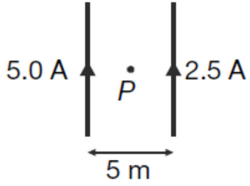
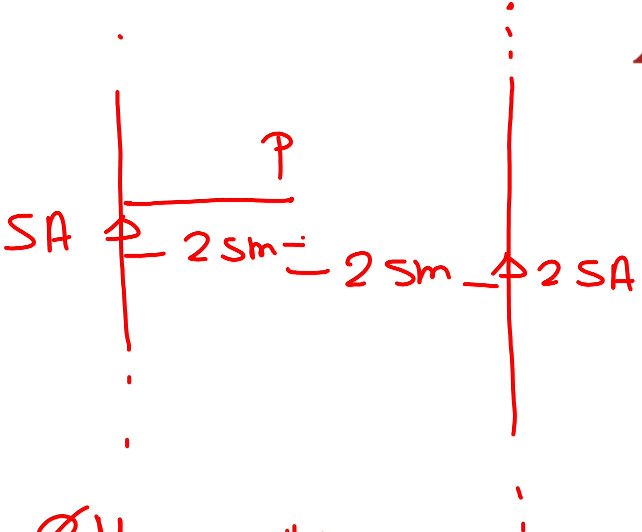
The magnetic field at centre, P will be



(a) $\frac{\mu_o}{4\pi}$ (b) $\frac{\mu_o}{\pi}$

(c) $\frac{\mu_o}{2\pi}$ (d) $4\mu_o\pi$



$$(B_5) = \frac{\mu_0 \cancel{5}\,2}{2\pi \times 2.\cancel{5}} = \frac{\cancel{2}\mu_0}{\cancel{2}\pi} = \frac{\mu_0}{\pi} \otimes$$

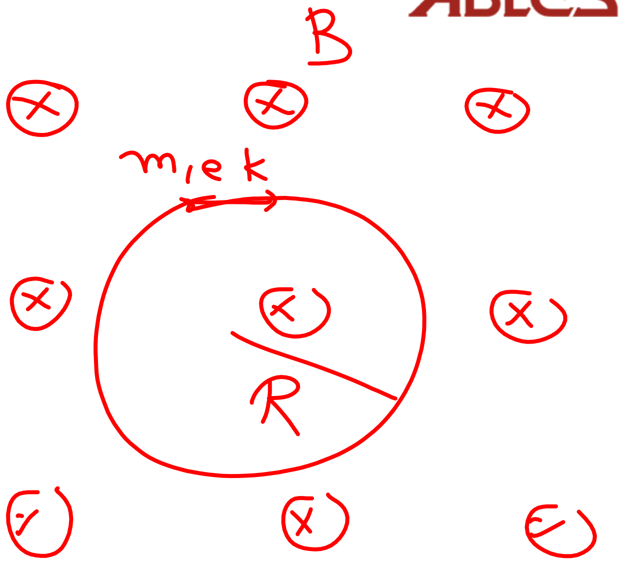
$$(B_{2.5}) = \frac{\mu_0 (\cancel{2.5})}{2\pi(\cancel{2.5})} = \frac{\mu_0}{2\pi} \odot$$

$$B_{net} = \frac{\mu_0}{\pi} - \frac{\mu_0}{2\pi} = \frac{\mu_0}{2\pi} \otimes$$

An electron having mass m and kinetic energy E enter in uniform magnetic field B perpendicularly, then its frequency will be

(a) $\frac{eE}{qvB}$ (b) $\frac{2\pi m}{eB}$

(c) $\frac{eB}{2\pi m}$ (d) $\frac{2m}{eBE}$



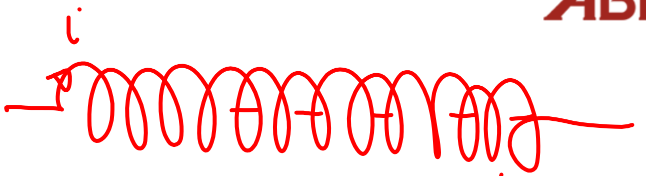
$$T = \frac{2\pi m}{qB} = \frac{2\pi m}{eB}$$

$$f = \frac{1}{T} = \frac{eB}{2\pi m}$$

A long solenoid carrying a current produces a magnetic field B along its axis. If the current is doubled and the number of turns per cm is halved, the new value of the magnetic field is

