

**JEE-Main-30-01-2024 (Memory Based)**  
**[MORNING SHIFT]**

**Physics**

**Question:** A particle of mass 'm' has been thrown at an angle of  $30^\circ$  with horizontal at speed 'u'. Find its angular momentum at the highest point about the point of projection.

**Options:**

- (a)  $\frac{mu^2}{16g}$   
(b)  $\frac{\sqrt{3}mu^2}{16g}$   
(c)  $\frac{mu^3}{8g}$   
(d)  $\frac{\sqrt{3}mu^3}{8g}$

**Answer: (b)**

**Question:** The work function of metal surface is 3 eV. The maximum wavelength that should strike the metal for emitting Photoelectron (in nm) is

**Options:**

- (a) 413  
(b) 450  
(c) 315  
(d) 350

**Answer: (a)**

**Question:** If the length of a rod is doubled and area of cross section is halved, then its young's modulus will be

**Options:**

- (a) Doubled  
(b) Same  
(c) Halved  
(d) Four times

**Answer: (b)**

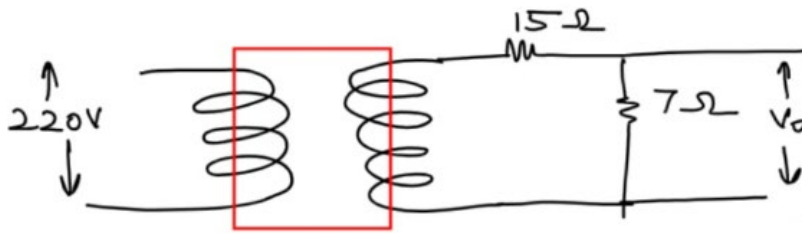
**Question:** The gravitational potential at certain height from the surface of earth is  $-5.12 \times 10^7$  and gravity at that height is  $6.4 \text{ ms}^{-2}$ . Then that height from surface of earth is

**Options:**

- (a) 80 km  
(b) 8000 m  
(c) 800 km  
(d) 16000 m

**Answer: (a)**

**Question:** In a transformer if primary and secondary coil have 100 and 10 turns and primary voltage is 220V. If the secondary coil has 2 resistors  $7\Omega$  and  $15\Omega$  as shown in the figure, find the potential difference across  $7\Omega$  resistance.



**Options:**

- (a) 15 V
- (b) 7 V
- (c) 22 V
- (d) 11 V

**Answer: (b)**

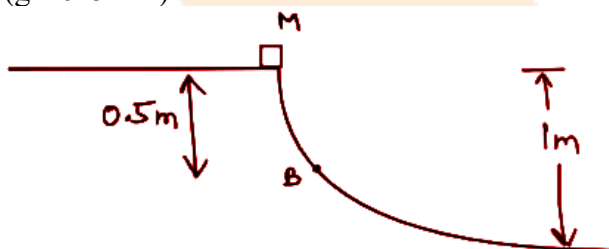
**Question:** The distance between an object and its twice magnified real image for a convex lens is 45 cm. Find the focal length of the lens

**Options:**

- (a) 15 cm
- (b) 10 cm
- (c) 30 cm
- (d) 60 cm

**Answer: (b)**

**Question:** If a block of mass 'M' is released from the top of a frictionless slide, find the velocity when the block reaches to point 'B' that 0.5 m below the starting point. ( $g = 9.8 \text{ m/s}$ )

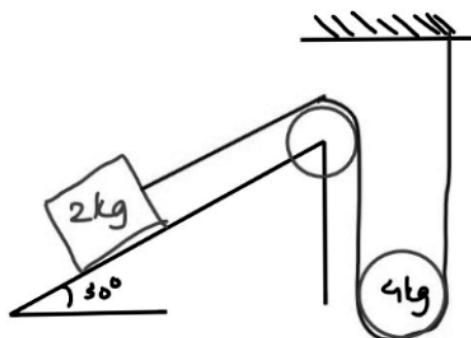


**Options:**

- (a) 3.14
- (b) 6.28
- (c) 3.4
- (d) 4.2

**Answer: (a)**

**Question:** Find the acceleration of 2 kg block. (Surface of inclined plane is smooth)



**Options:**

- (a)  $g$
- (b)  $g/2$
- (c)  $g/3$
- (d)  $g/4$

**Answer: (c)**

**Question:** Find the temperature at which RMS speed of  $H_2$  will be same as that of RMS speed of Oxygen at  $47^\circ C$

**Options:**

- (a)  $20^\circ C$
- (b)  $-253^\circ C$
- (c)  $0^\circ C$
- (d)  $-253 K$

**Answer: (b)**

**Question:** A disc of radius 2m and mass 5 kg is rotating about its vertical axis at 10 rad/sec. if another identical disc at rest is kept on top of it coaxially, then find the energy dissipated by the time slipping stops

**Options:**

- (a) 500 J
- (b) 1000 J
- (c) 250 J
- (d) 100 J

**Answer: (c)**

**Question:** Two identical insulated coil carrying same current  $I$  (same radius  $a$ ) & placed such that their centers are coinciding with each other, but planes of coil are perpendicular to each other. Find net magnetic induction at the center due this arrangement.

