05/04/2026
Evening

Corporate Office : AESL, 3rd Floor, Incuspaze Campus-2, Plot-13, Sector-18, Udyog Vihar, Gurugram, Haryana-122015

Memory Based
Answers & Solutions

Time : 3 hrs. *for* M.M. : 300

JEE (Main)-2026 (Online) Phase-2

(Physics, Chemistry and Mathematics)

PHYSICS

SECTION - A

Multiple Choice Questions: This section contains 20 multiple choice questions. Each question has 4 choices (1), (2), (3) and (4), out of which **ONLY ONE** is correct.

Choose the correct answer:

1. Find dimensions of $\sqrt{\frac{Gh}{c^5}}$

(1) ML^2T^{-1} (2) $M^0L^0T^1$

(3) $M0LT^{-1}$ (4) $M^0L^0T^{-1}$

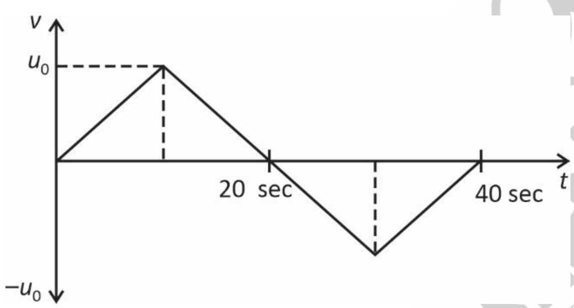
Answer (2)

Sol. $\sqrt{\frac{Gh}{c^5}}$

$\Rightarrow M^0L^{-1}L^1T^1$

$M^0L^0T^1$

2. Velocity v/s time graph of a particle is as shown in the figure below:



Find magnitude of acceleration of the particle at t = 105 sec.

(1) $\frac{u_0}{10}$ (2) $\frac{u_0}{20}$

(3) $\frac{u_0}{5}$ (4) $\frac{u_0}{4}$

Answer (1)

Sol. $|\vec{a}| = \left(\frac{u_0}{10}\right)$

3. 8 Hg drops coalesce to form a new drop. Ratio of final surface energy of single drop to total surface energy of 8 drops is

(1) $\frac{1}{4}$ (2) $\frac{1}{8}$

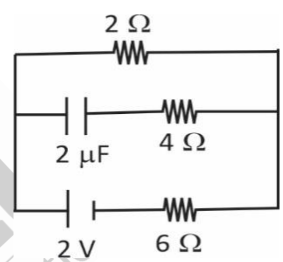
(3) $\frac{1}{2}$ (4) 1

Answer (3)

Sol. $8\frac{4}{3}\pi r^3 = \frac{4}{3}\pi R^3, \quad R = 2r$

Ratio = $\frac{S \times 4\pi(R)^2}{8 \times S \times 4\pi(r)^2} = \frac{1}{8} \times 4 = \frac{1}{2}$

4. In circuit below, find voltage across capacitor in steady state



(1) 1 V (2) 0.5 V

(3) $\frac{3}{2}$ V (4) 4 V

Answer (2)

Sol. $V_C = \frac{2 \times 2}{8} = 0.5$ V

5. A particle of mass m moves from height 2R above earth surface to surface of earth. Find change in P.E. (R is radius of earth)

(1) $\frac{-2}{3}\frac{GMm}{R}$ (2) $\frac{-GMm}{3R}$

(3) $\frac{-GMm}{R}$ (4) $\frac{GMm}{4R}$

Answer (1)

Sol. $\Delta U = \frac{-GMm}{R} + \frac{GMm}{3R}$

$\Rightarrow \frac{-2GMm}{3R}$

6. Magnetic field $B = (2t^2 + 2t + 4)$ T is passing perpendicularly through a coil of radius r = 20 cm. Resistance of the coil is $R = 10\ \Omega$. Find current through the coil at $t = 3$ sec.

