

$$a) \quad V = 2400 \text{ V} \\ q = 1.6 \times 10^{-19} \text{ C}$$

$$U_e = q \cdot V = (1.6 \times 10^{-19} \text{ C})(2400 \text{ V})$$

$$U_e = 3.84 \times 10^{-16} \text{ J}$$

$$U_e = KE = \frac{1}{2} \cdot m \cdot v^2$$

$$(3.84 \times 10^{-16} \text{ J}) = \frac{1}{2} (9.11 \times 10^{-31} \text{ kg}) \cdot v^2$$

$$v = 2.9 \times 10^7 \text{ m/s}$$

Max F_B occurs when B and v are perpendicular ($\theta = 90^\circ$)

$$F_B = q \cdot v \cdot B \cdot \sin \theta$$

$$= (1.6 \times 10^{-19} \text{ C})(2.9 \times 10^7 \text{ m/s})(1.70 \text{ T}) \cdot \sin 90^\circ$$

$$\boxed{F_B = 7.9 \times 10^{-12} \text{ N}}$$

b) F_B min occurs when B and v are parallel ($\theta = 0^\circ$)

$$F_B = q \cdot v \cdot B \cdot \sin 0^\circ = q \cdot v \cdot B \cdot \text{zero}$$

$$\boxed{F_B = \text{zero}}$$