08/04/2026
Evening

Aakash
Medical | IIT-JEE | Foundations

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Memory Based
Answers & Solutions

Time : 3 hrs. M.M. : 300

for

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:

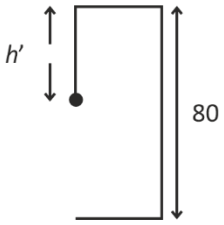
1. A balloon is moving with speed 10 m/s in upward direction. At height of 75 m a stone is released. Distance travelled by stone in air

(1) 70 m (2) 80 m

(3) 85 m (4) 90 m

Answer (3)

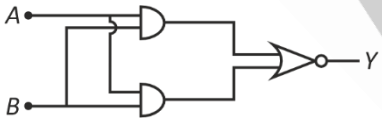
Sol.



$$h' = \frac{v^2}{2g} = \frac{10^2}{20} = 5 \text{ m}$$

$d = 5 + 5 + 75 = 85$

2. For the logic gate shown in the diagram find the output Y for the given input A and B



(1) $A \cdot \overline{B}$ (2) $\overline{A} + \overline{B}$

(3) $\overline{A+B}$ (4) $\overline{A+B}$

Answer (2)

Sol. $\overline{(AB)+(AB)} = Y$

$\Rightarrow \quad Y = \overline{AB} = \overline{A} + \overline{B}$

3. Two photons of wavelength λ_1 & λ_2 ($\lambda_1 = 2\lambda_2 = 2\lambda$) photoelectric effect on a metal surface emitting two photoelectrons of kinetic energies k_1 & k_2 respectively ($k_1 = 3k_2 = 3k$).

(1) $\frac{6hc}{\lambda}$ (2) $\frac{5ch}{2\lambda}$

(3) $\frac{hc}{2\lambda}$ (4) $\frac{4hc}{3\lambda}$

Answer (2)

Sol. $\frac{hc}{\lambda_1} = k_1 + \phi \Rightarrow \frac{hc}{2\lambda} = 3k + \phi$

$$\frac{hc}{\lambda} = k + \phi$$

$$\Rightarrow \quad k = \frac{hc}{\lambda} - \phi$$

$$\frac{hc}{2\lambda} = \frac{3hc}{\lambda} - 3\phi + \phi$$

$$\Rightarrow \quad 2\phi = \frac{3hc}{\lambda} - \frac{hc}{2\lambda}$$

$$\phi = \frac{5hc}{2\lambda}$$

4. A block attached to a spring has natural frequency f_1. If the spring is cut in two equal half and only one of the half spring is connected to the block then the frequency becomes f_2. Find $\frac{f_2}{f_1}$

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

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

Answer (3)

Sol. For $f_1 = \frac{1}{2\pi}\sqrt{\frac{k}{m}}$

For half spring key = $2k$

So $f_2 = \frac{1}{2\pi}\sqrt{\frac{2k}{m}}$

$\frac{f_2}{f_1} = \sqrt{2}$

5. Two projectiles projected from ground with same speed have same range. Find their time periods are 5 s and 10 s respectively range.

(1) 125 m (2) 250 m

(3) 100 m (4) 480 m

Answer (2)

Sol. $\frac{T_1}{T_2} = \frac{4\sin\theta}{4\cos\theta} = \tan\theta = \frac{1}{2}$

$\therefore \quad \sin\theta = \frac{1}{\sqrt{5}}$

$T_1 = 5$

$\frac{24}{10} \times \frac{1}{\sqrt{5}}$

$u = 25\sqrt{5}$ m/s

$\therefore \quad R = \frac{2u^2 \sin\theta\cos\theta}{g}$

$= \frac{2\times25\times25\times25}{10} \times \frac{1}{\sqrt{5}} \times \frac{2}{\sqrt{5}}$

= 250 m

6. A new unit (α) of length is chosen such that it is equal to the distance travelled by light in vacuum in 1 second. What is the distance d between Venus and Earth in terms of this new unit, if light takes 6 minutes 40 seconds to cover the distance?