(1) $I = 8\pi \times 10^{-2}$ A (2) $I = 3.2\pi \times 10^{-2}$ A

(3) $I = 7.2\pi \times 10^{-2}$ A (4) $I = 5.6\pi \times 10^{-2}$ A

Answer (4)

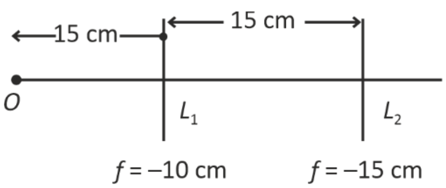
Sol. $\phi = \int B \cdot ds = (2t^2 + 2t + 4)\pi r^2$

$$\varepsilon = \left|\frac{d\phi}{dt}\right| = \pi r^2(4t + 2)$$

So $\varepsilon = \pi(14)(4 \times 10^{-2})$

So $I = \left(\frac{\varepsilon}{R}\right) = \frac{14\pi \times 4 \times 10^{-2}}{10}$

$\Rightarrow$ $I = 5.6\pi \times 10^{-2}$ A

7. 

Two concave lens are placed at separation of 15 cm, find final image of object O.

(1) $\frac{35}{2}$ cm from L_2 & virtual

(2) $\frac{17}{2}$ cm from L_1 & real

(3) $\frac{35}{4}$ cm from L_2 & virtual

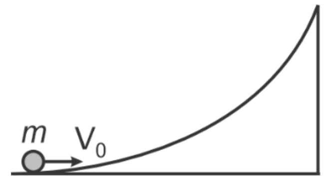
(4) $\frac{17}{2}$ cm from L_2 & real

Answer (3)

Sol. $v = \frac{uf}{u+f} = \frac{-15 \times -10}{-15 - 10} = \frac{-150}{25} = -6$

$$v = \frac{-21 \times -15}{-21 - 15} = \frac{15 \times 21}{36} = \frac{35}{4}$$

8. Which of the following objects given in options can reach maximum height in situation shown in figure below : (given that there is no slipping)



(1) Solid cylinder (2) Solid sphere

(3) Disc (4) Ring

Answer (4)

Sol. Ring because its KE is maximum for some mass & speed.

9. An ideal gas undergoes process whose equation is PT^3 = constant. What would be polytropic constant for this

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

(3) $\frac{2}{3}$ (4) 0.4

Answer (2)

Sol. PT^3 = constant

And PV = nRT

$\therefore$ $P(PV)^3$ = Constant

$\Rightarrow$ P^4V^3 = Constant

$\Rightarrow$ $PV^{3/4}$ = Constant

$\therefore$ $\frac{3}{4}$ will be answer

10. **Assertion (A):** EM wave exert pressure on surface on which it falls.

Reason (R): Rest mass of photons is zero.

(1) Both A & R are correct & R is correct explanation of A

(2) Both A & R are correct but R is not correct explanation of A

(3) A is correct but R is false

(4) A is false but R is correct

Answer (2)

Sol. Both are true but R is not correct explanation of A.

11. An electron is moving with sped $0.8c$ in a medium. de-Broglie wavelength of electron in medium is (c is speed of light)

(1) 1.54×10^{-15} m

(2) 3×10^{-12} m

(3) 2.34×10^{-27} m

(4) 3.5×10^{-15} m

Answer (2)

Sol. $\lambda = \dfrac{h}{mv}$

$$= \frac{20}{3} \times \frac{10^{-34}}{9.1 \times 10^{-31} \times 0.8 \times 3 \times 10^{8}}$$

$$= \frac{20}{7.2 \times 9.1} \times 10^{-11} = 0.3 \times 10^{-11}$$

12. If velocity of a particle is decreased by 20% then new de-Broglie wavelength is $\alpha\lambda_0$, where λ_0 is initial wavelength. Find the value of $\propto$.