**Options:**

- (a)  $\frac{\sqrt{2}\mu_0 I}{4a}$
- (b)  $\frac{\mu_0 I}{\sqrt{2}a}$
- (c)  $\frac{\sqrt{2}\mu_0 I}{a}$
- (d)  $\frac{\sqrt{3}\mu_0 I}{2a}$

**Answer: (b)**

**Question:** If electric field component of an EM wave is

$$\vec{E} = E_0 \cos(\omega t - kz) \hat{i}$$
 then the magnetic component will

**Options:**

(a)  $\vec{B} = E_0 C \cos(\omega t - kz) \hat{j}$

(b)  $\vec{B} = \left(\frac{E_0}{C}\right) \cos(\omega t - kz) \hat{j}$

(c)  $\vec{B} = (E_0 C) \cos(\omega t - kz) (-\hat{j})$

(d)  $\vec{B} = \left(\frac{E_0}{C}\right) \cos(\omega t - kz) (-\hat{j})$

**Answer: (b)**

**Question:** In a closed organ pipe, fundamental frequency  $f$  is 50 Hertz. Now same water is filled and frequency becomes 110 Hz. if the cross sectional area of the pipe is  $2 \text{ cm}^2$ , then find the amount of water added in grams. Speed of sound in air = 330 m/s.

**Options:**

(a) 90 grams

(b) 180 grams

(c) 300 grams

(d) 18 grams

**Answer: (b)**

**Question:** For uniform accelerated motion a body travels 125m from  $t$  to  $t+1$  s while increasing speed by 50 m/s, then the displacement in the next second from  $t+1$  to  $t+2$  is ?

**Options:**

(a) 175 m

(b) 165 m

(c) 186 m

(d) 195 m

**Answer: (a)**

**Question:** Dimensions of viscosity coefficient, surface tension, angular momentum, rotational energy ?

**Options:**

(a)  $M^1 L^{-1} T^{-1}$

(b)  $MT^{-2}$

(c)  $M^1 L^2 T^{-1}$

(d)  $M^1 L^2 T^{-2}$

**Answer: (a)**

**Question:** Electrostatic potential due to a short dipole is proportional to

**Options:**

(a)  $r$

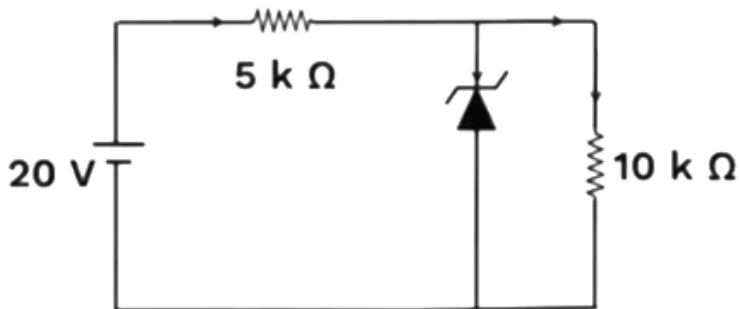
(b)  $1/r$

(c)  $1/r^2$

(d)  $1/r^3$

**Answer: (c)**

**Question:** Breakdown voltage of zener diode is 10 V then the current through it is ?



**Options:**

- (a) 1 mA
- (b) 2 mA
- (c) 3 mA
- (d) 4 mA

**Answer: (a)**

**Question:** If the power factor of LR circuit having voltage  $E = 25 \sin(1000t)$  is  $1/\sqrt{2}$  then the power factor of  $E = 20 \sin(2000t)$  is ?

**Options:**

- (a)  $1/\sqrt{5}$
- (b)  $1/\sqrt{3}$
- (c)  $1/2$
- (d)  $1/\sqrt{7}$

**Answer: (a)**

**Question:** A ball of 100 g is dropped from a height of 10 m and after collision with ground rises to 5 m. Find the impulse by the ground surface ?

**Options:**

- (a) 0.09 Ns
- (b) 0.28 Ns
- (c) 0.38 Ns
- (d) 0.29 Ns

**Answer: (d)**

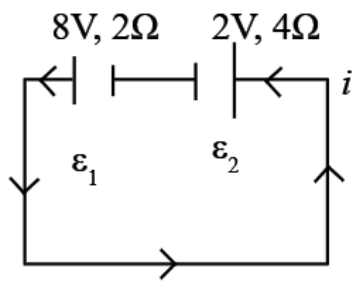
**Question:** A wire carrying  $\sqrt{2}$  A current is placed in the plane of magnetic field of  $3.5 \times 10^{-5}$  T making  $45^\circ$ . Find the force per unit length on it ?

**Options:**

- (a)  $34 \times 10^{-6}$  N/m
- (b)  $34 \times 10^{-5}$  N/m
- (c)  $35 \times 10^{-6}$  N/m
- (d)  $35 \times 10^{-5}$  N/m

**Answer: (c)**

**Question:**



Voltage drop across  $\epsilon_2$ ?

**Options:**

- (a) 6 V
- (b) 5 V
- (c) 4 V
- (d) 7 V

**Answer: (a)**

