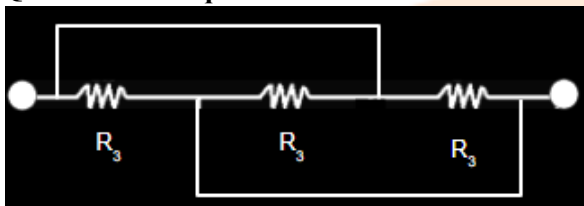


**JEE-Main-28-01-2025 (Memory Based)**  
**[MORNING SHIFT]**

**Physics**

**Question:** The equivalent resistance across A and B is



**Options:**

- (a)  $R/3$
- (b)  $R/2$
- (c)  $R/9$
- (d)  $R$

**Answer:** (c)

**Question:** A uniform wire of linear charge density  $\lambda$  is placed along y-axis. The locus of equipotential

**Options:**

- (a)  $x^2 + y^2 + z^2 = \text{constant}$
- (b)  $x^2 + z^2 = \text{constant}$
- (c)  $xyz = \text{constant}$
- (d)  $xy + yz + zx = \text{constant}$

**Answer:** (b)

**Question:** Three Carnot engines operating at different temperatures ranging from

$273 \text{ K} \rightarrow 473 \text{ K}$ ,  $373 \text{ K} \rightarrow 473 \text{ K}$ ,  $273 \text{ K} \rightarrow 373 \text{ K}$ , Find % efficiency nearly

**Options:**

- (a) 42, 21, 26
- (b) 52, 24, 28
- (c) 22, 21, 26
- (d) 50, 21, 26

**Answer:** (a)

**Question:** Which of the following reactions is correct? (Where symbols have their usual meanings)

**Options:**

- (a)  $n \rightarrow p + e^- + \bar{\nu}$

- (b)  $n \rightarrow p + e^+ + \bar{\nu}$
- (c)  $n \rightarrow p + e^+ + \bar{\nu}$
- (d)  $n \rightarrow p + e^- + \bar{\nu}$

Answer: (d)

Question: Two disc having equal mass, radius of one is twice the other find the ratio of  $I_1/I_2$  ( $r_2 = r_1 \times 2$ )

Options:

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

Answer: (a)

Question: An ice water mixture is present at 273 Kelvin at the initial pressure equal to atmospheric pressure if the pressure is doubled keeping the temperature constant then

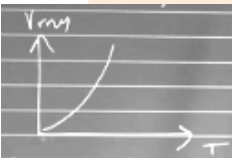
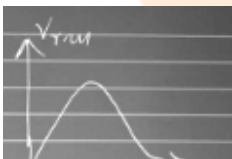


Options:

- (a) More ice will melt
- (b) More ice water will convert to ice
- (c) Water will vapourize completely
- (d) Water will completely convert to ice

Answer: (a)

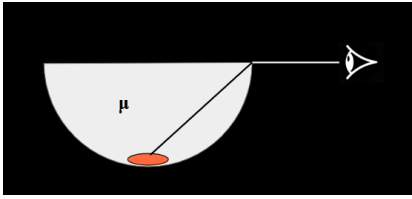
Question: The graph of root mean square velocity versus temperature is ?

Options:

- (a) 
- (b) 
- (c) 
- (d) 

Answer: (d)

**Question:** A coin is placed at the bottom of a hemispherical container filled with a liquid of refractive index  $\mu$ . Find the least refractive index if the coin is visible to an observer at E.

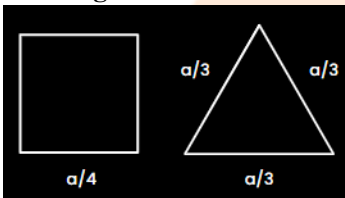


**Options:**

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

**Answer:** (b)

**Question:** In the given figure, the square and the triangle have the same resistance per unit length. Find the ratio of their resistances about adjacent corners.

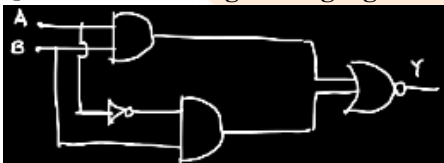


**Options:**

- (a)  $32/27$
- (b)  $27/32$
- (c)  $8/9$
- (d)  $9/8$

**Answer:** (b)

**Question:** For the given logic gates combination correct truth table will be



**Options:**

(a)

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

(b)

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

(c)

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

(d)

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

Answer: (d)

**Question:** Assertion : Work done by central force is independent of path.

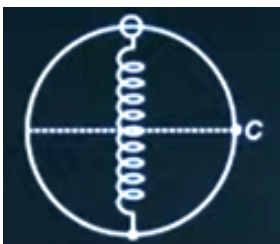
**Reason :** Potential energy is associated with every force.

