

# JEE-Main-29-07-2022-Shift-2 (Memory Based)

## Physics

**Question:** Two plate have charge  $q_1, q_2$  ( $q_1 > q_2$ ) they are used to make capacitor. Find potential difference?

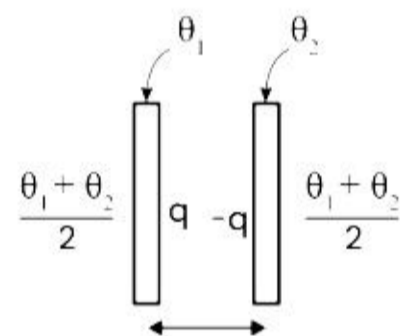
**Options:**

- (a)  $q_1 + q_2 / C$
- (b)  $(q_1 - q_2) / 2C$
- (c)  $q_1 - q_2 / C$
- (d)  $q_1 + q_2 / 2C$

**Answer:** (b)

**Solution:**

$$q = \frac{\theta_1 - \theta_2}{2}$$



$$V = \frac{q}{c} = \frac{\theta_1 - \theta_2}{2c}$$

**Question:** Linear momentum is increased by 20% then increase in kinetic energy?

**Options:**

- (a) 40%
- (b) 44%
- (c) 50%
- (d) 60%

**Answer:** (b)

**Solution:**

$$\frac{\Delta k}{k_i} = \frac{k_f - k_i}{k_i}$$

$$= \frac{\frac{P_f^2}{2m} - \frac{P_i^2}{2m}}{\frac{P_i^2}{2m}} = 1$$

$$= \left( \frac{P_f}{P_i} \right)^2 - 1(1.2)^2 - 1 = 1.44$$

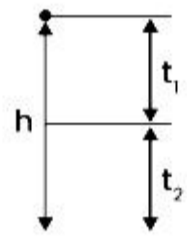
**Question:** What is ratio of time  $t_1$  and  $t_2$  if  $t_1$  is time travelled from highest point to half of distance and  $t_2$  the remaining half distance.

**Options:**

- (a)  $t_1 = \sqrt{2}t_2$
- (b)  $t_1 = (\sqrt{2} - 1)t_2$
- (c)  $t_1 = (\sqrt{2} + 1)t_2$
- (d)  $t_2 = (\sqrt{2} - 1)t_1$

**Answer:** (d)

**Solution:**



$$\frac{h}{2} = \frac{1}{2}gt_1^2 \dots(1)$$

$$h = \frac{1}{2}g(t_1 + t_2)^2 \dots(2)$$

$$2 = \frac{1}{\frac{1}{2}} = \left( \frac{t_1 + t_2}{t_1} \right)^2 \Rightarrow 1 + \frac{t_2}{t_1} = \sqrt{2} \Rightarrow \frac{t_2}{t_1} = (\sqrt{2} - 1)$$

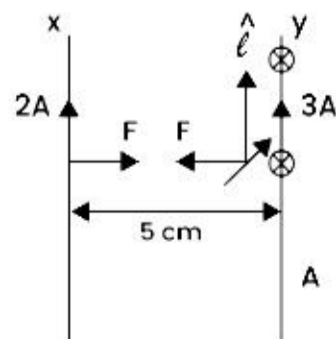
**Question:** A current carrying wire x of 50 cm carrying current 2A is parallel to another wire y of length 5m and 3A current, has separation of 2m find force on wire y due to x.

**Options:**

- (a)  $1.4 \times 10^{-5}$  N towards x
- (b)  $1.3 \times 10^{-5}$  N towards y
- (c)  $1.4 \times 10^{-5}$  N towards y
- (d)  $1.2 \times 10^{-5}$  N towards x

**Answer:** (d)

**Solution:**



$$F = \left( \frac{\mu_0 i_1 i_2}{2\pi d} \right) l$$

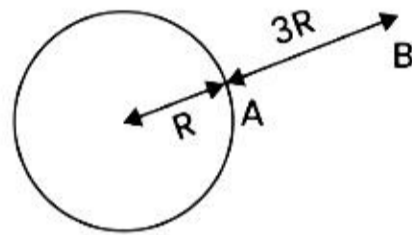
**Question:** Gravitation ka tha ki 1g ki body ko 3R from surface leke gye toh gain in potential energy?

**Options:**

- (a) 48 mJ
- (b) 24 mJ
- (c) 30 mJ
- (d) 26 mJ

**Answer:** (a)

**Solution:**



$$\Delta U = U_B - U_A$$

$$-\frac{GMm}{4R} + \frac{GMm}{R}$$

$$\frac{GMm}{R} \frac{3}{4} = \left( \frac{Gm}{R^2} \right) mR \times \frac{3}{4}$$

$$= 10 \times 1 \times 6400 \times 10 \times \frac{3}{4}$$

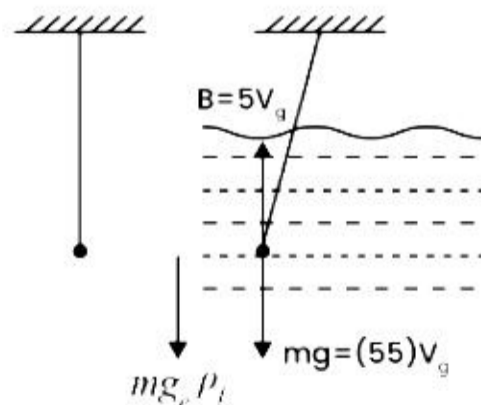
**Question:** Time period of pendulum 10s. Its relative density is 5 it is immense in water. If new time period is  $5\sqrt{x}$  s. Find x.