(a) $B/2$ (b) B

(c) $2\,B$ (d) $4\,B$



$$B = \mu_0 n i \qquad n$$

$$i \longrightarrow 2i$$

$$n \longrightarrow \frac{n}{2} \qquad B' = \mu_0 \left(\frac{n}{\cancel{2}}\right) \cancel{2} i$$

$$= \mu_0 n i = B$$

Two bulbs of (40 W, 200 V), and (100 W, 200 V). Then correct relation for their resistances

(a) $R_{40} < R_{100}$

(b) $R_{40} > R_{100}$

(c) $R_{40} = R_{100}$

(d) no relation can be predicted

$P = \frac{V^2}{R}$ → Rating

(1) (40W, 200V)

(11) (100W, 200V)

$R_1 = \frac{V_1^2}{P_1} = \frac{200 \times 200}{40} = 1000\,\Omega$

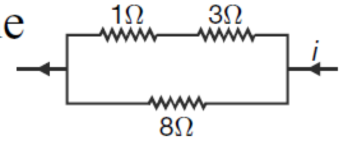
$R_1 = 1000\,\Omega$

$\boxed{R_{40} > R_{100}}$

$R_2 = \frac{V_2^2}{P_2} = \frac{200 \times 200}{100} = 400\,\Omega$

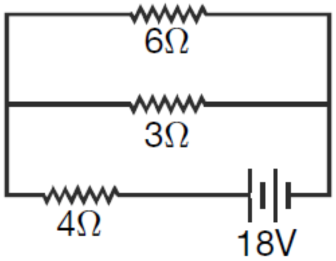
$R_2 < R_1$

Power dissipated across the 8 Ω resistor in the circuit shown here is 2 watt. The power dissipated across the 3 Ω resistor is



(a) 3.0 W
(b) 2.0 W
(c) 1.0 W
(d) 0.5 W

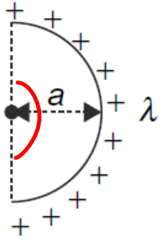
The total power dissipated in watt in the circuit shown here is



(a) 40 (b) 54

(c) 4 (d) 16

Electric field at centre O of semicircle of radius a hav-ing linear charge density λ given as



$E = \frac{2k\lambda}{R}\sin\frac{\alpha}{2}$

(a) $\frac{2\lambda}{\varepsilon_o a}$

$E = \frac{\cancel{2}\times 1}{\cancel{4}\pi\varepsilon_0 R}\lambda \cdot \sin\left(\frac{180}{2}\right)$

(b) $\frac{\lambda\pi}{\varepsilon_o a}$

(c) $\frac{\lambda}{2\pi\varepsilon_o a}$

$= \frac{\lambda}{2\pi\varepsilon_0 R}\sin 90$

(d) $\frac{\lambda}{\pi\varepsilon_o a}$

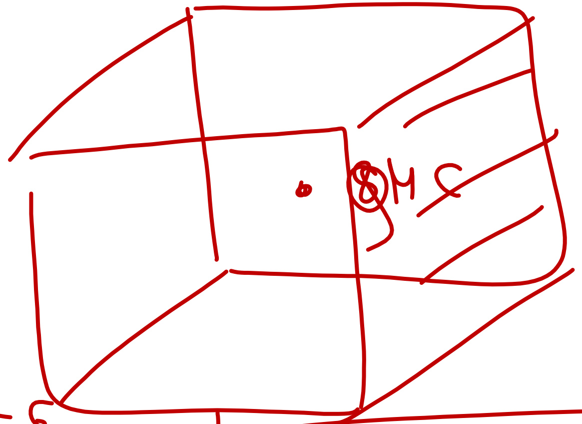
$\boxed{= \frac{\lambda}{2\pi\varepsilon_0 R}} = \frac{\lambda}{2\pi\varepsilon_0 a}$

