02/04/2026
Morning

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. The dimensions of $\frac{1}{2}\in_0 E^2$ is

(1) MLT^{-2} (2) $ML^{-1}T^{-2}$

(3) MLT^{-1} (4) $ML^{-1}T^{-1}$

Answer (2)

Sol. $\frac{1}{2}\in_0 E^2$ is energy density

So $\frac{ML^2T^{-2}}{L^3}=ML^{-1}T^{-2}$

2. A wooden cubic block of relative density 0.4 is floating in water. Side of cubic block is 10 cm. When a coin is placed on the block the block dips 0.3 cm in equilibrium. Weight of coin is

(1) 0.2 N (2) 30 N

(3) 0.3 N (4) 3 N

Answer (3)

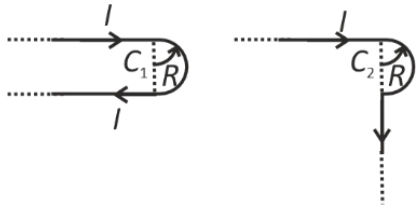
Sol. Weight of coin = additional buoyant force

$= \rho l a^2 \Delta x g$

$= 10^3 \times 10^{-2} \times 0.3 \times 10^{-2} \times 10$

$W = 0.3$ N

3. Consider two arrangements of wires, find ratio of magnetic field at centre of the semi-circular part.



(1) $\frac{\pi+4}{\pi-1}$ (2) $\frac{\pi+4}{\pi+2}$

(3) $\frac{\pi+2}{\pi+1}$ (4) $\frac{\pi-2}{\pi+1}$

Answer (3)

Sol. $B_1 = \frac{\mu_0 I}{4\pi R}+\frac{\mu_0 I}{2\times 2R}+\frac{\mu_0 I}{4\pi R}$

$B_1 = \frac{\mu_0 I}{4R}\left(\frac{2}{\pi}+1\right)$

$B_2 = \frac{\mu_0 I}{4\pi R}+\frac{\mu_0 I}{2\times 2R}$

$= \frac{\mu_0 I}{4R}\left(\frac{1}{\pi}+1\right)$

$\frac{B_1}{B_2}=\frac{2+\pi}{1+\pi}$

4. In isobaric reversible process on a diatomic gas, ratio of $\Delta Q : \Delta U : W$ shall be

(1) 7 : 5 : 2 (2) 5 : 3 : 2

(3) 3 : 2 : 1 (4) 6 : 5 : 1

Answer (1)

Sol. $\Delta Q = \mu C_P \Delta T$ $C_P : C_V : R$

$\Delta U = \mu C_V \Delta T$ $\frac{7}{5}:\frac{5}{2}:1$

$\Delta W = \mu R \Delta T$ 7 : 5 : 2

5. In circular motion, angular position θ and time t are related as

$\theta = \frac{5t^4}{4}-\frac{t^3}{3}$

Then angular acceleration at $t = 10$ sec is

(1) 1180 rad/s^2 (2) 130 rad/s^2

(3) 1480 rad/s^2 (4) 98 rad/s^2

Answer (3)

Sol. $\omega : \frac{5\times 4t^3}{4}-\frac{3t^2}{3}=5t^3-t^2$

$\alpha = 15t^2 - 2t = 1500 - 20 = 1480$

6. For an ideal gas having $C_p = 3R$ and $C_v = 2R$. Find work done by one mole of the gas in adiabatic expansion when pressure reduces from 8 bar to 1 bar. (Initial temperature = 140°C)

(1) $140R$ (2) $70R$

(3) $826R$ (4) $413R$

Answer (4)

Sol. Here $y=\frac{C_p}{C_v}=\frac{3}{2}$

And $\frac{(T_2)^y}{(P_2)^{y-1}}=\frac{(T_1)^y}{(P_1)^{y-1}}$

$\Rightarrow (T_2)^{3/2}=\frac{(1)\cdot(T_1)^{3/2}}{(8)^{1/2}}$

$\Rightarrow T_2=\frac{T_1}{(8)^{1/3}}=\frac{T_1}{2}=\frac{413}{2}K$

So $|\Delta w| = NC_v dT$

$=(1)2R\left(\frac{413}{2}\right)=413R$

7. In YDSE experiment wavelength of light used is 620 nm and separation between slits is 0.2 mm. Find angular fringe width.