**Options:**

- (a) Both Assertion and Reason are correct
- (b) Assertion is correct, Reason is incorrect
- (c) Assertion is incorrect, Reason is correct
- (d) Both Assertion and Reason are incorrect

Answer: (d)

**Question:** There is a smooth ring of radius  $R$  in the vertical plane. A spring of natural length  $R$  and elastic constant  $K$  is vertical across along a diameter. The free end is connected to bead of mass  $m$  and when slightly disturbed it reaches point  $C$  with speed where  $V$  is



**Options:**

- (a)  $\sqrt{\frac{KR^2(\sqrt{2}-1) + 2mgR}{m}}$
- (b)  $\sqrt{\frac{2KR^2(\sqrt{2}-1) + 2mgR}{m}}$
- (c)  $\sqrt{\frac{2KR^2(\sqrt{2}-1) + mgR}{m}}$
- (d)  $\sqrt{\frac{KR^2(\sqrt{2}-1) + mgR}{m}}$

Answer: (b)

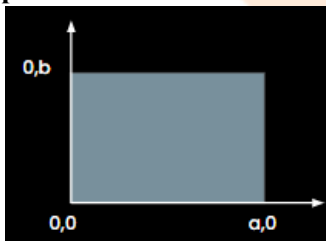
Question: A proton moving at kinetic energy  $E$  has the same kinetic energy as that of a photon. The ratio of de-Broglie wavelength of proton to photon is

Options:

- (a)  $\frac{1}{C} \sqrt{\frac{2E}{m}}$
- (b)  $\frac{1}{C} \sqrt{\frac{E}{2m}}$
- (c)  $\frac{2}{C} \sqrt{\frac{E}{m}}$
- (d)  $\frac{2}{C} \sqrt{\frac{2E}{m}}$

Answer: (b)

Question: Surface mass density varies as  $\sigma = \frac{\sigma_0 x}{ab}$  for the given plane sheet. Find the position of centre of mass for the distribution given



Options:

- (a)  $2a/3, 2b/3$
- (b)  $2a/3, b/2$
- (c)  $a/3, b/2$
- (d)  $a/2, b/2$

Answer: (b)

**Question:** Identify the correct statement/s from the following list and select the appropriate option.

- I) The coefficient of viscosity decreases as the temperature increases.
- II) Terminal velocity of a spherical body falling through a viscous fluid depends on its radius  $r$ , its density and acceleration due to gravity.
- III) Terminal velocity of a spherical body falling through a viscous fluid depends only on density of body and density of fluid.
- IV) The coefficient of viscosity is independent of temperature.
- V) Viscous force acting on a spherical body is directly proportional to speed of body

**Options:**

- (a) I, II, V
- (b) III, V
- (c) I, II, V
- (d) III, VI, V

**Answer:** (c)

**Question:** When light of 600 nm is used, the 10th bright fringe is 10 mm from central bright. Find the distance from central max if light of 660 nm is used.

**Options:**

- (a) 10 mm
- (b) 11 mm
- (c) 12 mm
- (d) 14 mm

**Answer:** (b)

**Question:** Dispersion without deviation is produced by two thin (small angled) prisms which are combined together. One prism has angle  $4^\circ$  and refractive index 1.56. If the other prism has refractive index 1.7, what is its angle ?

**Options:**

- (a)  $3.2^\circ$
- (b)  $2.2^\circ$
- (c)  $5.5^\circ$
- (d)  $8^\circ$

**Answer:** (a)

**Question:** 3 infinite wires each having linear charge density  $\lambda$  are kept, one each at  $x$ ,  $y$  and  $z$  axis respectively. Then the locus of equipotential surface will be

**Options:**

- (a)  $xyz = \text{constant}$
- (b)  $xy + yz + zx = \text{constant}$
- (c)  $(x+y)(y+z)(z+x) = \text{constant}$
- (d)  $(x^2 + y^2)(y^2 + z^2)(z^2 + x^2) = \text{constant}$

**Answer:** (d)

**Question:** If the area of 2.5 mm x 5 mm sheet is calculated using a screw gauge of pitch 0.75 mm and 15 division on circular scale, then the error in the calculation of area is  $x/100$ . Find  $x$  after rounding off.

**Options:**

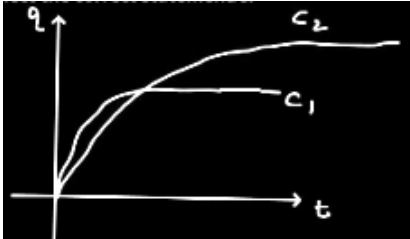
- (a) 38
- (b) 48

(c) 58

(d) 28

Answer: (a)

Question: If two capacitors  $C_1$  and  $C_2$  are in parallel combination. Variation of charge stored on capacitor with time is show in the graph. Select the correct statement/s.



(1)  $C_1 > C_2$

(2)  $C_1 < C_2$

(3)  $U_1 > U_2$

(4)  $U_1 < U_2$

Options:

(a) 1 & 3

(b) 1 & 4

(c) 2 & 3

(d) 2 & 4

Answer: (d)