JEE-Main-28-01-2025 (Memory Based)
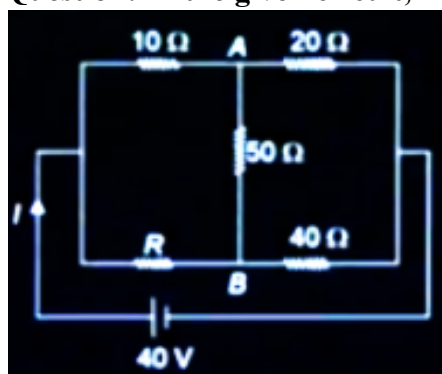# [EVENING SHIFT]

Physics

Question: In the given circuit, find l if the potentials at A and B are equal

Options:
(a) 1 A
(b) 2 A
(c) 3 A
(d) 4 A
Answer: (b)

Question: Bohr's model is applicable for a single electron atom of atomic number Z. Dependency of frequency of rotation of electron in nth principal quantum number is proportional to
Options:
(a) Z/n^2
(b) Z^2/n^3
(c) n^3/Z
(d) Z/n
Answer: (b)

Question: In an electromagnetic wave, the magnetic field is given as

$$\vec{B} = \left(\frac{\sqrt{3}}{2}\hat{i} + \frac{1}{2}\hat{j} \right) 30 \, \sin(\omega t - kz)$$

the corresponding electric field is

Options:

(a) $\left(\frac{1}{2}\hat{i} + \frac{\sqrt{3}}{2}\hat{j} \right) 9 \times 10^9 \, \sin(\omega t - kz)$

(b) $\left(\frac{1}{2}\hat{i} - \frac{\sqrt{3}}{2}\hat{j} \right) 9 \times 10^9 \, \sin(\omega t - kz)$

(c) $\left(\frac{1}{2}\hat{i} + \frac{\sqrt{3}}{2}\hat{j}\right) 9 \times 10^9 \cos(\omega t - kz)$

(d) $\left(\frac{1}{2}\hat{i} - \frac{\sqrt{3}}{2}\hat{j}\right) 9 \times 10^9 \cos(\omega t - kz)$

Answer: (b)

Question: For concave mirror, distance between object and image = 20cm and m = - 3 find focal length
Options:
(a) -7.5 cm
(b) -15 cm
(c) -20 cm
(d) -10 cm
Answer: (a)

Question: Wave theory of light cannot explain
Options:
(a) Compton effect
(b) Reflection of light
(c) Refraction of light
(d) Diffraction of light
Answer: (a)

Question: The mass and radius of a planet P is 8 and 3 times that of earth respectively. If escape velocity from surface of earth is V_e , then escape velocity from surface of planet P is
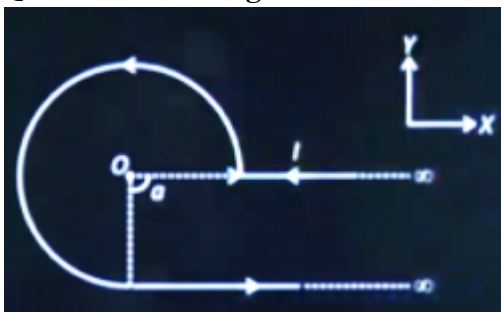**Options:**
(a) $\sqrt{\frac{8}{3}} V_e$
(b) $\sqrt{24} V_e$
(c) $\sqrt{\frac{3}{8}} V_e$
(d) 8/3 V_e
Answer: (a)

Question: The magnetic field $\vec{B}$ at the centre O of the given arrangement is

Options:

(a) $\dfrac{+\mu_0 I}{8\pi a}(3\pi + 2)\widehat{k}$

(b) $\dfrac{-\mu_0 I}{8\pi a}(3\pi + 2)\widehat{k}$

(c) $\dfrac{+\mu_0 I}{8\pi a}(3\pi - 2)\widehat{k}$

(d) $\dfrac{-\mu_0 I}{8\pi a}(3\pi - 2)\widehat{k}$

Answer: (a)

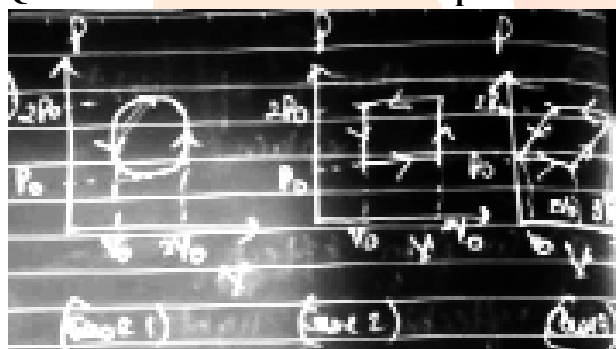**Question: A cube of side 10 cm having bulk modulus of 1.4 x 1011 Pa is placed in the atmosphere. Now it is subjected to extra pressure of 7×10^6 Pa then magnitude of change in volume of cube is**
Options:
(a) 0.03 mL
(b) 0.3 mL
(c) 0.05 mL
(d) 0.2 mL
Answer: (c)

Question: What is the relationship between change in internal energy of each case ?

