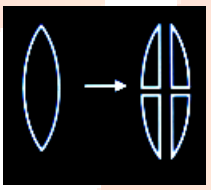
JEE-Main-22-01-2025 (Memory Based)
[EVENING SHIFT]
Physics

Question: A ball is thrown at 20 m/s at 60° horizontally. The difference in kinetic energy at highest point of trajectory and at the point of release is;(m = mass)
Options:
(a) 200 m
(b) 50 m
(c) 150 m
(d) 100 m
Answer: (c)

$$K_1 = \frac{1}{2} \times m \times 20 \times 20$$
$$= 200\,m$$
$$K_2 = \frac{1}{2} \times m \times 10 \times 10$$
$$= 50\,m$$

Question: An equiconvex lens of focal length f, is cut into four parts as shown in the diagram. The focal length of each part is
Options:
(a) 4f
(b) f/2
(c) 2f
(d) f/4
Answer: (c)



Question: The radius of a tube decreases from 2R to R in which ideal liquid is flowing at the same level. Speed at one end is 2 m/s as shown, find speed v at other end
Options:
(a) 4 m/s
(b) 1 m/s
(c) 2 m/s
(d) 8 m/s
Answer: (c)

Question:Statement 1: Time period of pendulum changes on a planet whose mass is 4 times and radius is 2 times that of earth
Statement 2: Mass of pendulum is same on both planets
Options:
(a) Both the assertion and reason are true, and the reason is the correct explanation of the assertion
(b) Both the assertion and reason are true, but the reason is not the correct explanation of the assertion
(c) The assertion is true, but the reason is false

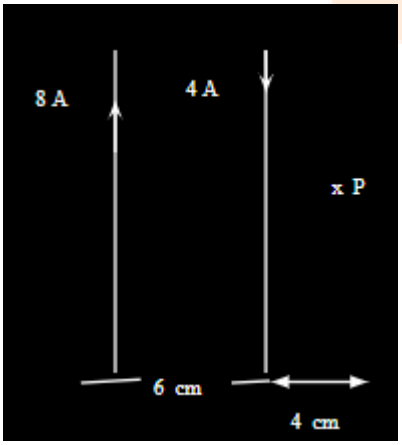
(d) The assertion is false, but the reason is true
Answer: (d)

Question: The dimensional formula of capacitance is
Options:
(a) $[M^{-1}L^{2}T^{2}A^{-3}]$
(b) $[M^{-1}L^{-2}T^{4}A^{3}]$
(c) $[M^{-1}L^{-2}T^{4}A^{2}]$
(d) $[M^{-1}L^{-2}T^{2}A^{2}]$
Answer: (c)

Question: A proton is moving with uniform velocity of 2 x 10^{8} m/s in uniform magnetic and electric fields which are perpendicular to each other. If the electric field is switched off then the proton moves in a circular path of radius 1.6 x 10^{-5} m. Then magnetic field is:
Options:
(a) 5 × 10^{-5} T
(b) 1.2 × 10^{5} T
(c) 2.5 × 10^{4} T
(d) 2.5 × 10^{2} T
Answer: (b)

Question: The displacement of a particle moving under the action of a force $\overrightarrow{F} = 2\hat{i} + b\hat{j} + \widehat{k}$ **is** $\overrightarrow{d} = \hat{t} + \hat{j} + \widehat{k}.$ **Find the value of b if the work done by the force is zero.**
Options:
(a) 0
(b) +3
(c) -3
(d) -1
Answer: (c)

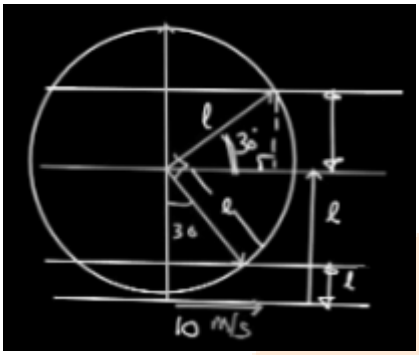
Question: Find the Magnetic field at point P due to System of conducting wires as shown(Answer in micro Tesla)