(1) 500 unit (2) 300 unit

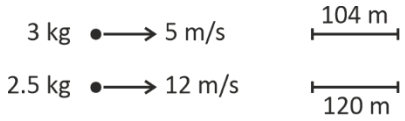
(3) $\frac{1}{200}$ unit (4) 400 unit

Answer (4)

Sol. $d_{(\text{in meter})} = c(360 + 40) = c \times 400$

$d_{(\text{in new unit})} = \frac{400 \times c}{c \times 1} = 400$

7. Two objects (1) & (2) travels 104 m & 120 m in 50th sec with their initial speed of 5 m/s & 12 m/s respectively.



Ratio of momentum of object (1) & (2) at t = 50 sec is nearly

(1) 2 (2) 4

(3) 1 (4) 3

Answer (3)

Sol. $104 = 5 + \frac{a}{2}(99) \quad , \quad a = 2$

$120 = 12 + \frac{a'}{2}(99) \quad , \quad a' = \frac{108\times2}{99}$

$\frac{m_1v_1}{m_2v_2} = \frac{3(5+2\times50)}{2.5\left(12+\frac{108\times2}{99}\times50\right)} \approx \frac{105\times3}{2.5(12+108)} = \frac{21}{20}$

8. Dipole moment of system, with q_1, q_2 at $\vec{r}_1$ and $\vec{r}_2$ as 3 μC, −9 μC and $\vec{r}_1 = 2\hat{i} + 3\hat{j} + 3\hat{k}$, $\vec{r}_2 = \hat{i} + \hat{j} + \hat{k}$ respectively is of magnitude _____.

(1) $5\sqrt{2}$ μCm (2) 10 μCm

(3) 3 μCm (4) 12 μCm

Answer (3)

Sol. $\vec{P} = \Sigma q_i \vec{r}_i$

$= (6-9)\hat{i} + (9-9)\hat{j} + (9-9)\hat{k}$

9. A solid cylinder has V_{cm} = 9 m/s & $\omega = \frac{V_{cm}}{4R}$ as shown. Find time after which it will start pure rolling C_g = 10 m/s²)

(1) 1 s (2) 0.9 s

(3) 2 s (4) 1.3 s

Answer (2)

Sol. $Li = Lg$ (about point of content)

$$\Rightarrow mV_{cm}R + \frac{mR^2}{2}\omega = mV_fR + \frac{mR^2}{2}\omega_f$$

$$\Rightarrow V_{cm}R + \frac{V_{cm}}{8} = \frac{3}{2}V_fR$$

$$\Rightarrow \frac{9}{8}V_{cm} = \frac{3}{2}V_f$$

$$\Rightarrow V_f = \frac{3V_{cm}}{4}$$

$a_{cm} = \mu g$

$$V_f = V_{cm} - \mu gt$$

$$\Rightarrow \mu gt = \frac{V_{cm}}{4}$$

$$t = \frac{V_{cm}}{4\mu g} = 0.9\text{ s}$$

10. Initial pressure & volume of monoatomic gas is P & V. It is expanded adiabatically to 27 times its initial volume. Find magnitude of change in internal energy.

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

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

Answer (3)

Sol. $PV^{5/3} = P_f(27V)^{5/3}$

$$P_f = \frac{P}{3^5}$$

$$\Delta U = nc_v\Delta T$$

$$\Rightarrow \Delta U = \frac{3}{2}(P_fV_f - P_iV_i)$$

$$\Rightarrow \Delta U = \frac{3}{2}\left(\frac{P}{3^5}27V - PV\right)$$

$$\Rightarrow \Delta U = \frac{3}{2}\left(\frac{PV}{9} - PV\right)$$

$$|\Delta U| = \frac{3}{2}\times\frac{8}{9}PV$$

$$= \frac{4}{3}PV$$

11. Magnetic field is represented in terms of μ_0, ε_0 and electric filed E as $\mu_0^x\varepsilon_0^yE^z$ then $(x + y + z)$ is