$E = \frac{2k\lambda}{R}\sin\frac{\alpha}{2}$

A charge Q μC is placed at the centre of a cube, the flux coming out from each face will be

(a) $\frac{Q}{6\varepsilon_o}\times10^{-6}$ (b) $\frac{Q}{6\varepsilon_o}\times10^{-3}$

(c) $\frac{Q}{24\varepsilon_o}$ (d) $\frac{Q}{8\varepsilon_o}$



$$\phi = \frac{q_{in}}{\varepsilon_0} = \frac{9\times10^{-6}}{\varepsilon_0}$$

$$\phi_{Total} = \frac{9\times10^{-6}}{\varepsilon_0}$$

$$\boxed{\phi_{oneface} = \frac{9\times10^{-6}}{6\varepsilon_0}}$$

A dipole of dipole moment $\vec{p}$ is placed in uniform electric field $\vec{E}$ then torque acting on it is given by

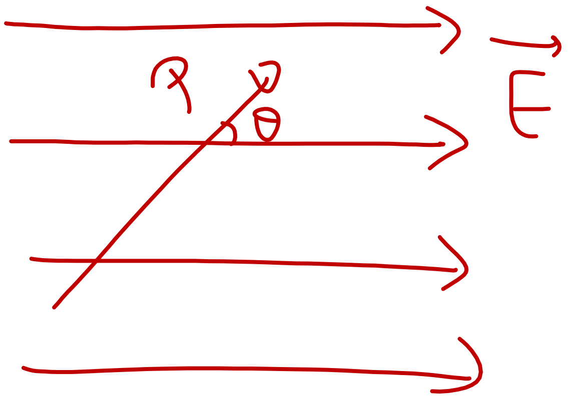
(a) $\vec{\tau} = \vec{p} \cdot \vec{E}$

(b) $\vec{\tau} = \vec{p} \times \vec{E}$

(c) $\vec{\tau} = \vec{p} + \vec{E}$

(d) $\vec{\tau} = \vec{p} - \vec{E}$

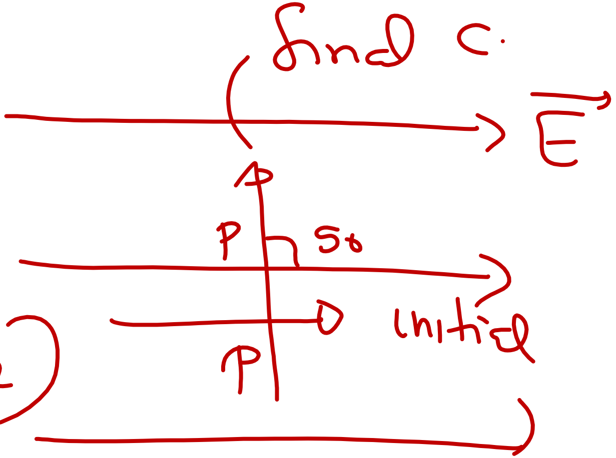
$\vec{\tau} = \vec{P} \times \vec{E}$



An electric dipole of moment $\vec{p}$ is lying along a uniform electric field $\vec{E}$. The work done in rotating the dipole by 90° is

(a) pE ✓ (b) $\sqrt{2}\,pE$

(c) $pE/2$ (d) $2pE$



$$W = PE(\cos\theta_1 - \cos\theta_2)$$

$$W = PE[\cos 0 - \cos 90^\circ]$$

$$= PE[1 - 0]$$

$$\boxed{W = PE}$$

1	2	3	4	5	6	7	8	9	10
C	C	B	B	A	B	C	A	B	A