(1) 3×10^{-4} (2) 3.1×10^{-3}

(3) 1.2×10^{-3} (4) 6.2×10^{-4}

Answer (2)

Sol. $\omega=\frac{\lambda}{d}$

$=\frac{620\times10^{-9}}{2\times10^{-4}}=310\times10^{-5}$

$= 3.1 \times 10^{-3}$

8. Photons of wavelength λ & 3λ incident on a metal surface. If stopping potential for the ejected photoelectrons are $4V_0$ & V_0 respectively, find threshold wavelength.

(1) 6λ (2) 9λ

(3) 2λ (4) 8λ

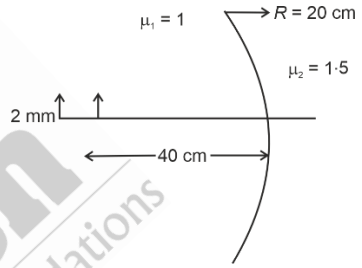
Answer (2)

Sol. $\frac{hc}{\lambda}=\phi+4V_0$

$\Rightarrow \frac{hc}{3\lambda}=\phi+V_0$

$\Rightarrow \frac{hc}{3\lambda}=3d, \Rightarrow \phi=\frac{hc}{9\lambda}$

9. For the given spherical surface of curvature radius R = 20 cm, object of height h_0 = 2 mm is placed at distance 40 cm from surface. Medium on both side of spherical surface have refractive index μ_1 = 1 and μ_2 = 1.5 respectively as shown. Find height of image.



(1) 2 mm (2) 1.5 mm

(3) 1 mm (4) 4 mm

Answer (C)

Sol. $\frac{\mu_2}{v}-\frac{\mu_1}{u}=\frac{\mu_2-\mu_1}{R}$

$\Rightarrow \frac{3}{2v}+\frac{1}{40}=-\frac{-1}{2\times20}$

$\Rightarrow \frac{3}{2v}=-\frac{1}{40}-\frac{1}{40}=-\frac{1}{20}$

$\Rightarrow v=-30\,\text{cm}$

So, M = $\frac{\mu_1 v}{\mu_2 u}=\frac{3(-30)}{\left(\frac{3}{2}\right)(-40)}=0{\cdot}5$

So $h = mh_0 = \frac{1}{2}\times2(\text{mm})=1\,\text{mm}$

10. Find change in surface energy if 512 small drops of radius $r = 2$ mm merge into a single large drop. (surface tension = S).

(1) $\pi S \times 7.168 \times 10^{-3}$ Joule

(2) $\pi S \times 3.584 \times 10^{-3}$ Joule

(3) $\pi S \times 1.792 \times 10^{-3}$ Joule

(4) $\pi S \times 6.284 \times 10^{-3}$ Joule

Answer (1)

Sol. Total volume

$$512 \cdot \frac{4}{3}\pi r^2 = \frac{4}{3}\pi R^2$$

$\Rightarrow R = 8r$ Here $r = 2$ mm

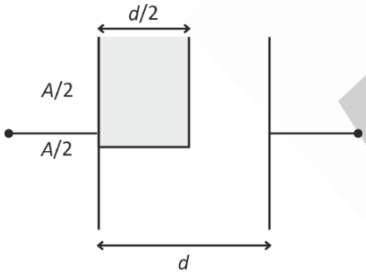
Now $14 = (512) \cdot 4\pi(r^2)S - 4\pi R^2 \cdot S$

