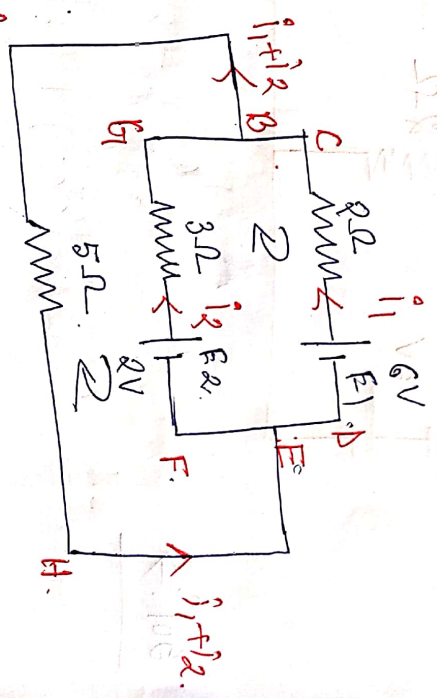


Q1] Two batteries E_1 & E_2 having emfs of 6V and 8V respectively & internal resistances of 2Ω and 3Ω respectively are connected in parallel across a 5Ω resistor. Calculate -

- I] current through each battery.
- ii] Terminal voltage.



Solⁿ →

I] loop ABCDEF,

$$-2i_1 + 6 - 2 + 3i_2 = 0$$

$$\Rightarrow -2i_1 + 3i_2 + 4 = 0$$

$$\Rightarrow 2i_1 - 3i_2 = 4 \rightarrow \text{①}$$

loop ABGFENA,

$$-3i_2 + 2 - 5(i_1 + i_2) = 0$$

$$\Rightarrow -3i_2 + 2 - 5i_1 - 5i_2 = 0$$

$$\Rightarrow -5i_1 - 8i_2 + 2 = 0$$

$$\Rightarrow 5i_1 + 8i_2 = 2 \rightarrow \text{②}$$

$$\text{①} \times 5 \Rightarrow 10i_1 - 15i_2 = 20$$

$$\text{②} \times 2 \Rightarrow 10i_1 + 16i_2 = 4$$

$$-31i_2 = 16$$

$$i_2 = -\frac{16}{31} \text{ A}$$

$$2i_1 = 4 + 3 \times \left(-\frac{16}{31}\right)$$

$$i_1 = 2.44$$

$$i_1 = 1.82 \text{ A}$$

battery E_1 in discharged.

Q. A battery having an emf of 110 volt and internal resistance of $0.2\ \Omega$ is connected in parallel with another battery with emf 100 volt & internal resistance of $0.25\ \Omega$. This combination is connected across 220 volt supply with a series resistance of $5\ \Omega$. Calculate the magnitude and direction of current in each battery and total current taken from the supply. Use Kirchhoff's Law.

Solⁿ →