(1) 1.5 (2) 0.5

(3) 2 (4) 2.5

Answer (3)

Sol. $E = CB$

$$E = \frac{1}{\sqrt{\mu_0\varepsilon_0}}B$$

$$B = \sqrt{\mu_0\varepsilon_0}E$$

$$\Rightarrow \frac{1}{2} + \frac{1}{2} + 1 = 2$$

12. A solenoid is having 10 turns, length of 25 mm and of cross section area of 5 cm^2. The ament in solenoid changes from $2A$ to $4A$ in 3.14 s then average EMF include is

(1) 0.9 mV (2) 0.35 mV

(3) 0.16 μV (4) 0.8 μV

Answer (3)

Sol. $\frac{\Delta Q}{\Delta t} = \frac{A\Delta B}{\Delta t} = \frac{A\Delta(\mu_0 n_i)}{\Delta t} = \frac{4\pi\times10^{-7}}{\pi}\times\frac{10}{25\times10^{-3}}\times2\times5\times10^{-4}$

$$= \frac{400}{25}\times10^{-7-4+3}$$

$= 16 \times 10^{-8}$ V

13. A car is moving with speed of 54 km/h takes a turn of radius 20 m. Angle made by bob from car ceiling with vertical is

(1) $\tan^{-1}(0.045)$ (2) $\tan^{-1}(0.05)$

(3) $\tan^{-1}(0.09)$ (4) $\tan^{-1}(0.6)$

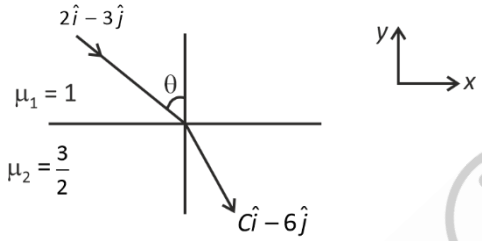
Answer (1)

Sol. $\tan\theta = \frac{v^2}{rg}$

$\tan\theta = \frac{g}{20\times 10}$

$\theta = \tan^{-1}(0.045)$

14. The direction (vector) of incident and refracted light are shown in the diagram. Find the value of *C*.



(1) $\frac{24}{\sqrt{101}}$ (2) $\frac{24}{7}$

(3) 3 (4) $\frac{25}{\sqrt{101}}$

Answer (1)

Sol. $\mu_1\sin\theta_1 = \mu_2\sin\theta_2$

$1\times\frac{2}{\sqrt{13}} = \frac{3}{2}\sin\theta_2$

$\Rightarrow (\sin\theta_2)^2 = \frac{16}{9\times 13} = \frac{C^2}{C^2+36}$

$\Rightarrow 16C^2 + 576 = 117C^2$

$\Rightarrow 101C^2 = 576$

$\Rightarrow C = \frac{24}{\sqrt{101}}$ (+ve)

15.

16.

17.

18.

19.

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. A drop is falling with terminal velocity v_1 in a gas. The drop splits into 64 identical droplets. If one small droplet falls with terminal velocity v_2, find the ratio $\frac{v_1}{v_2}$.

Answer (16)

Sol. $6\pi\eta R v_1 = mg - F_B$

$6\pi\eta r v_2 = \frac{mg}{64} - \frac{F_B}{64}$

$\Rightarrow mg - F_B = 6\pi\eta R v_1 = 64(6\pi\eta r v_2)$ ...(1)

Also $\frac{4}{3}\pi R^3 = 64\times\frac{4}{3}\pi r^3$

$\Rightarrow R = 4r$

So, $4rv_1 = 64\cdot rv_2$

$\Rightarrow v_1 = 16v_2$

So, $\frac{v_1}{v_2} = 16$

22.

23.

24.

25.