(1) $\alpha = 1.50$

(2) $\alpha = 0.5$

(3) $\alpha = 1.25$

(4) $\alpha = 0.75$

Answer (3)

Sol. Initially $P_0 = mv_0$

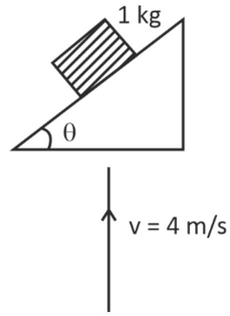
So $\lambda_0 = \dfrac{h}{mv_0}$

Now, $p = mv_0 \dfrac{8}{10}$

So, $\lambda = \dfrac{h \times 10}{mv_0 \times 8} = \dfrac{\lambda_0 \times 10}{8}$

$\Rightarrow \lambda = 1.25\,\lambda_0$

13. A block of mass 1 kg rests on an inclined plane. If whole system is moving with velocity 4 m/s (upward). Calculate the work done by friction in $t = 2$ sec.



(1) $\Delta w = 40 \sin 2\theta$

(2) $\Delta w = 80 \sin^2\theta$

(3) $\Delta w = 80 \sin^2\theta$

(4) $\Delta w = 40 \sin^2\theta$

Answer (2)

Sol. $f = mg\sin\theta$

And $Ar - V\in = 4 \times 2 = 8$ m

So $A = \vec{f} \cdot \vec{\Delta r}$

$\Rightarrow \Delta w = (mg \text{ sing}) \times \mathbf{8} \times \sin\theta$

$\Rightarrow \Delta w = 8 \text{ mg } \sin^2\theta = 80 \sin^2\theta$

14. A uniformly angular accelerated wheel rotates θ_1 in first 2 seconds and θ_2 in next 2 seconds. Initial angular speed is zero then $\dfrac{\theta_2}{\theta_1}$

(1) 4

(2) 3

(3) 5

(4) 6

Answer (2)

Sol. $\theta = \dfrac{1}{2}\alpha t^2$

$$\frac{\theta_2}{\theta_1} = \frac{4^2 - 2^2}{2^2 - 0^2} = \frac{16 - 4}{4} = 3$$

15. If a cell is connected to 20 Ω resistance then current is circuit is 0.25A. But if resistance of 2 Ω is connected across the cell then current is 2 A. Find internal resistance of the cell.

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

(3) 1 Ω (4) 2 Ω

Answer (1)

Sol. $E = \frac{1}{4}r + \frac{1}{4}\times 20$

$E = \frac{r}{4} + 5$

And $E = 2r + 2 \times 2$

$\Rightarrow E = 2r + 4$

$\therefore E = \frac{r}{4} + 5 = 2r + 4$

$\Rightarrow 1 = \frac{7r}{4}$

$\therefore r = \frac{4}{7}\Omega$

16. Consider ${}_6C^{12}$ Nuclei

Given m_p = 1.007276 amu; m_n = 1.008664 amu. Find binding energy for nucleon.

(in MeV/nucleon)

(1) 7.42 (2) 10.4

(3) 2.20 (4) 12.3

Answer (1)

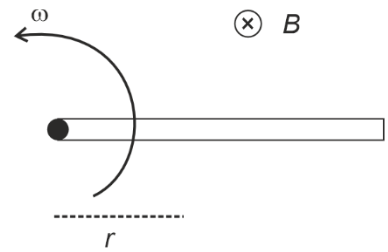
Sol. Δm = [(6 × 1.007276] + (6 × 1.008664) – 12] amu.

Δm = 0.09564 amu

BE = (0.09564 × 931.5) MeV = 89.08866 MeV

So $\frac{BE}{12}$ = 7.42 MeV/Nucleon

17. Spatial magnetic field is given as $B = B_0 e^{-\lambda r}$ where r is distance from hinged end of the rod of length ℓ. Emf induced across ends of rod for angular velocity of ω is



(1) $B_0\omega\left(\frac{1}{\lambda^2} - \frac{e^{-\lambda\ell}}{\lambda^2}\right)$

(2) $B_0\omega\left(\frac{e^{-\lambda\ell}}{\lambda^2} + \frac{\ell}{\lambda}e^{-\lambda\ell}\right)$

(3) $\in = B_0\omega\left\{\frac{1}{\lambda^2} - \frac{c^{-\lambda\ell}}{\lambda^2} - \frac{\ell}{\lambda}e^{-\lambda\ell}\right)$

