PAPER SOLUTION

From Meerut

JEE MAIN

2025

JAN	SHIFT
28	2nd

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Question Paper

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#Q. Bohr's model is applicable for single electron atom of atomic number Z. Dependency of frequency of rotation of electron in nth principal quantum number is proportional to :

A Z/n^2

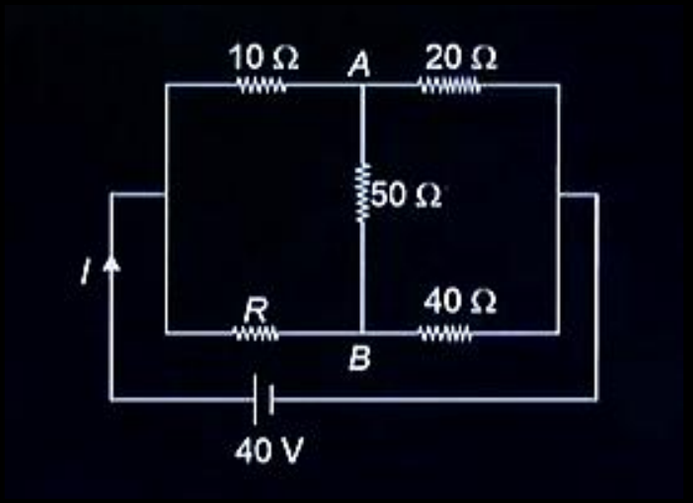
B Z^2/n^3

C Z^3/n

D Z/n

Ans. (B)

#Q. In the given circuit, find I if the potentials at A and B are equal



(A) 1 A

(B) 2 A

(C) 3 A

(D) 4 A

Ans. (B)

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#Q. In an electromagnetic wave, the magnetic field is given as $\vec{B} = \left(\frac{\sqrt{3}}{2}\hat{\imath} + \frac{1}{2}\hat{\jmath}\right) 30\ sin\ (\omega t - kz)$ the corresponding electric field is :

A $\left(\frac{1}{2}\hat{\imath} + \frac{\sqrt{3}}{2}\hat{\jmath}\right) 9 \times 10^9\ sin(\omega t - kz)$

B $\left(\frac{1}{2}\hat{\imath} - \frac{\sqrt{3}}{2}\hat{\jmath}\right) 9 \times 10^9\ sin(\omega t - kz)$

C $\left(\frac{1}{2}\hat{\imath} + \frac{\sqrt{3}}{2}\hat{\jmath}\right) 9 \times 10^9\ cos(\omega t - kz)$

D $\left(\frac{1}{2}\hat{\imath} - \frac{\sqrt{3}}{2}\hat{\jmath}\right) 9 \times 10^9\ cos(\omega t - kz)$

Ans. (B)

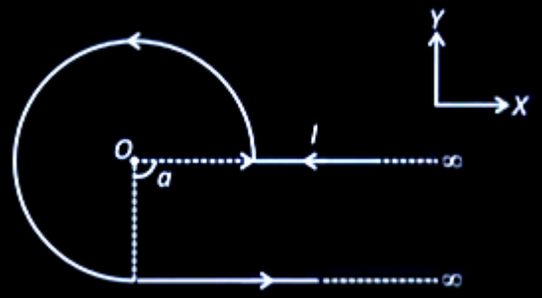
#Q. The magnetic field $\vec{B}$ at the centre O of the given arrangement is

(A) $\frac{+\mu_0 I}{8\pi a}(3\pi+2)\hat{k}$

(B) $\frac{-\mu_0 I}{8\pi a}(3\pi+2)\hat{k}$

(C) $\frac{+\mu_0 I}{8\pi a}(3\pi-2)\hat{k}$

(D) $\frac{-\mu_0 I}{8\pi a}(3\pi-2)\hat{k}$



Ans. (A)

#Q. A cube of side 10 cm having bulk modulus of 1.4×10^{11} Pa placed in atmosphere. Now it is subjected to extra pressure 0f 7×10^{6} Pa then magnitude of change in volume of cube is :

(A) 0.03 mL

(B) 0.3 mL

(C) 0.05 mL

(D) 0.2 mL

Ans. (C)

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#Q. Which of the following phenomenon is not explained by wave theory of light ?