$= 4\pi S(512r^2 - 64r^2)$

$= 4\pi S(448) \times 4 \times 10^{-6}$ Joule

$= \pi S \times 7.168 \times 10^{-3}$ Joule

11. One fourth volume of an empty capacitor of capacitance C_0 is filled with dielectric of constant $K = 5$. Surface area of dielectric is $A/2$ & width $d/2$. If $A >> d^2$, then, new capacitance is

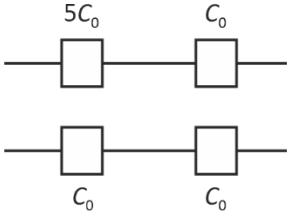


(1) $\frac{3}{2}C_0$ (2) $\frac{4}{3}C_0$

(3) $\frac{5}{4}C_0$ (4) $\frac{7}{6}C_0$

Answer (2)

Sol.



$$\frac{5C_0}{6} + \frac{C_0}{2} = \frac{4}{3}C_0$$

12. Two hollow conducting spheres are separated by large distance. They are connected by a conducting wire. If E_1 & E_2 are the magnitude of electric field near the surface of sphere (1) and sphere (2) respectively, then find the ratio of $\frac{E_1}{E_2}$.

(1) $\frac{9}{2}$ (2) $\frac{9}{4}$

(3) $\frac{2}{9}$ (4) $\frac{4}{9}$

Answer (2)

Sol. $\sigma_1 r_1 = \sigma_2 r_2 \Rightarrow \frac{\sigma_1}{\sigma_2} = \frac{r_2}{r_1}$

And $E = \frac{\sigma}{\varepsilon_0}$

So $\frac{E_1}{E_2} = \frac{\sigma_1}{\sigma_2} = \frac{18}{8}$

$\Rightarrow \frac{E_1}{E_2} = \frac{9}{4}$

13. A charge particle of charge 1 μC moves along y-axis with constant speed 1.6×10^6 m/s. EM wave has electric field component $E = 600\sin(\omega t - kx)\hat{j}$ exist in region. Find maximum electric force on the charge.

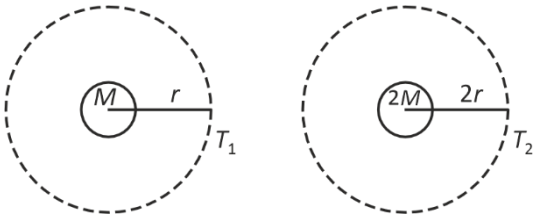
(1) 8×10^4 N (2) 6×10^4 N

(3) 2×10^{-4} N (4) 41×10^{-4} N

Answer (2)

Sol. $\vec{F} = 1.6 \times 10^{-6} \times 600 = 960\hat{j}$

14. Two satellites are revolving around two planets in circular orbits as shown. Find ratio of their time periods.



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

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

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

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

Answer (1)

Sol. $T_1 = 2\pi\sqrt{\frac{r^3}{GM}}$

$T_2 = 2\pi\sqrt{\frac{8r^3}{2GM}} = 2T_1$

$\frac{T_1}{T_2} = \frac{1}{2}$

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. Power dissipated in an inductor coil is P. If coil of same material, but with number of turns, length and cross-section area being doubled, is used at same current then power dissipated is $\alpha\sqrt{2}P$ then α is _____

Answer (2)

Sol. $R \alpha$ length

Assuming tight, number of turns per unit length remain same.

$A \to 2A \Rightarrow r \to \sqrt{2}r$

Case 1 : Length = $(2\pi R)N = L$

Case 2 : Length = $(2\pi\sqrt{2}R)2N = 2\sqrt{2}L$

Power = L^2R

$R \to 2\sqrt{2}R$

$P \to 2\sqrt{2}P$

22. For a thin prism of angle A deviation of ray is 8. If refractive index of prism is 1.5 then $\frac{A}{\delta}$ is _____

Answer (2)

Sol. $(\mu - 1)A = 0.5A = \delta$

23.

24.

25.