DPP
DAILY PRACTICE PROBLEMS

Class : XIIth
Date :

Solutions

Subject : PHYSICS
DPP No. : 8

Topic :- MOVING CHARGES AND MAGNETISM

1 **(d)**

The magnetic induction at O due to the current in portion AB will be zero because O lies on AB when extended

2 **(d)**

Use Right hand palm rule, or Maxwell's Cork screw rule or any other

4 **(c)**

Magnetic field on the axis of circular current

$$B = \frac{\mu_0}{4\pi} \cdot \frac{2\pi n i r^2}{(x^2 + r^2)^{3/2}} \Rightarrow B \propto \frac{n r^2}{(x^2 + r^2)^{3/2}}$$

5 **(b)**

$M = I \times$ Area of loop $\hat{k}$

$$= I \times \left[a^2 + \frac{\pi a^2}{4 \times 2} \times 4\right]\hat{k}$$

$$= I \times a^2\left[\frac{\pi}{2} + 1\right]\hat{k}$$

6 **(c)**

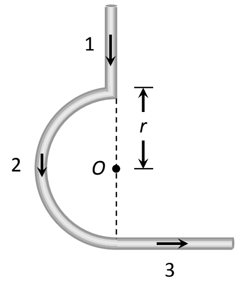
Magnetic field due to different parts are

$B_1 = 0$

$$B_2 = \frac{\mu_0}{4\pi} \cdot \frac{\pi i}{r} \odot$$

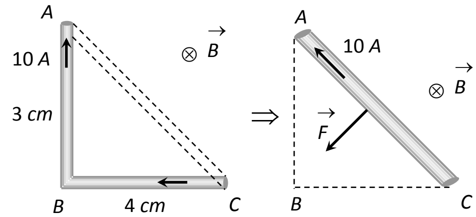
$$B_3 = \frac{\mu_0}{4\pi} \cdot \frac{i}{r} \odot$$

$$\therefore B_{net} = B_2 + B_3 = \frac{\mu_0 i}{4r} + \frac{\mu_0 i}{4\pi r}$$



7 **(c)**

According to the question figure can be drawn as shown below



Force on the conductor $ABC =$ Force on the conductor AC

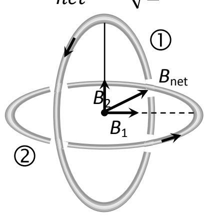
$= 5 \times 10 \times (5 \times 10^{-2}) = 2.5N$

8 **(a)**

$$B_1 = B_2 = B = \frac{\mu_0}{4\pi} \times \frac{2\pi i}{r}$$

$$B_{net} = \sqrt{2}B$$

$$\Rightarrow \frac{B}{B_{net}} = \frac{1}{\sqrt{2}}$$



9 **(d)**

$$B_{\text{axis}} = \frac{\mu_0 niR^2}{2(R^2 + x^2)^{3/2}}$$

$$B_{\text{centre}} = \frac{\mu_0 ni}{2R}$$

At $x = \sqrt{3}R$, $\quad B_{\text{axis}} = \frac{\mu_0 niR^2}{2(R^2 + 3R^2)^{3/2}} = \frac{\mu_0 ni}{16R}$

$$\therefore \frac{B_{\text{centre}}}{B_{\text{axis}}} = \frac{8}{1}$$

10 **(b)**

Since particle is moving undeflected

So $qE = qvB \Rightarrow B = E/v = \frac{10^4}{10} = 10^3 Wb/m^2$

11 **(d)**

Along the axis of coil $\vec{v}$ and $\vec{B}$ are parallel, so $F = 0$

12 **(c)**

$$B = \frac{\mu_0}{4\pi}\frac{2\pi i}{r}\frac{\mu_0}{4\pi}\frac{2\pi}{r}\frac{e}{(2\pi r/v)} = \frac{\mu_0}{4\pi}\frac{ev}{r^2}$$

$$= \frac{10^{-7} \times 1.6 \times 10^{-19} \times 7.5 \times 10^{+4}}{(5.3 \times 10^{-11})^2}$$

On solving $B = 0.43\ \text{Wb m}^{-2}$

13 **(b)**

Here, $i_g = 0.005$ A; $V = 500$ volt;

$R = 965\ \Omega$, G=?

$R = \frac{V}{i_g} - G$

Or $G = \frac{V}{i_g} - R = \frac{5}{0.005} - 975 = 25\Omega$

14 **(b)**

$$B = \frac{\mu_0}{4\pi}\frac{2\pi i}{r} = 10^{-7} \times \frac{2\pi \times 2}{0.0157} = 8 \times 10^{-5} Wb/m^2$$

15 **(c)**

$$v = \frac{E}{B} = \frac{20}{5} = 4\ m/s$$

16 **(a)**

For first case, the wire of length L is bent to form a circular coil of one turn,

$$L = 2\pi r_1$$

Similarly for second case,

$$L = 4\pi r_2$$

Now, $2\pi r_1 = 4\pi r_2$ or $r_2 = \frac{r_1}{2}$

$$\therefore \quad B_1 = \frac{\mu_0 I}{2r_1}$$

$$B_2 = \frac{\mu_0 I}{2r_2} = \left(\frac{\mu_0 I}{2r_1}\right) \times 2$$

$$\Rightarrow \quad B_2 = 2B_1$$

17 **(a)**

Time period is given by $T = \frac{2\pi m}{qB}$

$\Rightarrow$ Frequency $v = \frac{1}{T} = \frac{qB}{2\pi m}$

18 **(d)**

The component of velocity perpendicular to H will make the motion circular while that parallel to H will make it move along a straight line. The two together will make the motion helical

20 **(d)**

$M = iA = 0.1 \times \pi \times (0.05)^2$

$= (0.1) \times 3.14 \times 25 \times 10^{-4} = 7.85 \times 10^{-4} amp - m^2$

ANSWER-KEY										
Q.	1	2	3	4	5	6	7	8	9	10
A.	D	D	C	C	B	C	C	A	D	B
D										
Q.	11	12	13	14	15	16	17	18	19	20
A.	D	C	B	B	C	A	A	D	C	D