A Reflection of light

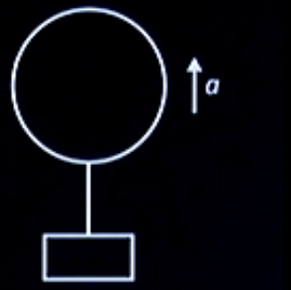
B Refraction of light

C Diffraction

D Compton effect

Ans. (D)

#Q. 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)



Ans. $m = \frac{2Ma}{3a + g}$

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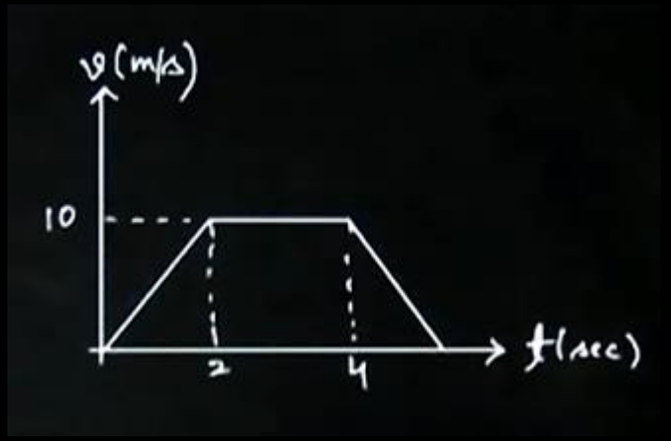
#Q. The escape velocity the surface of earth of 11.2 k/s. Find the escape velocity from the planet whose radius is 2 times the radius of earth and mass is 8 time that of earth.

Ans. (22.4 km/s)

#Q. Find the distance travelled by the body in 4 sec.



Ans. (30 m)

#Q. An equilateral triangle frame of side l is carrying current I, find magnetic field at its centroid :

A $\frac{3\mu_0 i}{4\pi l}$

B $\frac{3\mu_0 i}{\pi l}$

C $\frac{9\mu_0 i}{2\pi l}$

D $\frac{\mu_0 i}{\pi l}$

Ans. (C)

#Q. Choose the correct option representing the energy density between the plates of a parallel plate capacitor with plate area A, plate separation d and potential difference V.

A $\frac{\varepsilon_0 V^2}{2d^2}$

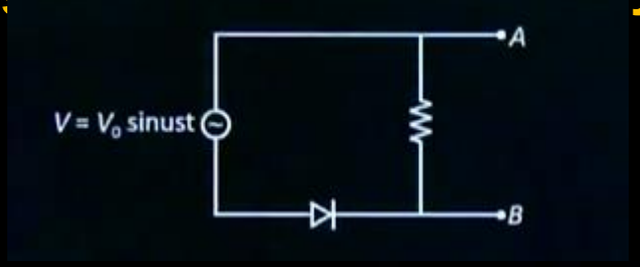
B $\frac{\varepsilon_0 V^2}{2}$

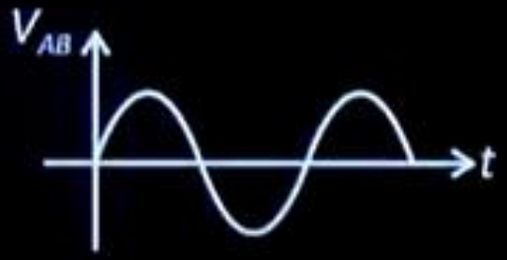
C $\frac{\varepsilon_0 A V^2}{2d}$

D $\frac{\varepsilon_0 A V^2}{2d^2}$

Ans. (A)

#Q. The correct variation of voltage across AB is given by (consider that the threshold voltage of the diode is very small).