(4) $B_0\omega\left(\frac{e^{-\lambda\ell}}{\lambda}\right)$

Answer (3)

Sol. $\int d\in = \int Bdlv = \int_0^\ell B_0 e^{-\lambda r} dr\, r\omega$

$= B_0\omega\left\{\frac{re^{-\lambda r}}{-\lambda}\right\}_0^\ell - \left\{\frac{e^{-\lambda r}}{\lambda^2}\right\}_0^\ell$

$= \left[B_0\omega\left\{\frac{\ell e^{-\lambda r}}{-\lambda}\right\} - \frac{1}{\lambda^2}\left\{e^{-\lambda r} - 1\right)\right]$

$\in = B_0\omega\left\{\frac{1}{\lambda^2} - \frac{c^{-\lambda\ell}}{\lambda^2} - \frac{\ell}{\lambda}e^{-\lambda\ell}\right)$

18. Two thin lense are placed in contact in air. Than combination behaves as – (if)

(A) $|f_{concave}| > |f_{convex}|$ then combination acts as concave

(B) $|f_{convex}| > |f_{concave}|$ then combination acts as concave lens

(C) $|f_{convex}| = |f_{concave}|$ then combination acts as concave lens

(D) $|f_{convex}| = |f_{concave}|$ then combination acts as convex lens

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

Answer (2)

Sol. $P = P_1 + P_2$

If power of convex lens is larger then total power will be +ve and effectively the combination will be have like convex lens.

So for it $|f_{\text{convax}}| > |f_{\text{concave}}|$

Or $|f_{\text{convax}}| < |f_{\text{concave}}|$

And vise-versa

19. A particle is projected with velocity $\frac{v_0}{\sqrt{2}}(\hat{i}+\hat{j})$ from origin. Electric field $\vec{E}$ and magnetic field $\vec{B}$ are present in space as $\vec{B} = B_0\hat{k}$ and $\vec{E} = E_0 e^{-\lambda x}\hat{i}$. Speed of particle at $x = L$ is (m and q are mass and charge of particle)

(1) v_0

(2) $\sqrt{2}v_0 + e^{-\lambda L}\frac{qE_0}{\lambda m}$

(3) $\sqrt{v_0^2 + \frac{2qE_0}{\lambda m}(1 - e^{-\lambda L})}$

(4) $\sqrt{v_0^2 + \frac{qE_0}{\lambda m}e^{-\lambda L}}$

Answer (3)

Sol. $\int_0^L qE_0 e^{-\lambda x}dx = \left.\frac{qE_0 e^{-\lambda x}}{(-\lambda)}\right|_0^L$

$$\frac{1}{2}mv^2 = \frac{1}{2}mv_0^2 + \omega = \frac{qE_0}{\lambda}(1 - e^{-\lambda L}) + \frac{1}{2}mv_0^2$$

20.

SECTION - B

Numerical Value Type Questions: This section contains 5 Numerical based questions. The answer to each question should be rounded-off to the nearest integer.

21. Escape velocity on earth is $v_e = \sqrt{2gR}$. A planet of half the radius of earth with density equal to that of earth, the escape speed shall be $\frac{v_e}{N}$ then N is

Answer (2)

Sol. $V_e = \sqrt{\frac{2G\rho\frac{4}{3}\pi R^3}{R^2}R} \propto \sqrt{\rho R^2}$

$$V_e^1 = \sqrt{\rho\left(\frac{R}{2}\right)^2} \quad \frac{Ve}{Ve'} = 2$$

22. A series RLC circuit is in resonance. It is given that $L = 1.6$ H and $C = 40$ μF. Then find value of inductive reactance (in SI unit)

Answer (200)

Sol. $\frac{1}{\sqrt{LC}}$

$$\Rightarrow \quad \frac{1}{\sqrt{1.6 \times 40 \times 10^{-6}}} = \frac{10^3}{8}$$

$$\therefore \quad X_L = \omega L = \frac{10^3}{8} \times 1.6 = 200\,\Omega$$

23.

24.

25.