24/01/2026
Evening

Aakash
Medical | IIT-JEE | Foundations

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Memory Based
Answers & Solutions

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

JEE (Main)-2026 (Online) Phase-1

(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:

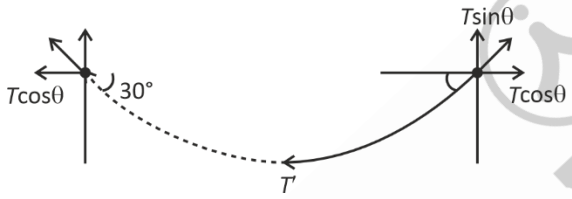
1. A uniform rope is supported by two level pin support as shown in the figure. Mass of the rope is m. Find the tension at mid-point.

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

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

Answer (2)

Sol.

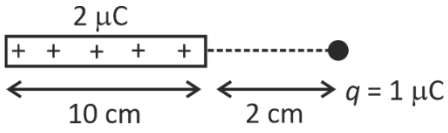


$2T\sin 30 = mg$

$T = mg$

$$T'' = T\cos\theta = mg\frac{\sqrt{3}}{2}$$

2. Find force on charge q = 1 μC due to unfirmly charged rod as shown in the figure



(1) 7.5 N (2) 6 N

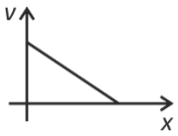
(3) 12 N (4) 18 N

Answer (1)

Sol. $F = \frac{k\,9Q}{2\times 12\times 10^{-4}} = \frac{9\times 10^{9}\times 2\times 10^{-6}\times 1\times 10^{-6}}{12\times 2\times 10^{-3}}$

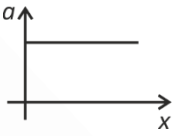
$$= \frac{5}{6}\times 9N = \frac{45}{6} = 7.5$$

3. Velocity of particle varies with position as shown in the below graph.

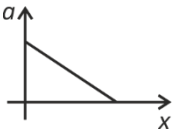


Find the correct variation of acceleration with position.

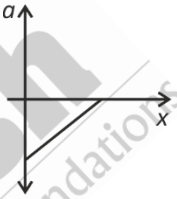
(1)



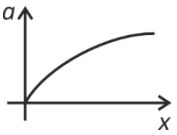
(2)



(3)



(4)

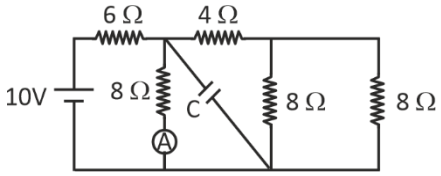


Answer (3)

Sol. $\frac{vdv}{dx} = a = \left(-\frac{v_0}{x_0}\right)\left(-\frac{v_x}{x_0} + v_0\right)$

$$= \frac{v_0^2}{x_0^2}x - \frac{v_0^2}{x_0}$$

4. Find current through ammeter (in A)



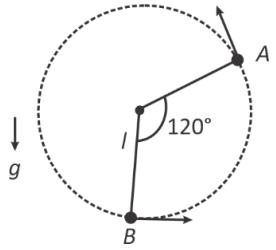
(1) 1 (2) 0.5

(3) 2 (4) 0.75

Answer (2)

Sol. $i = \frac{10}{10} \times \frac{1}{2} = 0.5\ \text{A}$

5. A particle attached to an ideal string is project from position *B* (lowest position). At position *A*, tension in string becomes zero. Find speed in string at *B*.



