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Subject - Physics

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Q#1

Given data:

$$\text{Voltage} = V = 20V$$

$$\text{Current in } A = 1A$$

$$\text{Resistance in } A = R_A = 1\Omega$$

$$R_b = 6\Omega$$

$$\text{current in } a = R_a = 4\Omega$$

$$R \text{ in } a = R_a = 4\Omega$$

$$R_c = 1\Omega$$

$$R_o = 1\Omega$$

$$R_d = 2\Omega$$

$$E_m f_1 = E_1 = ?$$

$$E_m f_2 = E_2 = ?$$

Applying KVL on Loop 1

$$V = IR_r$$

$$20V - (1A)(1V) + (1A)(4\Omega) + 1(A)(1\Omega)$$

$$- E_1 - (1A)(6\Omega)$$

$$= 0$$

From this eq we can find E ,

$$E_1 = 20V - 1V + 4V + 1V - 6V$$

current \times resistance = Voltage

$$= 18.00V$$

We will apply kirchoff voltage on V_2

$$V_s = IR_r$$

$$20V - (1A)(1\Omega) - (2A)(1\Omega) - E_2 - (200A)(2\Omega) \\ - (1A)(6\Omega) = 0$$

$$E_2 = 20V - 1V - 2V - 4V - 6V$$

$$= 7.00V$$

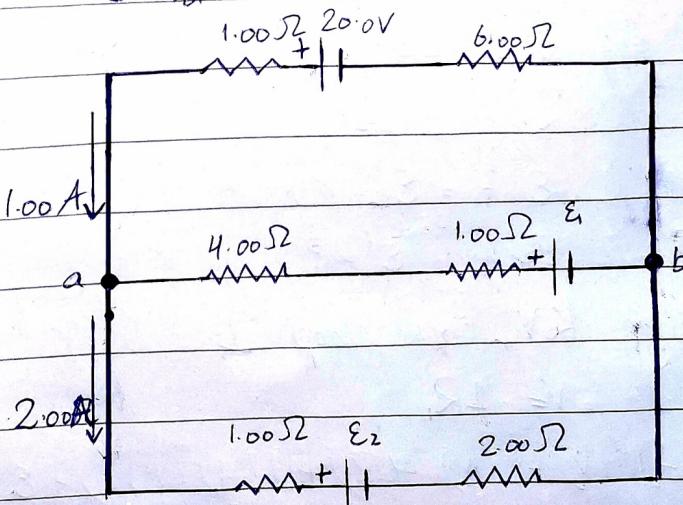
From b to A along lower branch

$$V_b - (2A)(2\Omega) + 7V + (2A)(1\Omega) = V_a - V_b - V \\ = -13V$$

For $V_b - V_a$

$$V_b - (1A)(6\Omega) + 20V - (1A)(1.00\Omega) = V_a$$

$$V_b - V_a = -13V$$



Question #2

Solution

Given data

$$\text{Current in } A = I_A = 2A$$

$$\text{Current in } C = I_C = 3A$$

$$\text{Resistance in } C = R_C = 4.00 \Omega$$

$$\text{Resistance in other Resistor} = 3.00 \Omega$$

Applying junction rule
on point a:-

$$\sum_{in} = \sum_{out}$$

$$I_{enter} = I_{out}$$

Apply on a

$$= 3A + 5A - I_3 = 0$$

$$8A - I_3 = 0$$

$$8A = I_3$$

on point B:-

$$2A + I_u - 3A = 0$$

$$I_u = IA$$

on point C:-

$$I_3 - I_u - I_s = 0$$

$$8A - 1A - I_s = 0$$

$$7A = I_s$$

To find ϵ_1 , $\phi \epsilon_2$,

we apply KVL

$$V_s = IR_r$$

For ϵ_1

$$\epsilon_1 - (3A)(4\Omega) - I_3(3\Omega) = 0$$

$$\epsilon_1 - 12A - (8A)(3\Omega) = 0$$

$$\epsilon_1 = 12A + 24$$

$$\epsilon_1 = 36.00V$$

For ϵ_2

$$\epsilon_2 - (5A)(6\Omega) - I_3(3\Omega) = 0$$

$$\epsilon_2 = 30A + (8A)(3\Omega)$$

$$= 30A + 24A$$

$$\epsilon_2 = 54.00V$$

For Resistance of R_r , we will apply loop rule.

$$(-2A)R_r - \epsilon_1 + \epsilon_2 = 0$$

$$R_r = \frac{\epsilon_2 - \epsilon_1}{2A}$$

$$R_r = \frac{54V - 36V}{2A}$$

$$R_r = \frac{18V}{2A}$$

$$R_r = 9\Omega$$

