

PR ¹² Mag. force & field

MC

1) I know II time III km
(b)

2) $qvB = mv$

$$h = \frac{qvB}{v} = \frac{(4.0 \times 10^{-19} \text{ C})(3.0 \times 10^6 \text{ m/s})(0.1 \text{ T})}{2e^{-4} \text{ kg}} = 0.06 \text{ m}^2/\text{s} \quad (c)$$

3) (c) u) (d)

5) $F = qvB = \frac{mv^2}{r}$

$mv = qBr \quad (A)$

6) ~~$\oint B \cdot dl = \mu_0 I$~~ $B = \frac{\mu_0 I}{2\pi r}$

$$= \frac{(4\pi \times 10^{-7} \text{ T}\cdot\text{m/A})(10 \text{ A})}{2\pi(0.02 \text{ m})} = 1e^{-4} \text{ T} \quad (d)$$

7) $\frac{F}{l} = \frac{\mu_0 I_1 I_2}{2\pi r}$, same direction; towards (d)

8) (e) 9) $B = \frac{\mu_0 NI}{l}$

$$N = \frac{Bl}{\mu_0 I} = \frac{(0.2 \text{ T})(0.5 \text{ m})}{(4\pi \times 10^{-7} \text{ T}\cdot\text{m/A})(20 \text{ A})} = 6400 \quad (b)$$

10) $\oint B \cdot dl = \mu_0 I$

$$I = \frac{(6.28 \times 10^{-6} \text{ T}\cdot\text{m})(1 \text{ m})}{4\pi \times 10^{-7} \text{ T}\cdot\text{m/A}} = 5 \text{ A} \quad (e)$$