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HW#3 ENGR065 - 1

1. a) Find the current, voltage, and power associated with the $20\text{k}\Omega$ resistor

$$V_o = IR \quad \{ R = 10\text{k}\Omega, I = 5\text{mA} \}$$

$$V_o = (10 \cdot 10^3) (5 \cdot 10^{-3}) = 50 \text{ Volts}$$

dependent source is 0.01V

$$0.01 \cdot 50 = 0.5 \text{ Amperes}$$

$$\begin{aligned} & \text{I through } 20\text{k}\Omega \\ &= \frac{5 \cdot 10^3}{(5 \cdot 10^3) + 20 \cdot 10^3} (0.01) \end{aligned}$$

$$= 0.2 \cdot 0.5 = 0.1 \text{ Amps} = I_{20\text{k}\Omega}$$

$$\text{Voltage across } 20\text{k}\Omega, V = 20 \cdot 10^3 \cdot I_{20\text{k}\Omega} = 20 \cdot 10^3 \cdot 0.1$$

$$V_{20\text{k}\Omega} = 2 \text{ kV}$$

$$I = 0.1 \text{ A}, V = 2 \text{ kV}$$

b) $P = VI$

$$I = \frac{P}{V} = \frac{40}{12} = 3.33 = 4$$

$$I_2 = .25 \cdot I_1 \Rightarrow .25 \cdot 4 = 1.0 \text{ Amp} = I_3$$

KCL

$$-I_1 + I_2 + I_3 = 0$$

$$-4 + I_2 + 1 = 0$$

$$I_2 = 4 - 1$$

$$I_2 = 3 \text{ amp}$$