**Options:**

- (a) 5
- (b) 3
- (c) 2
- (d) 4

**Answer:** (a)

**Solution:**



$$\begin{aligned}
 T' &= 2\pi \sqrt{\frac{l}{g_{\text{eff}}}} \\
 &= 2\pi \sqrt{\frac{l}{g}} \\
 &= 10 \times \frac{\sqrt{5}}{2} \\
 &= 5 \\
 10\text{s} = T &= 2\pi \sqrt{\frac{l}{g}} \\
 mg_{\text{eff}} &= m\rho - B \\
 &= 4\rho v_g \\
 g_{\text{eff}} &= \frac{4}{5}g
 \end{aligned}$$

**Question:** If  $\alpha$  particle and proton are accelerated from same potential difference then the ratio of their linear momenta.

**Options:**

- (a)  $2\sqrt{2} : 1$
- (b)  $2\sqrt{2} : 3$
- (c)  $\sqrt{2} : 1$
- (d)  $\sqrt{2} : 2$

**Answer:** (a)

**Solution:**

$$\begin{aligned}
 P &= \sqrt{2mK} = \sqrt{2qV} \\
 \frac{P_\alpha}{P_p} &= \sqrt{\frac{4m}{m} \times \frac{2e}{e}} = 2\sqrt{2} : 1
 \end{aligned}$$

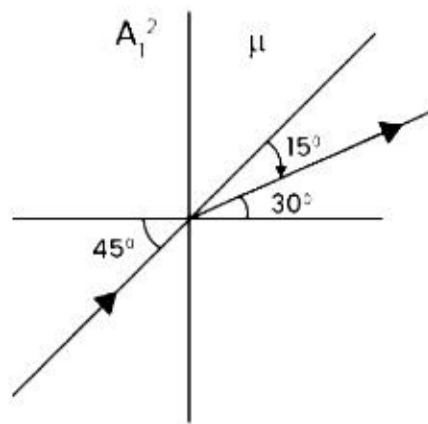
**Question:** Light ray from air enters a medium with  $45^\circ$  angle and it deviates  $15^\circ$  from its original path. Find the refractive index of the medium.

**Options:**

- (a) 2.314
- (b) 1.414
- (c) 1.314
- (d) 1.333

**Answer:** (b)

**Solution:**



$$\sin \pi = \mu \sin 30^\circ$$

$$\mu = \sqrt{2}$$

**Question:** Wire length of 1 m divided in x and y wire x stretched to twice, then stretched wire is twice the resistance of y.

**Options:**

- (a) 2: 1
- (b) 1:2
- (c) 4:1
- (d) 1:4

**Answer:** (b)

**Solution:**

Then  $\frac{\text{Length of } x}{\text{Length of } y}$

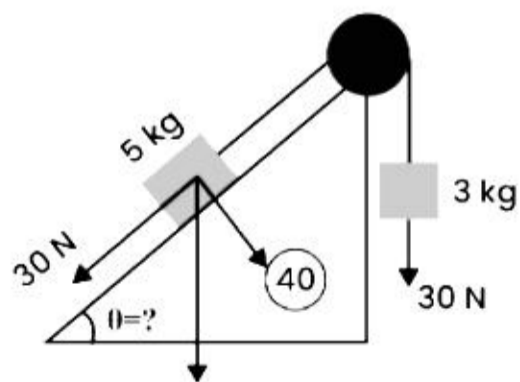
$$1 = x + y \dots (1)$$

$$4x = 2y$$

$$4\left(\frac{\rho x}{A}\right) = 2\left(\frac{\rho y}{A}\right)$$

$$\frac{x}{y} = \frac{1}{2}$$

**Question:** At equilibrium Reaction force by inclined place.

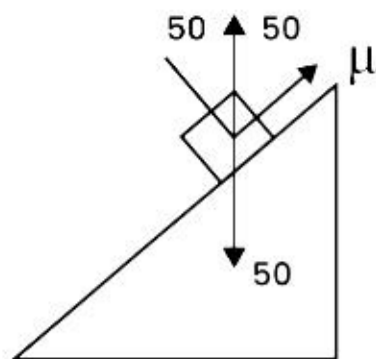


**Options:**

- (a) 30
- (b) 40
- (c) 50
- (d) 10

**Answer:** (b)

**Solution:**



**Question:** Match the following

A – Torque, 1 –  $\text{Nms}^{-1}$

B – Stress, 2 –  $\text{Jkg}^{-1}$

C – Latent, 3 –  $\text{Nm}$

D- Power, 4 –  $\text{Nm}^{-2}$

**Options:**

(a) A→1, B→4, C→3, D→2

(b) A→3, B→4, C→2, D→1

(c) A→1, B→3, C→2, D→4

(d) A→2, B→1, C→4, D→3

**Answer:** (b)

**Solution:**

A→3, B→4, C→2, D→1

**Question:** Assertion: Constantan and manganin are used in resistance coil.

Reason: their temperature coefficient of resistance is low

**Options:**

(a) If both assertion and reason are true and the reason is the correct explanation of the assertion.

(b) If both assertion and reason are true, but the reason is not the correct explanation of the assertion.

(c) If assertion is true, but reason is false.

(d) If both the assertion and reason are false.

**Answer:** (a)

**Solution:**

$$\alpha \approx 0$$

$$R = R_0 (1 + \alpha \Delta T)$$