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

(3) $\sqrt{\frac{7gl}{2}}$ (4) $\sqrt{5gl}$

Answer (3)

Sol. At *A*

$$mg\cos 60° = \frac{mv^2}{l}$$

$$v^2 = \frac{gl}{2}$$

& Energy at *B* = Energy *NA*

$$\Rightarrow \frac{1}{2}mu^2 = \frac{1}{2}mv^2 + mg \times \frac{3l}{2}$$

$$\Rightarrow u^2 = \frac{gl}{2} + 3gl$$

$$= \frac{7gl}{2}$$

6. Radius of a soap bubble is changed from 7 cm to 14 cm then the work done in this process is (in μJ) is (15000 – *x*) find the value of *x*. $\left(\pi = \frac{22}{7}\right)(\sigma = 0.04\ \text{N/m})$

(1) 216 (2) 196

(3) 256 (4) 225

Answer (1)

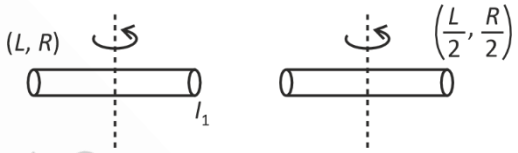
Sol. $\sigma 4\pi(2R)^2 \times 2 - \sigma\, 4\pi R^2 \times 2 = \Delta V = \Delta W$

$$\Delta W = \sigma 8\pi \times \left(3R^2\right)$$

$$\left(R = 7 \times 10^{-2}\ \text{m},\ \sigma = \frac{4}{100}\ \pi = \frac{22}{7}\right)$$

$$\Delta W = 14784\ \mu\text{J}$$

7. For a uniform cylinder of length *L* and radius *R* the moment of inertia is I_1. Now for similar situation but length $\frac{L}{2}$ and radius $\frac{R}{2}$ moment of inertia is I_2. Find $\frac{I_1}{I_2}$



(1) 32

(2) 8

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

(4) 16

Answer (1)

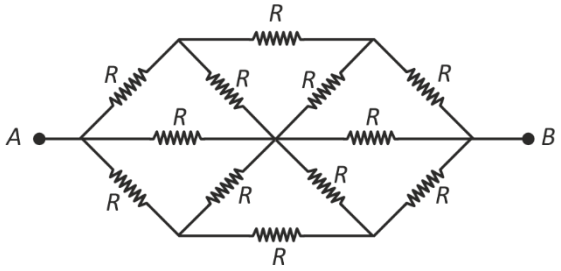
Sol. $\because \quad I_1 = \frac{mR^2}{4} + \frac{mL^2}{12} = \pi R^2 L\rho\left[\frac{R^2}{4} + \frac{L^2}{12}\right]$

and $I_2 = \frac{\pi R^2}{4} \cdot \frac{L}{2}\rho\left[\frac{R^2}{4\times 4} + \frac{L^2}{4\times 12}\right]$

$$\frac{I_1}{I_2} = \frac{\pi R^2 \rho L\left[\frac{R^2}{4} + \frac{L^2}{12}\right]}{\frac{1}{8}\pi R^2 \rho L \times \frac{1}{4}\left[\frac{R^2}{4} + \frac{L^2}{12}\right]}$$

= 32

8. Find the equivalent resistance between A & B of the resistor's network. Each value of the resistor is R.



(1) $\frac{14}{19}R$ (2) $\frac{4}{5}R$

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

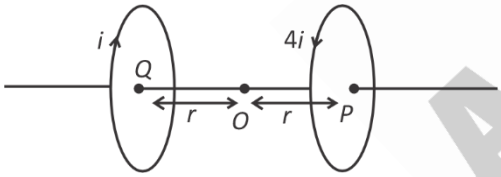
Answer (2)

Sol. $\frac{1}{R_{eq}}=\frac{1}{2R}+\frac{3}{8R}+\frac{3}{8R}$

$\Rightarrow \frac{1}{R_{eq}}=\frac{10}{8R}$

$\Rightarrow R_{eq}=\frac{4R}{5}$

9. Two identical loops are placed coaxially as shown. Radius of both loops is r



Find magnetic field at O.

