

Chapter 28

7 → 10, 14, 15, 17, 18, 21, 22, 23,
24, 25, 28, 29,

7.

$$\begin{aligned}\Sigma \vec{F} &= m \vec{a} \\ \Rightarrow \vec{F}_B + \vec{F}_E &= m \vec{a} \\ \Rightarrow q \vec{v} \times \vec{B} + q \vec{E} &= m \vec{a} \\ \Rightarrow \vec{v} \times \vec{B} + \vec{E} &= \frac{m}{q} \vec{a} \\ \vec{E} &= \frac{m}{q} \vec{a} + \vec{v} \times \vec{B}\end{aligned}$$

8.

$$\begin{aligned}E &= vB \\ \Rightarrow v &= \frac{E}{B}\end{aligned}$$

$$9. \quad E = vB$$

$$\Rightarrow \frac{V_2}{d} = v_1 B$$

$$U = q V_1$$

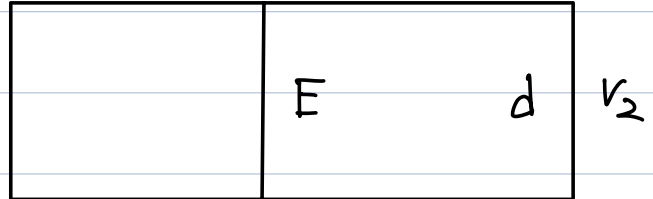
$$\Rightarrow e V_1 = \frac{1}{2} m v^2$$

$$\Rightarrow \sqrt{\frac{2 e v_1}{m}} = v$$

10. Tray

$$V_2 = E d$$

$$\Rightarrow E = \frac{V_2}{d}$$



14. $V_H = B V d$

$$\Rightarrow 3.0 \times 10^{-6} = 1.2 \times 10^{-3} \times V \times 0.85 \times 10^{-2}$$

$$V = ?$$

15. a) $\vec{F}_E = \vec{F}_B$

$$\Rightarrow q \vec{E} = q \vec{V} \times \vec{B}$$

$$= 20 \hat{i}$$

$$= 20 \hat{i} \times 30 \times 10^{-3} \hat{j}$$

$$= \dots \dots \hat{k}$$

$$\Rightarrow V_H = \vec{E} \cdot \vec{d}$$

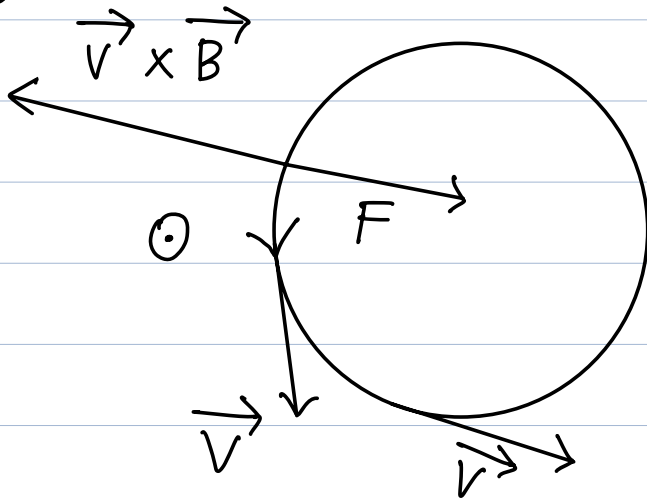
$$= (c \hat{i}) \cdot (d_x \hat{i} + d_y \hat{j} + d_z \hat{k})$$

$$= c d_z (\hat{i} \cdot \hat{k})$$

$$= c d_z$$

17. Try

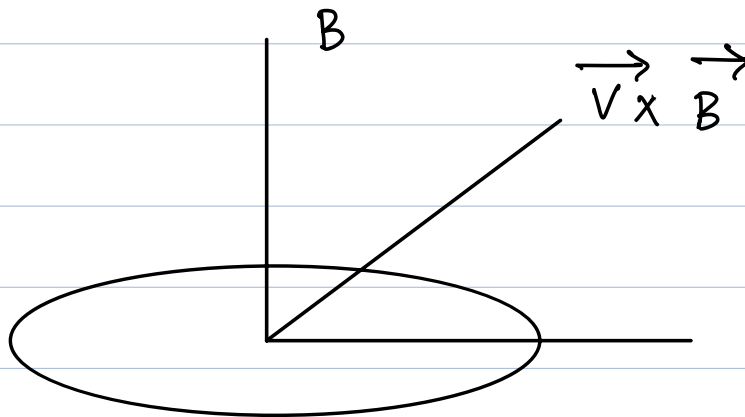
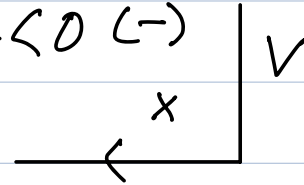
18.



$$\vec{F}_B = q \vec{v} \times \vec{B}$$

$$q > 0 (+)$$

$$q < 0 (-)$$



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

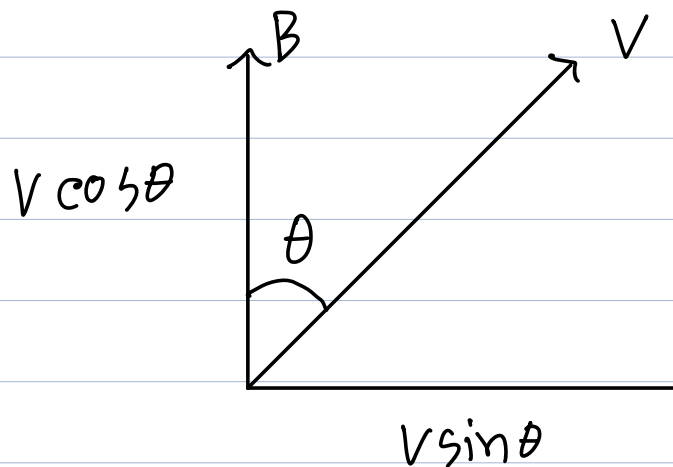
$$r = \frac{mv \sin 90^\circ}{qB}$$

$$29. \quad B = 0.3 \text{ T}$$

$$p = 6 \text{ mm} = 6 \times 10^{-3} \text{ m}$$

$$F = 2 \times 10^{-15} \text{ N}$$

$$V = ?$$



$$\Rightarrow p = V \cos \theta T$$

$$\Rightarrow p/T = V \cos \theta \quad \text{--- (i)}$$

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

$$F_B = qVB \sin \theta$$

$$\Rightarrow \frac{F_B}{qB} = V \sin \theta \quad \text{--- (ii)}$$

$$(i)^{\sim} + (ii)^{\sim} \Rightarrow$$

$$\frac{p^r}{T^r} + \frac{F_B^r}{q^r B^r} = V^r (\cos^r \theta + \sin^r \theta)$$

$$V = \sqrt{\frac{p^r}{T^r} + \frac{F_B^r}{q^r B^r}}$$