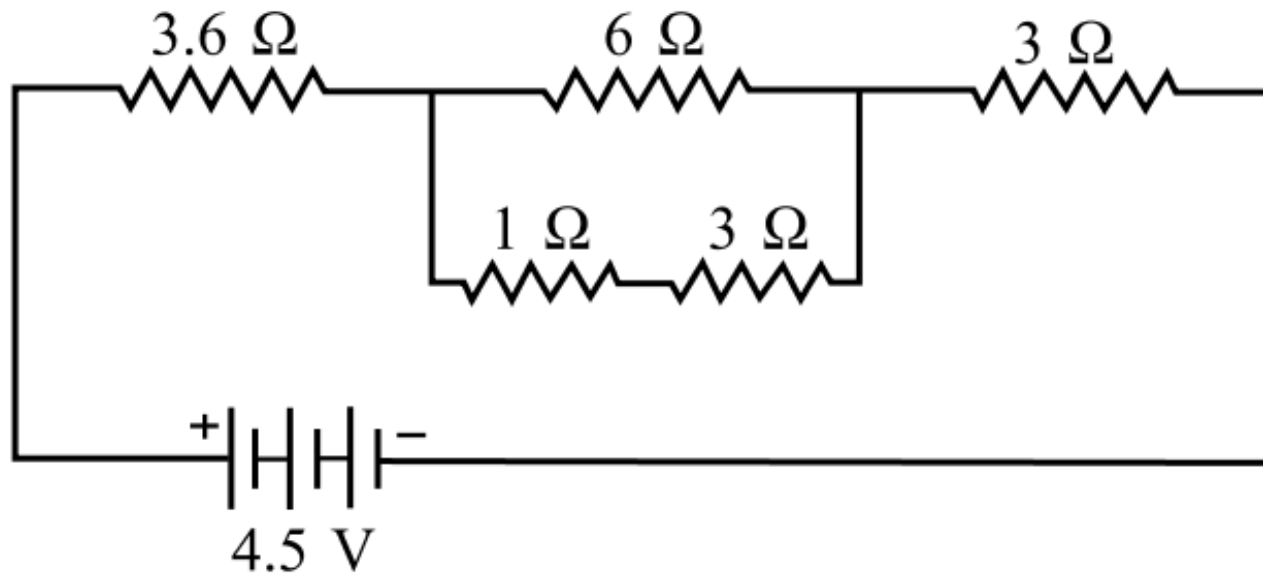# CASE STUDY QUESTION 05

Read the following and answer any four questions from (i) to (v)

Shyam made one circuit for his Physics. He used five resistances: two 3Ω, one 1Ω, one 6Ω, one 3.6 Ω and a battery of 4.5 V. The circuit diagram is given below:

(i) Total resistance of parallel combination is :

(a) 2.4 Ω   (b) 3 Ω   (c) 6 Ω   (d) 2 Ω

1 Ω and 3 Ω are in series.

$$\frac{1}{R} = \frac{1}{6} + \frac{1}{1+3} = \frac{1}{6} + \frac{1}{4} = \frac{5}{12}$$
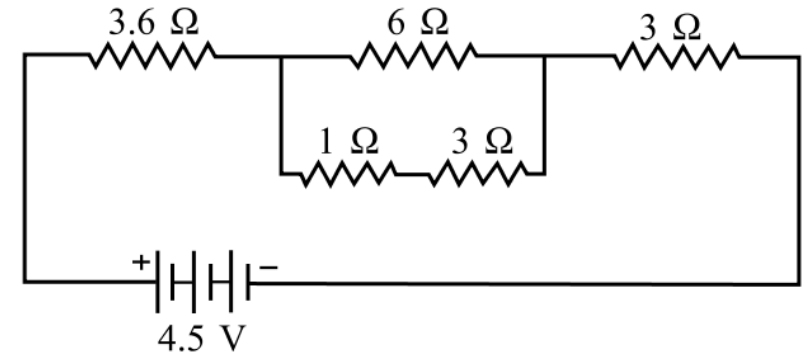
$$\Rightarrow R = \frac{12}{5} = 2.4 \ \Omega$$

(ii) Equivalent resistance of total circuit is :

(a) 5 Ω   (b) 9 Ω   (c) 11 Ω   (d) 13 Ω

$$R_1 = R + 3.6 + 3$$
$$= 2.4 + 3.6 + 3 = 9 \ \Omega$$

(iii) Total current in the circuit is :
(a) 2 A   (b) 4.5 A   (c) 0.5 A   (d) 10 A
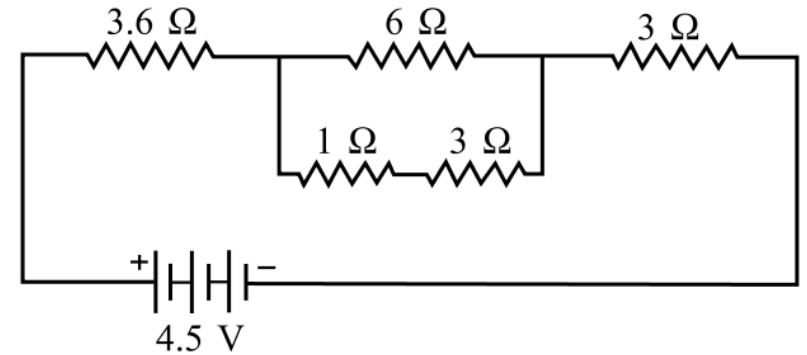
$$I = \frac{V}{R_1} = \frac{4.5\ V}{9\ \Omega}$$

$$= 0.5\ A$$

(iv) Current in 6 ohm resistance is
(a) 0.3 A   (b) 0.2 A   (c) 4 A   (d) 6 A

$$V = IR_l = 0.5 \times 2.4 = 1.2\ V$$

$$\therefore\ I_1 = \frac{1.2\ V}{6\ \Omega} = 0.2\ A$$

(v) Potential across 3.6 ohm resistance will be :
(a) 1.8 V   (b) 2.6 V   (c) 9 V   (d) 4.5V

$$V_1 = I \times 3.6 \ \Omega$$

$$= 0.5 \ A \times 3.6 \ \Omega$$

$$= 1.8 \ V$$