A


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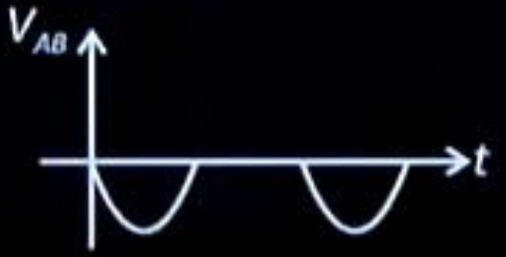
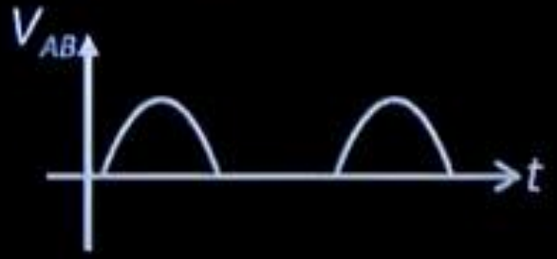


C


D

Ans. (B)

#Q. 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 :

Ans. (15)

#Q. An electric dipole of moment 6×10^{-6} cm is placed parallelly in electric field of strength of 10^6 N/C. Work done required to rotated the dipole by 180° is X joules, then X is :

Ans. (12)

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#Q. Column-A shows physical quantities and column-B shows dimensions. Match them correctly.:

Column-A	Column-B
(A) Angular impulse	(P) $L^2 T^{-2}$
(B) Resistivity	(Q) ML^2T^{-1}
(C) Voltage	(R) $ML^2T^{-3}A^{-1}$
(D) Latent heat	(S) $ML^3T^{-2}A^{-2}$

A A-Q, B-R, C-S, D-P

B A-R, B-S, C-P, D-Q

C A-S, B-P, C-Q, D-R

D A-Q, B-S, C-R, D-P

Ans. (D)

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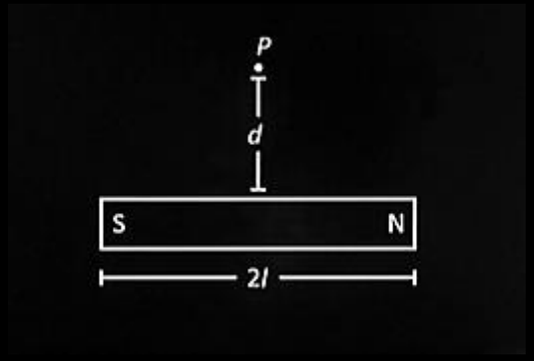
#Q. Due to the bar magnet shown, if the % uncertainly in d is 1%, find uncertainty in the magnetic field at P. [d : 10 units, l = 10 units):



(A) 2%

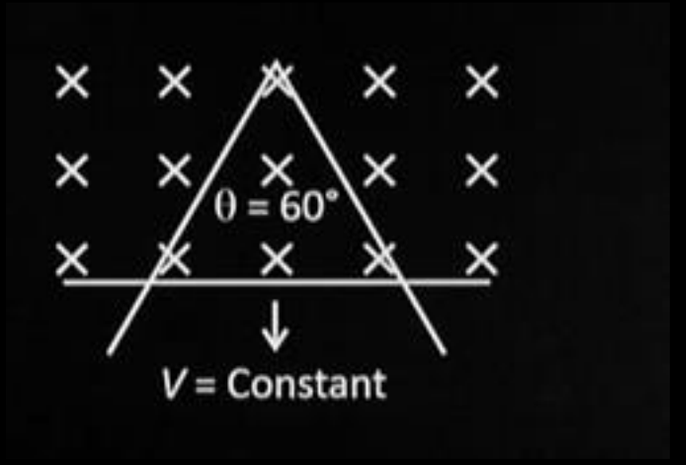
(B) 3%

(C) 1.5%

(D) 0.5%

Ans. (C)

#Q. The figure shows a conducting rod sliding on two conducting rails having angle ($\theta = 60^{o}$) in a uniform magnetic field with a constant velocity V. Find n if the motional emf E various with time as $E = ct^{n}$.



Ans. (1)