Options:
(a) 1
(b) 2

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

Question: A pendulum having a small bob of mass m and length of thread 1m is performing vertical circular as showing in the figure. If it linear velocity of bob at point C is 10 m/s. Find difference between speed of bob at point A and B



Options:

(a) $V_A - V_B = \sqrt{10}\left[\sqrt{8+\sqrt{3}+\sqrt{7}}\right]$

(b) $V_A - V_B = \sqrt{10}\left[\sqrt{8-\sqrt{3}-\sqrt{7}}\right]$

(c) $V_A - V_B = \sqrt{10}\left[\sqrt{8+\sqrt{3}-\sqrt{7}}\right]$

(d) $V_A - V_B = \sqrt{10}\left[\sqrt{7}-\sqrt{8+\sqrt{3}}\right]$

Answer: (c)

Question: A force is acting along the x axis whose magnitude is changing as per the given equation $F = 8x^2 - 3$ If at an incident work done is O then find the variable x .

Options:

(a) $\frac{1}{2\sqrt{2}}$

(b) $\frac{3}{2\sqrt{2}}$

(c) $\sqrt{2}$

(d) 0

Answer: (b)

Question: The point A is situated on the axis of dipole at a distance 'r' from the dipole with $\in_0$ & V_0 the electric field & electric potential at A Find electric field & potential at a point B at distance "2r" from dipole on its perpendicular bisector in terms of $\in_0$ & V_0

Options:

(a) $\frac{\in_0}{16}, 0\, V_0$

(b) $\frac{\in_0}{16}, 8\,V_0$

(c) $\frac{\in_0}{16}, 3\,V_0$

(d) $\frac{\in_0}{8}, 16\,V_0$

Answer: (a)

Question: The maximum percentage error in the measurement of density of a wire is
m=(0.60 ± 0.003) g
r=(0.50 ± 0.01)cm
l =(10.00±0.05)cm
Options:
(a) 5 %
(b) 2 %
(c) 10 %
(d) 12 %
Answer: (a)

Question: Statement-I : Fringe width of red light is more than fringe width of violet light.
Statement-II : Fringe width is directly proportional to the wavelength of light used.
Choose the correct option.
Options:
(a) Statement-I is correct and statement-II is incorrect
(b) Both statement-I and statement-II are correct
(c) Statement-I is incorrect and statement-II is correct
(d) Both statement-I and statement-II are incorrect
Answer: (b)

Question: In a photoelectric emission, Radiation of wavelength "λ" strikes a plate whose work function is 1 e V and K.E of emitted electron is 4 eV. If the wavelength of electricity radiation becomes half then find the K.E of outcoming electrons.
Options:
(a) 9 eV
(b) 10 eV
(c) 3 eV
(d) 2 eV
Answer: (a)

Question: A force $\overrightarrow{F} = 2\hat{i} + \hat{j} + 2\hat{k}$ **acting at a point (1, 1, 1). Find the torque of this force about the origin.**
Options:
(a) $\hat{i} + \hat{j} + \hat{k}$

(b) $\hat{i} + \hat{j}$

(c) $\hat{i} - \hat{k}$

(d) $\hat{j} - \hat{k}$

Answer: (c)

Question: For non-vibrating diatomic gas has adiabatic constant of γ_1 & for vibrating diatomic gas has diabatic constant of γ_2 then

Options:

(a) $\gamma_1 > \gamma_2$

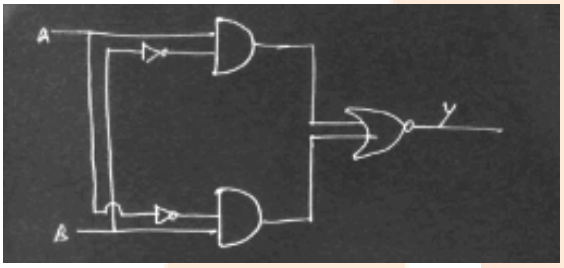
(b) $\gamma_1 < \gamma_2$

(c) $\gamma_1 = \gamma_2$

(d) None of these

Answer: (a)

Question: The truth table for above is :



Options:

(a)

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

(b)

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

(c)

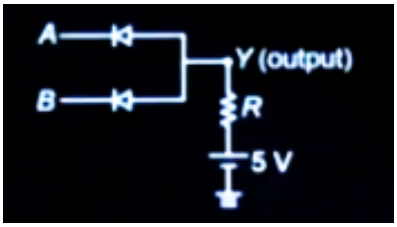
A	B	Y
0	0	1
0	1	1
1	0	0
1	1	0

(d)

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

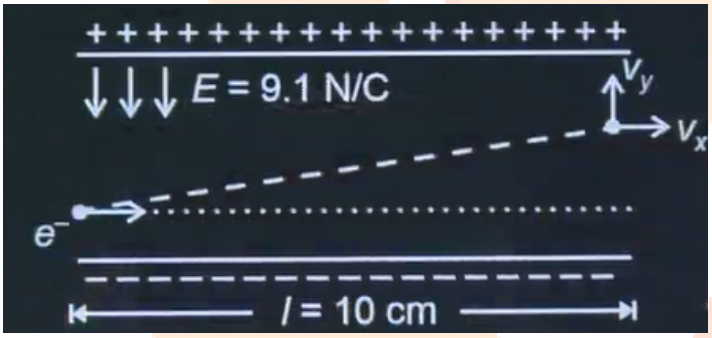
Answer: (a)

Question: Name the logic gate



Options:
(a) OR
(b) AND
(c) NOT
(d) NAND
Answer: (b)

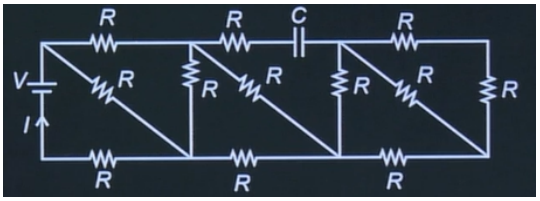
Question: The figure shows an electron entering the space between the plates of a parallel plate capacitor with an initial velocity, $V_x = 10^6$ m/s parallel to the plates. If the length of plates is l = 10 cm and the electric field in the region E = 9.1 N/C, then the value of v_y when the electron comes out of the plates is
(Electronic mass = 9.1×10^{-31} kg)



Options:
(a) 1.6×10^4 m/s
(b) 1.6×10^5 m/s
(c) 1.6×10^7 m/s
(d) 1.6×10^3 m/s
Answer: (b)

Question: Find the equivalent power of the thin lens combination shown in the figure.
Options:
(a) $\left(\frac{R_1+R_2}{R_1+R_2}\right)$
(b) $-\left(\frac{R_1+R_2}{R_1R_2}\right)$
(c) $-\left(\frac{R_1+R_2}{6R_1R_2}\right)$
(d) $+\left(\frac{R_1+R_2}{6R_1R_2}\right)$
Answer: (c)

Question: In the RC circuit shown, find l .



Options:

(a) $\frac{V}{5R}$

(b) $\frac{5V}{3R}$

(c) $\frac{8V}{13R}$

(d) $\frac{3V}{R}$

Answer: (c)

Question: Solid sphere of mass M, radius R exerts force F on a point mass. Now a concentric spherical mass M/7 is removed. What is new force?

Options:

(a) $\frac{F}{7}$

(b) $\frac{6}{7}F$

(c) $\frac{5F}{7}$

(d) $\frac{3F}{7}$

Answer: (b)