Options:
(a) $\Delta U_1 > \Delta U_2 > \Delta U_3$
(b) $\Delta U_1 = \Delta U_2 = \Delta U_3$
(c) $\Delta U_1 < \Delta U_2 < \Delta U_3$
(d) $\Delta U_1 = \Delta U_2 \neq \Delta U_3$
Answer: (b)

Question: A parallel plate capacitor of capacitance $6\,\mu F$ is charged by a battery of voltage 10 V. Area of plate 10 cm^2 . Find energy density
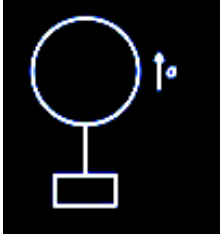Options:

(a) $\dfrac{18}{\varepsilon_0} \times 10^{-7}$

(b) $\dfrac{9}{\varepsilon_0} \times 10^{-7}$

(c) $\dfrac{25}{\varepsilon_0} \times 10^{-8}$

(d) $\dfrac{18}{\varepsilon_0} \times 10^{-8}$

Answer: (d)

Question: A balloon system having mass m is moving up with acceleration a, find the mass to be removed from it to have acceleration 3a. (Neglect the volume of mass attached)

Options:

(a) $\dfrac{2ma}{3a+g}$

(b) $\dfrac{2ma}{2a+g}$

(c) $\dfrac{ma}{3a+g}$

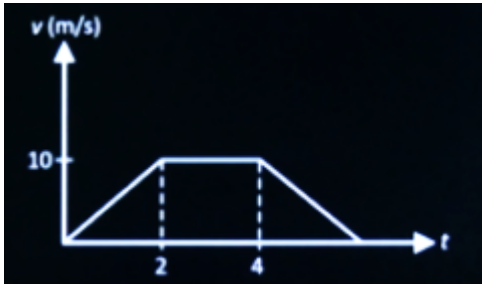**(d)** $\dfrac{ma}{g-3a}$

Answer: (a)

Question: An equilateral triangle frame of side l is carrying current i, find magnetic field at its centroid

Options:

(a) $\dfrac{3\mu_0 l}{4\pi l}$

(b) $\dfrac{3\mu_0 l}{\pi l}$

(c) $\dfrac{9\mu_0 l}{2\pi l}$

(d) $\dfrac{\mu_0 l}{\pi l}$

Answer: (c)

Question: The velocity vs time graph of a particle moving along X-axis is plotted as shown. The distance travelled (in metre) by the particle in the interval t = 0 s to t = 4 s is

Options:
(a) 10
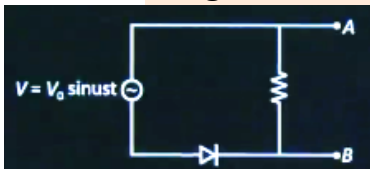(b) 20
(c) 30
(d) 40
Answer: (c)

Question: The translational Kinetic energy of molecules of 50g of CO_2 gas at 17°C is
Options:
(a) 2500J
(b) 4110 J
(c) 5250 J
(d) 6300 J
Answer: (b)

Question: The correct variation of voltage across AB is given by (consider that the threshold voltage of the diode is very small)

Options:

(a)

(b)

(c)

(d)
Answer: (b)

Question: An electric dipole of moment 6 x 10⁻⁶ cm is placed parallelly in electric field of strength 10^6 N/C. Work done required to rotate the dipole by 180° is X joules, then X is
Options:
(a) 5
(b) 20
(c) 18
(d) 12
Answer: (d)

Question: Distance between real object and its three times magnified image formed by concave mirror is 20 cm then radius of curvature of the mirror is X cm, then X is
Options:
(a) 15
(b) 10
(c) 5
(d) 25
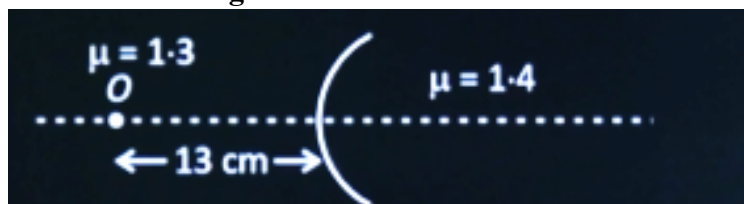Answer: (a)

Question: Select the correct match for dimensions

Column-I	Column-II
(A) Angular Momentum	(I) $[MLT^{-2}]$
(B) Force	(II) $[ML^2T^{-1}]$
(C) Energy	(III) $[ML^{-1}T^{-2}]$
(D) Pressure	(IV) $[ML^2T^{-2}]$

Options:
(a) A-(II), B(III), C-(I), D-(IV)
(b) A-(I), B(II), C-(III), D-(IV)
(c) A-(II), B(I), C-(IV), D-(III)
(d) A-(II), B(I), C-(III), D-(IV)
Answer: (c)

Question: In the figure shown the object kept at a distance 13 cm from the interface forms a real image which is double in size. The radius of curvature of the interface is

Options:
(a) 3/2 cm
(b) 2/3 cm

(c) 3/4 cm
(d) 4/3 cm
Answer: (b)

Question: Due to the bar magnet shown, if the % uncertainty in d is 1% , find uncertainty in the magnetic field at P. [d : 10 units, l = 10 units]
Options:
(a) 2%
(b) 3%
(c) 1.5 %
(d) 0.5 %
Answer: (c)