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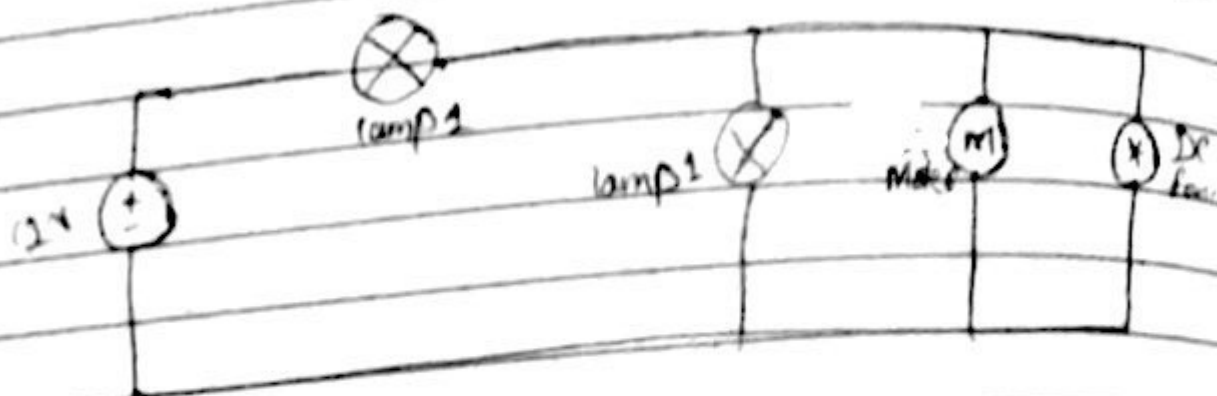
Deptt BE (Electrical)

Semester 2nd

Assignment open ended lab.

LCA (Lab)

QNC
ANS: figures



Solution
Solving through nodales

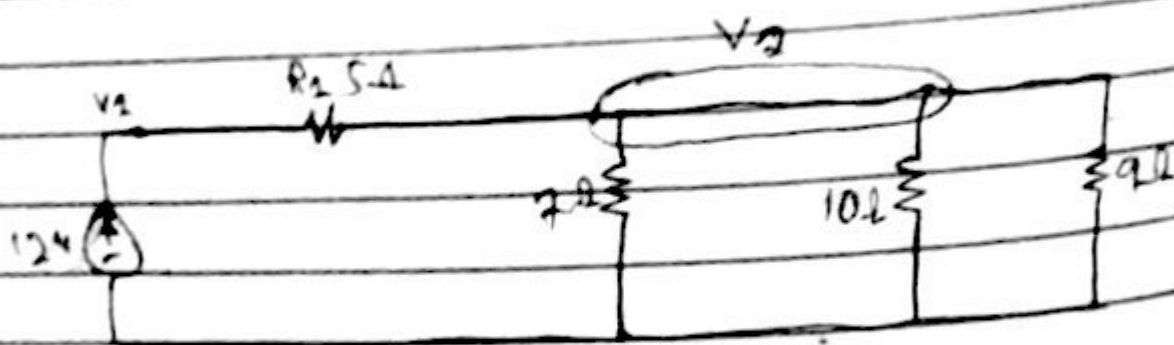
let

$$R_1 = 5$$

$$R_2 = 7$$

$$R_3 = 10$$

$$R_4 = 9$$



Applying KCL on V_2

$$\frac{V_2 - 12}{5} = 12$$

$$V_1 - V_2 = 60$$

applying KCL on node 2

$$\frac{V_2 - V_1}{5} + \frac{V_2}{7} + \frac{V_2}{8} + \frac{V_2}{9} = 0$$

$$\underline{126V_2 - 126V_1 + 90V_2 + 63V_2 + 70V_2 = 0}$$
$$630$$

$$\underline{-126V_1 + 349V_2 = 0}$$
$$630$$

$$-0.2V_1 + 0.6V_2 = 0$$

ming 0.1 with eq (2)

$$0.2V_1 - 0.6V_2 = 18 \quad \text{--- (1)}$$

Subtracting from eq (2)

$$\cancel{-0.2V_1} + 0.6V_2 = 0$$

$$\cancel{0.2V_1} - 0.2V_2 = 18$$

$$0.4V_2 = 12$$

$$V_2 = 30 \text{ V}$$

Putting in eq (1)

$$0.2V_1 = 18$$

$$V_1 = 90 \text{ V}$$

9) Find Current:-

Current across R_1

$$I = \frac{V}{R}$$

$$I = \frac{90}{5} = 18 \text{ A}$$

Current across R_2

$$I = \frac{V}{R}$$

$$= \frac{30}{7} = 4.3 \text{ A}$$

Current across R_3

$$I = \frac{V}{R}$$

$$= \frac{30}{10} = 3 \text{ A}$$

Current across R_4

$$I = \frac{V}{R}$$

$$= \frac{30}{9} = 3.3$$

$$I_1 = 18 \text{ A}$$

$$I_2 = 4.3 \text{ A}$$

$$I_3 = 3 \text{ A}$$

$$I_4 = 3.3 \text{ A}$$

(ii) Finding Voltages

V across R_1

$$V = IR$$

$$V = (1.8)(5) = 9.0 \text{ V}$$

V across R_2

$$V = IR$$

$$V = (4.3)(7) = 30.1$$

V across R_3

$$V = IR$$

$$= (3)(10) = 30$$

$$V = (3.3)(9) = 29.7$$

Result is

$$V_1 = 9.0 \text{ V}$$

$$V_2 = 30.1 \text{ V}$$

$$V_3 = 30 \text{ V}$$

$$V_4 = 29.7 \text{ V}$$