Worksheet Solution

(Chapter 1 Kirchhoff's Law)

MCQ (Multiple Choice Questions)

Ans. 1: (a)

Solution: The sum of the currents entering a node is equal to the sum of the currents leaving the node.

$$\therefore \quad I_0 + 10\ A = 4\ A + 2\ A$$

$$\Rightarrow I_0 = -4\ A$$

Ans. 2: (b)

Solution: Applying KVL

$$-3 + 4I + 5 + 6I = 0 \quad \Rightarrow \quad 10\,I = -2, \therefore I = -0.2\ A$$

Ans. 3: (c)

Solution: Total Resistance in the circuit

$$R_{eq} = R + \frac{10 \times 10}{10 + 10} = R+5$$

$$I = \frac{V}{R_{eq}} = \frac{100}{R+5} = 8$$

$$8R + 40 = 100 \Rightarrow R = 7.5\ \Omega$$

Ans. 4: (b)

Solution: Let the potential at node a is V

Applying KCL at node **a**

$$\frac{5 - V}{5} + 1 - \frac{V}{15} = 0$$

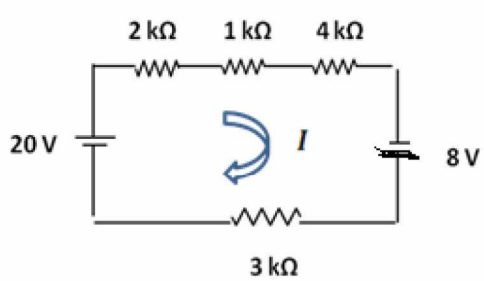
$$\frac{15 - 4V}{15} + 1 = 0$$

$$4\ V - 15 = 15 \Rightarrow V = 7.5\ V$$

$$I = \frac{V}{15} = \frac{7.5}{15} = 0.5\ A$$

Ans. 5: (b)

Solution: The circuit can be redrawn in the form of voltage source (source transformation technique)



Applying KVL, $-20\ V + I\ 10\ k\Omega - 8\ V = 0$

$$I = \frac{28}{10k\Omega} = 2.8\ mA$$

Ans. 6: (a)

Ans. 7: (c)

MSQ (Multiple Select Questions)

Ans. 8: (b), (d)

Solution: Decrease in R_3 leads to a decrease in voltage drop across R_3, also R_2 *and* R_3 are parallel so there will be decrease in voltage drop across R_2 which will result in less power dissipated in R_2. So option b & d are correct