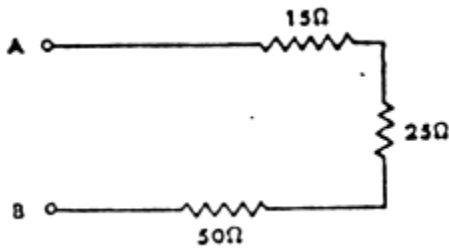


Equivalent Resistance

For each of the following circuits, calculate the equivalent resistance (R_{eq}) between A and B.

1.

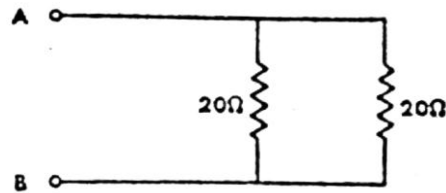


$$R_{eq} = R_1 + R_2 + R_3$$

$$R_{eq} = 15\ \Omega + 25\ \Omega + 50\ \Omega$$

$$R_{eq} = 90\ \Omega$$

2.

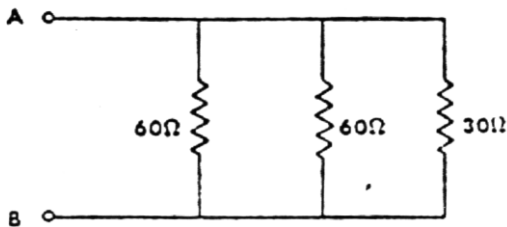


$$R_{eq} = \left(\frac{1}{R_1} + \frac{1}{R_2}\right)^{-1}$$

$$R_{eq} = \left(\frac{1}{20\ \Omega} + \frac{1}{20\ \Omega}\right)^{-1}$$

$$R_{eq} = 10\ \Omega$$

3.

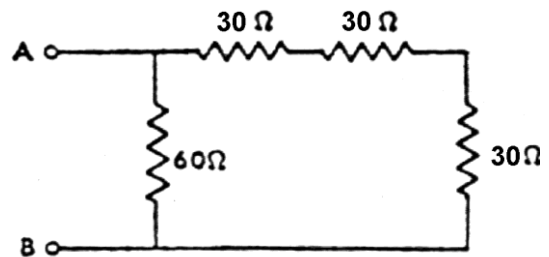


$$R_{eq} = \left(\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}\right)^{-1}$$

$$R_{eq} = \left(\frac{1}{60\ \Omega} + \frac{1}{60\ \Omega} + \frac{1}{30\ \Omega}\right)^{-1}$$

$$R_{eq} = 15\ \Omega$$

4.



$$R_{eq1} = R_2 + R_3 + R_4$$

$$R_{eq1} = 30\ \Omega + 30\ \Omega + 30\ \Omega$$

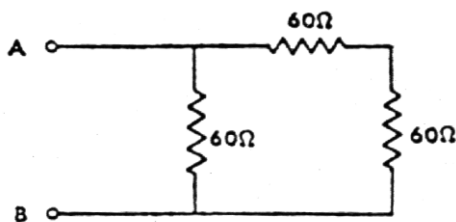
$$R_{eq1} = 90\ \Omega$$

$$R_{eq} = \left(\frac{1}{R_1} + \frac{1}{R_{eq1}}\right)^{-1}$$

$$R_{eq} = \left(\frac{1}{60\ \Omega} + \frac{1}{90\ \Omega}\right)^{-1}$$

$$R_{eq} = 36\ \Omega$$

5.



$$R_{eq1} = R_2 + R_3$$

$$R_{eq1} = 60\ \Omega + 60\ \Omega$$

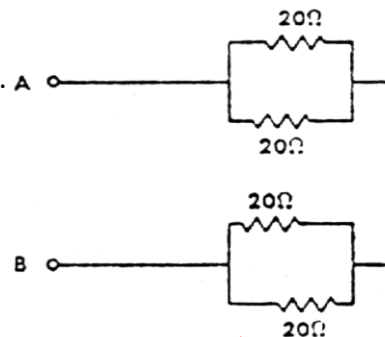
$$R_{eq1} = 120\ \Omega$$

$$R_{eq} = \left(\frac{1}{R_1} + \frac{1}{R_{eq1}}\right)^{-1}$$

$$R_{eq} = \left(\frac{1}{60\ \Omega} + \frac{1}{120\ \Omega}\right)^{-1}$$

$$R_{eq} = 40\ \Omega$$

6.



$$R_{eq1} = \left(\frac{1}{R_1} + \frac{1}{R_2}\right)^{-1}$$

$$R_{eq1} = \left(\frac{1}{20\ \Omega} + \frac{1}{20\ \Omega}\right)^{-1}$$

$$R_{eq1} = 10\ \Omega$$

$$R_{eq2} = \left(\frac{1}{R_3} + \frac{1}{R_4}\right)^{-1}$$

$$R_{eq2} = \left(\frac{1}{20\ \Omega} + \frac{1}{20\ \Omega}\right)^{-1}$$

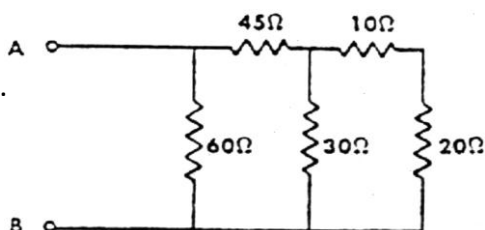
$$R_{eq2} = 10\ \Omega$$

$$R_{eq} = R_{eq1} + R_{eq2}$$

$$R_{eq} = 10\ \Omega + 10\ \Omega$$

$$R_{eq} = 20\ \Omega$$

7.



$$R_{eq1} = R_4 + R_5$$

$$R_{eq1} = 10\ \Omega + 20\ \Omega$$

$$R_{eq1} = 30\ \Omega$$

$$R_{eq2} = \left(\frac{1}{R_3} + \frac{1}{R_{eq1}}\right)^{-1}$$

$$R_{eq2} = \left(\frac{1}{30\ \Omega} + \frac{1}{30\ \Omega}\right)^{-1}$$

$$R_{eq2} = 15\ \Omega$$

$$R_{eq3} = R_2 + R_{eq2}$$

$$R_{eq3} = 45\ \Omega + 15\ \Omega$$

$$R_{eq3} = 60\ \Omega$$

$$R_{eq} = \left(\frac{1}{R_1} + \frac{1}{R_{eq3}}\right)^{-1}$$

$$R_{eq} = \left(\frac{1}{60\ \Omega} + \frac{1}{60\ \Omega}\right)^{-1}$$

$$R_{eq} = 30\ \Omega$$