

Motional EMF

$$\textcircled{1} \quad V = vBL$$

$$940 = v(4.8)(1.3)$$

$$v = \frac{940}{(4.8)(1.3)} = \boxed{150.6 \text{ m/s}}$$

$$\textcircled{2} \quad V = vBL$$

$$= (220)(5 \times 10^{-6})(59)$$

$$V = \boxed{0.0649 \text{ V}}$$

$\textcircled{3}$ a) driver's side

b) $V = vBL$

$$2.4 \times 10^{-3} = (25)(4.8 \times 10^{-5})L$$

$$L = \frac{2.4 \times 10^{-3}}{(25)(4.8 \times 10^{-5})}$$

$$L = \boxed{2 \text{ m}}$$

$\textcircled{4}$ Bar 1: $V = v_1 B_1 L$ Bar 2: $V = v_2 B_2 L$

Divide Bar 1 by Bar 2

$$\frac{V}{V} = \frac{v_1 B_1 L}{v_2 B_2 L}$$

$$1 = \frac{v_1 B_1}{v_2 B_2}$$

$$\rightarrow \frac{v_1}{v_2} = \frac{B_2}{B_1}$$

4) continued

$$\frac{v_1}{v_2} = \frac{B_2}{B_1}$$

$$\frac{5.8}{v_2} = \frac{0.33}{0.13}$$

$$v_2 = \frac{(5.8)(0.13)}{(0.33)} = \boxed{2.28 \text{ m/s}}$$

5)

$$V = vBL$$

$$0.24 = v(0.15)(0.75)$$

$$v = \frac{0.24}{(0.15)(0.75)} = 2.13 \text{ m/s}$$

$$d = v \cdot t$$

$$= (2.13)(7)$$

$$d = \boxed{14.9 \text{ m}}$$

$$\textcircled{b} \quad a) \quad P = \frac{v^2}{R}$$

$$15 = \frac{v^2}{6}$$

$$V = 9.49 \text{ V}$$

$$V = vBL$$

$$9.49 = v(2.4)(1.2)$$

$$v = \frac{9.49}{(2.4)(1.2)} = \boxed{3.29 \text{ m/s}}$$

$$\begin{aligned} b) \quad P &= \frac{dW}{dt} \\ &= \frac{W}{t} \\ &= \frac{F \cdot d}{t} \end{aligned}$$

$$P = F \cdot v$$

$$15 = F(3.29)$$

$$F = 4.56 \text{ N}$$