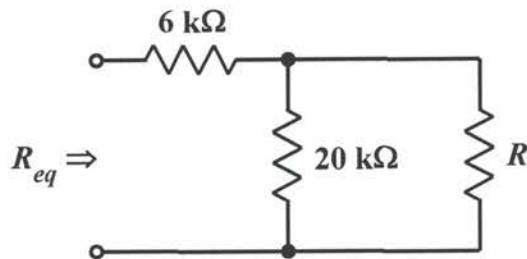


EE 2240
Problem #01



a. Find R_{eq} if $R = 5 \text{ k}\Omega$.

$$20 \text{ k}\Omega \parallel R = \frac{20 \text{ k}\Omega \cdot 5 \text{ k}\Omega}{20 \text{ k}\Omega + 5 \text{ k}\Omega} = 4 \text{ k}\Omega$$

$$R_{eq} = 6 \text{ k}\Omega + 4 \text{ k}\Omega = 10 \text{ k}\Omega$$

b. Find R_{eq} if $R = 380 \text{ k}\Omega$.

$$20 \text{ k}\Omega \parallel 380 \text{ k}\Omega = \frac{20 \text{ k}\Omega \cdot 380 \text{ k}\Omega}{20 \text{ k}\Omega + 380 \text{ k}\Omega} = 19 \text{ k}\Omega$$

$$R_{eq} = 6 \text{ k}\Omega + 19 \text{ k}\Omega = 25 \text{ k}\Omega$$

c. What value of R would result in $R_{eq} = 21 \text{ k}\Omega$?

$$R_{eq} = 6 \text{ k}\Omega + (20 \text{ k}\Omega \parallel R) = 21 \text{ k}\Omega$$

$$\Rightarrow 20 \text{ k}\Omega \parallel R = 15 \text{ k}\Omega$$

$$\frac{20 \text{ k}\Omega \cdot R}{20 \text{ k}\Omega + R} = 15 \text{ k}\Omega$$

$$20 \text{ k}\Omega \cdot R = (15 \text{ k}\Omega \cdot 20 \text{ k}\Omega) + (15 \text{ k}\Omega \cdot R)$$

$$5 \text{ k}\Omega \cdot R = 300 \times 10^6 \Omega^2$$

$$R = 60 \text{ k}\Omega$$