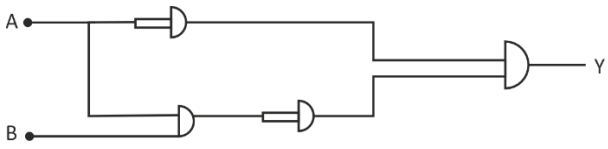
(1) $\frac{3\mu_0 i}{4\sqrt{2}r}$ towards P (2) $\frac{3gm_0 i}{4\sqrt{2}r}$ towards Q

(3) $\frac{\mu_0 i}{4\sqrt{2}r}$ towards Q (4) $\frac{\mu_0 i}{4\sqrt{2}r}$ towards P

Answer (1)

Sol. $\frac{\mu_0\times 4i}{4\sqrt{2}\,r}-\frac{\mu_0 i}{4\sqrt{2}\,r}=\frac{3\mu_0 i}{4\sqrt{2}\,r}$

10. The correct truth table for the given logic circuit is



(1)

A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

(2)

A	B	Y
0	0	0
1	0	1
0	1	0
1	1	0

(3)

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	0

(4)

A	B	Y
0	0	0
0	1	0
1	0	1
1	1	0

Answer (4)

Sol. $A\cdot\overline{A\cdot B}$

$\Rightarrow A\cdot\left(\overline{A}+\overline{B}\right)=A\overline{A}+A\overline{B}=A\overline{B}$

11. Distance between an object and its image formed by a lens is 30 cm with magnification m = 3. Find the focal length of lens (in cm)

(1) 11.25 cm (2) 22.5 cm

(3) 45 cm (4) 15 cm

Answer (2)

Sol. $|v| - |u| = 30$ cm

$u = 3u$ (given for $m = +3$)

$u = -15$ cm

$v = -45$ cm and $\frac{1}{\rho} = -\frac{1}{45} + \frac{1}{15}$

$f = \frac{45}{2} = 22.5$ cm

12. Two nucleon reactions are given below:

$He_2^3 + n \rightarrow He_2^4 + 20\,Mev$

$He_2^4 + n \rightarrow He_2^5 - 0.9\,Mev$

Find stability order of He_2^3, He_2^4, He_2^5

(1) $He_2^5 < He_2^4 < He_2^3$

(2) $He_2^3 < He_2^5 < He_2^4$

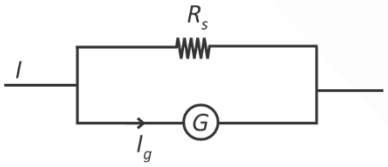
(3) $He_2^4 < He_2^3 < He_2^5$

(4) $He_2^5 < He_2^3 < He_2^4$

Answer (2)

Sol. Higher binding energy for nucleon $\rightarrow$ higher stability.

13. A galvanometer of 100 Ω resistance can give full scale deflection for I_g = 1 mA. Find the value of shunt resistance R_s to get the 5 mA range ammeter.



(1) 25 Ω

(2) 10 Ω

(3) 2 Ω

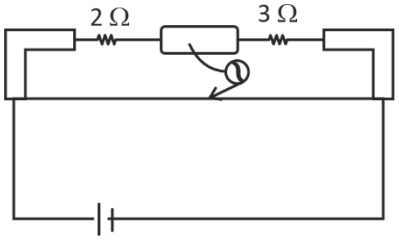
(4) 1 Ω

Answer (1)

Sol. $R_s 4 = 100 \times 1$

$\Rightarrow R_s = 25\ \Omega$

14. In meter bridge given below, when X Ω of resistor is connected in parallel to 3W, null point shifts by 10 cm. Find x



(1) 4 Ω (2) 6 Ω

(3) 2 Ω (4) 8 Ω

Answer (2)

Sol. $3\ell = 2(100 - \ell)$

$\Rightarrow 5\ell = 40$ cm

and $\frac{3X}{3+X}(1+10) = 2(90-\ell)$

$\Rightarrow \frac{3X}{3+X} 50 = 2 \times 50$

$\Rightarrow \frac{3X}{3+X} = 2$

$3X = 6 + 2X$

$X = 6\ \Omega$

15. A cubical block of density 600 kg/m^3 is floating in a liquid of density 900 kg/m^3. The height of cube immersed in liquid is (cube side = 10 cm)

(1) 6.67 cm (2) 10 cm

(3) 5 cm (4) 7.2 cm

Answer (1)

