\frac{9.8}{4\pi^2(0.5)^2}=0.99\text{ m}$$

**38.** **1**

**Sol.** Given, frequency of third harmonic = 100 Hz Fundamental frequency of the open pipe

$$\therefore \frac{3v}{4l}=100+\frac{v}{2l}$$

$$\therefore \frac{v}{4l}=100$$

Fundamental frequency of the open pipe,

$$f=\frac{v}{2l}=200\,\text{Hz}$$

**39.** **1**

**Sol.** Given, $A=60^\circ, \delta_m=30^\circ$

According to prism formula, $\mu=\dfrac{\sin\left(\dfrac{A+\delta_m}{2}\right)}{\sin\left(\dfrac{A}{2}\right)}$

$$\mu=\frac{\sin\left(\dfrac{60^\circ+30^\circ}{2}\right)}{\sin\dfrac{60^\circ}{2}}=\frac{\sin 45^\circ}{\sin 30^\circ}$$

or $\mu=\sqrt{2}$

$$\therefore \mu=\frac{\text{Speed of light in air (c)}}{\text{Speed of light in prism (v)}}$$

$$v=\frac{c}{\mu}=\frac{3\times10^8}{\sqrt{2}}=\frac{3}{\sqrt{2}}\times10^8\text{ m/s}$$

**40.** **3**

**Sol.** The nuclear reaction is $2\,{}_1H^2 \rightarrow {}_2He^4$

As we know that, Energy released = Binding energy of products – Binding energy of reactants and total binding energy = number of nucleons × binding energy per nucleon

$\therefore$ Energy released = 4 × 7 – 2 × 2 × 1.1

= 28 – 4.4 = 23.6 MeV

**41.** **4**

**Sol.** Given, square wire of side = 2 cm, u = –20 cm, f = –10 cm

$$\therefore \frac{1}{v}+\frac{1}{u}=\frac{1}{f}$$

$$\Rightarrow \frac{1}{v}+\frac{1}{(-20)}=\frac{1}{-10}$$

$$\Rightarrow \frac{1}{v}=-\frac{1}{10}+\frac{1}{20}$$

$$\Rightarrow v=-20\text{cm}$$

We know that, $m=-\dfrac{v}{u}=\dfrac{-(-20)}{-20}=-1$

$$\because \frac{\text{Area of image}}{\text{Area of object}}=m^2$$

$$\Rightarrow \frac{A_i}{A_o}=(-1)^2$$

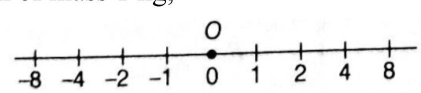
$$A_0=a^2=2\times2=4\text{cm}^2$$

$$\frac{A_i}{4}=1$$

$$A_i=4\text{cm}^2$$

**42.** **4**

**Sol.** Total gravitational potential at point $O$ due to each of mass 1 kg,




$$V=2\left[-\frac{G\times1}{1}-\frac{G\times1}{2}-\frac{G\times1}{4}-\frac{G\times1}{8}\ldots\right]$$

$$=-2G\left[1+\frac{1}{2}+\frac{1}{2^2}+\frac{1}{2^3}+\ldots.\right]$$

$$=-2G\left[\frac{1}{\left(1-\dfrac{1}{2}\right)}\right]=-4G$$

Magnitude of V = 4G

**43.** **2**

**44.** **1**

**Sol.** We know that, $P = I^2 R$

$\Rightarrow 4.4 = \left(2\times10^{-3}\right)^2 R$

$\Rightarrow 4.4 = 4\times10^{-6} R$

$\Rightarrow R = 1.1\times10^{6}\Omega$

$\therefore P' = \dfrac{V^2}{R}$

$P' = \dfrac{11^2}{R} = \dfrac{11^2}{11}\times10^{-6}$

$= 11 \times 10^{-5}$ W

**45.** **3**

**Sol.** Given, relative error in mass, $\dfrac{\Delta m}{m}\times100 = 6\%$

Percentage error in diameter, $\dfrac{\Delta d}{d}\times100 = 1.5\%$

Density of sphere, $\rho = \dfrac{\text{Mass}}{\text{Volume}}$

$= \dfrac{m}{\frac{4}{3}\pi r^3} = \dfrac{m}{\frac{4}{3}\pi\left(\frac{d}{2}\right)^3}$

$\Rightarrow \rho = \dfrac{6}{\pi} m d^{-3}$

$\Rightarrow \rho \propto m d^{-3}$

For maximum error in density,

$\dfrac{\Delta\rho}{\rho}\times100 = \left(\dfrac{\Delta m}{m} + 3\times\dfrac{\Delta d}{d}\right)\times100$

= 6% + 3 × 15% = 10.5%

$= \dfrac{1050}{100}\% = \dfrac{x}{100}\%$

$\therefore$ x = 1050

## PART – II : CHEMISTRY

**46.** **1**

**Sol.** Energy for ‘H’ depends only on value of ‘n’

**47.** **2**

**Sol.** Cr – $1s^2\ 2s^2\ 2p^6\ ss^2\ 3p^6\ 3d^5\ 4s^1$ $\ell = 1$ $\ell = 2$

**49.** **3**

**Sol.** I.E. $\alpha \dfrac{1}{\text{size}}$, I.E. a $Z_{eff}$, I.E. of elements depend on half and full filled orbital.

**52.** **3**

**Sol.** $\text{F}-\ddot{\underset{\cdot\cdot}{\text{X}}}\ddot{\text{e}}-\text{F}$

**55.** **1**

**Sol.** $m = \dfrac{\text{mole of solute}}{\text{mass of solvent in kg}}$

**56.** **3**

**Sol.** W= Area of PV curve

**57.** **3**

**Sol.** ΔG = ΔH + TΔS = Always positive

**59.** **2**

**Sol.** $XY_2 \rightleftharpoons XY + Y$

600–x x x

600 + x = 800, x = 200

Now $K_p = \dfrac{(p_{xy})(P_y)}{(P_{xy_2})}$

**68.** **2**

**Sol.** Reactivity of alkene for E.A.R. α stability of $C^+$ intermediate

**73.** **3**

**Sol.** $P = K_H X_{gas}$ If $k_H \uparrow$ then solubility $\downarrow$

**75.** **3**

**Sol.** ∵ has one chiral ‘C’ and one G.I. centre.

**76.** **4**

**Sol.** $\because \text{rate} \propto \dfrac{1}{E_a}$

**77.** **4**

**Sol.** Reactivity α stability of $C^+$

**85.** **2**

**Sol.** $\text{P}-\overset{\overset{\text{O}}{\|}}{\text{C}}-\text{CH}_2^-$ extra stable carbanion