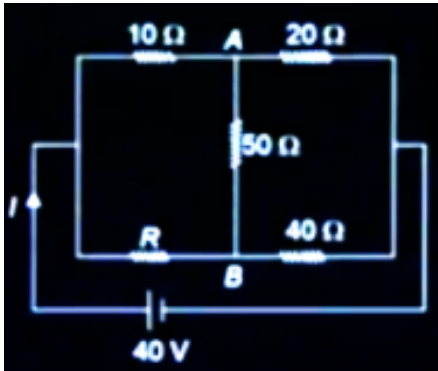


**JEE-Main-28-01-2025 (Memory Based)**  
**[EVENING SHIFT]**

**Physics**

**Question:** In the given circuit, find  $I$  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  $n^{\text{th}}$  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)  $\sqrt{\frac{8}{3}} V_e$

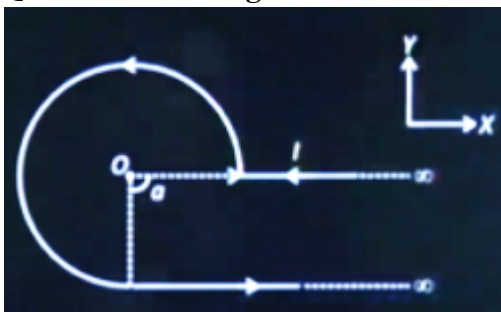
(b)  $\sqrt{24} V_e$

(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)  $\frac{+\mu_0 l}{8\pi a} (3\pi + 2)\hat{k}$   
 (b)  $\frac{-\mu_0 l}{8\pi a} (3\pi + 2)\hat{k}$   
 (c)  $\frac{+\mu_0 l}{8\pi a} (3\pi - 2)\hat{k}$   
 (d)  $\frac{-\mu_0 l}{8\pi a} (3\pi - 2)\hat{k}$

Answer: (a)

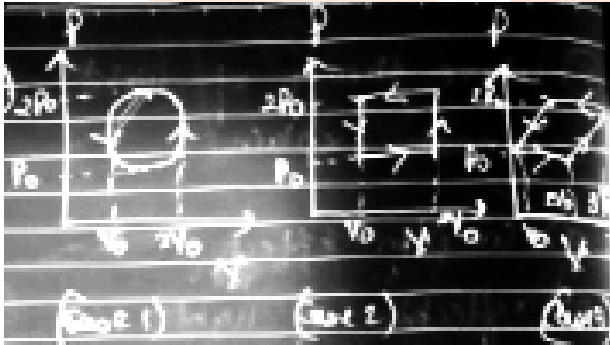
**Question:** A cube of side 10 cm having bulk modulus of  $1.4 \times 10^{11}$  Pa is placed in the atmosphere. Now it is subjected to extra pressure of  $7 \times 10^6$  Pa then magnitude of change in volume of cube is

**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  $6 \mu\text{F}$  is charged by a battery of voltage 10 V. Area of plate  $10 \text{ cm}^2$ . Find energy density

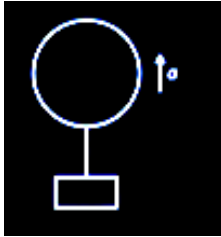
**Options:**

- (a)  $\frac{18}{\epsilon_0} \times 10^{-7}$   
 (b)  $\frac{9}{\epsilon_0} \times 10^{-7}$

- (c)  $\frac{25}{\epsilon_0} \times 10^{-8}$   
 (d)  $\frac{18}{\epsilon_0} \times 10^{-8}$

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)  $\frac{2ma}{3a + g}$   
 (b)  $\frac{2a + g}{ma}$   
 (c)  $\frac{3a + g}{ma}$   
 (d)  $g - 3a$

Answer: (a)

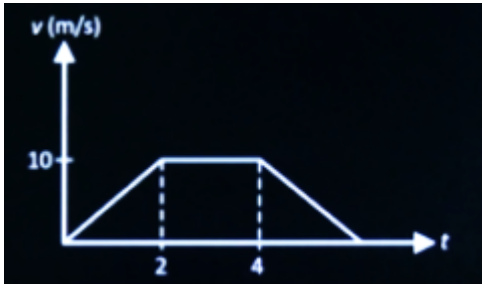
**Question:** An equilateral triangle frame of side  $l$  is carrying current  $i$ , find magnetic field at its centroid

Options:

- (a)  $\frac{3\mu_0 l}{4\pi}$   
 (b)  $\frac{\pi l}{9\mu_0}$   
 (c)  $\frac{2\pi l}{\mu_0}$   
 (d)  $\pi l$

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)

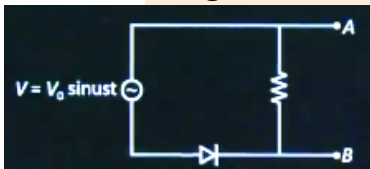
Question: The translational Kinetic energy of molecules of 50g of  $\text{CO}_2$  gas at  $17^\circ\text{C}$  is

Options:

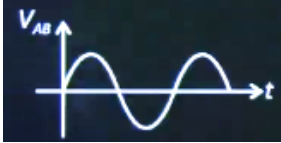
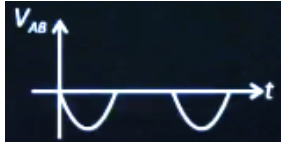
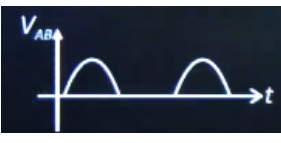

- (a) 2500J
- (b) 4110 J
- (c) 5250 J
- (d) 6300 J

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  $6 \times 10^{-6}$  cm is placed parallelly in electric field of strength  $10^6$  N/C. Work done required to rotate the dipole by  $180^\circ$  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

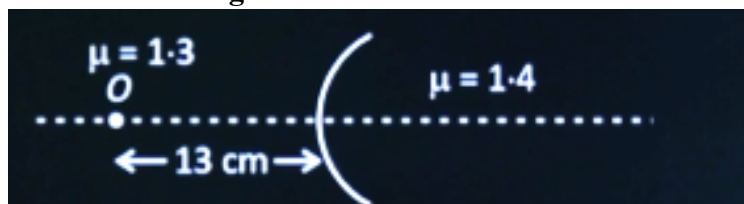
| Column-I             | Column-II               |
|----------------------|-------------------------|
| (A) Angular Momentum | (I) $[MLT^{-2}]$        |
| (B) Force            | (II) $[ML^2T^{-1}]$     |
| (C) Energy           | (III) $[ML^{-1}T^{-2}]$ |
| (D) Pressure         | (IV) $[ML^2T^{-2}]$ 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

**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)  $\frac{3}{4}$  cm

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