Sol. $h \times A\rho g = a \times A\sigma g$

$\Rightarrow h = a\frac{\sigma}{\rho} = 10 \times \frac{6}{9} = 10 \times .667 = 6.67$ cm

16. In a Vernier calliper 50 vernier scale dimension coincides with 48 mass scale dimensions. If one mass scale dimension is 1 mm then the least count of the measurement is

(1) 0.04 cm (2) 0.004 cm

(3) 0.02 cm (4) 0.002 cm

Answer (2)

Sol. $1\text{ VSD} = \frac{48}{50} \times \text{MSD} = 0.96\text{ MSD}$

LC = (1 – 0.96) MSD = 0.04 MSD

LC = 0.004 cm

17. Stopping potential for a photoelectric experiment is $v_0 = 3.2$ V for wavelength λ. If wavelength is doubled, the stopping potential becomes $v_0' = 0.7$ V. Find the wavelength λ.

(1) 80 nm (2) 410 nm

(3) 248 nm (4) 516 nm

Answer (3)

Sol. $eV_0 = \frac{hc}{\lambda} - \phi = \frac{32e}{10}$ …(i)

$\frac{hc}{2\lambda} - \phi = \frac{7}{10}e$ …(ii)

$\Rightarrow \quad \frac{hc}{2\lambda} = \frac{25}{10}e$

$\Rightarrow \quad \lambda = \frac{hc}{5e} \approx 248$ nm

18. The object and image distances from lens are recorded by student as $(u, v) - P_1(-30, 60)$, $P_2(30, 12)$, $P_3(20, 60)$ & $P_4(-25, 100)$. (Values are magnitudes of distances with sign). If power of lens is 5D. Which Readings is/are correct

(1) P_1, P_2 (2) P_1, P_4

(3) P_2, P_3 (4) P_1, P_3

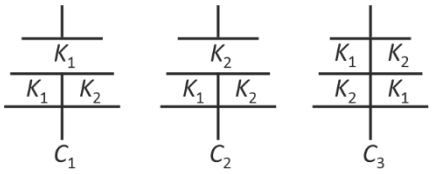
Answer (2)

Sol. $f = 20$ cm

$P_1(30, 60)$

$\Rightarrow \frac{1}{60} + \frac{1}{30} = \frac{1+2}{60} = \frac{1}{20}$

19. If $K_1 > K_2$ which order of C_{eq} for the 3 given configuration is correct.



(1) $C_1 > C_2 > C_3$ (2) $C_3 > C_2 > C_1$

(3) $C_2 > C_3 > C_1$ (4) $C_1 > C_3 > C_2$

Answer (4)

Sol. If one sq. has capacitance $C_0 = \frac{\varepsilon_0 \frac{A}{2}}{\frac{d}{2}}$

then $C_1 = \frac{K_1K_1}{K_1+K_1}C_0 + \frac{K_1K_2}{K_1+K_2}C_0$

$C_2 = \frac{K_2K_2}{K_2+K_2}C_0 + \frac{K_1K_2}{K_1+K_2}C_0$

$C_3 = \frac{K_1K_2}{K_2+K_2}C_0 + \frac{K_1K_2}{K_1+K_2}C_0$

If $K_1 > K_2$

then $C_1 > C_3 > C_2$

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. Given the half life of a radioactive sample $t_{1/2} = 245$ days. After X days 25% of sample is remaining the find X.

Answer (490)

Sol. $25\% \equiv \frac{1}{4}$ th of sample left means $\left(\frac{1}{2}\right)^2$

2 half lines spent,

$\therefore \quad X = 2 \times 245$

$= 490$

22. An ideal gas of molar mass 50 g is given 300 J heat at constant volume. Its temperature changes from 20°C to 50°C. If $C_0 = \frac{7}{2}R$ and $R = 8.3$ in SI unit, then mass of gas is (in g) (approx.)

Answer (17)

Sol. $Q = nCv\Delta T$

$300 = \frac{m}{50} \times \frac{7}{2} \times 8.3 \times 30 = 17.2$

23.

24.

25.