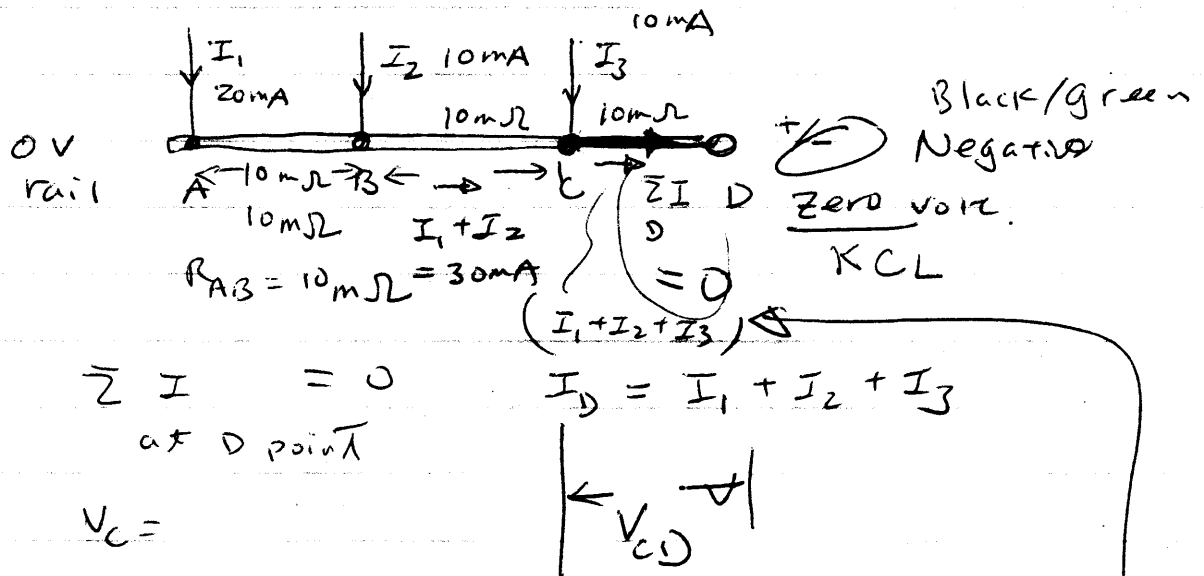


2012/2/29

①

Grounding & wiring

← (+) Red



$$\sum I = 0 \text{ at D point}$$

$$V_C =$$

$$I_D = I_1 + I_2 + I_3$$

$$R_{AB} = R_{BC} = 10 \text{ m}\Omega = 10 \times 10^{-3} \Omega$$

①

$$V_C = (I_1 + I_2 + I_3) \times 10 \text{ m}\Omega$$

$$= 40 \times 10 (\text{m}\Omega) = 400 \mu\text{V}$$

V_{CD}

②

$$V_B = V_C + V_{BC}$$

$$V_{BC} = (I_1 + I_2) \times 10 \text{ m}\Omega = 300 \mu\text{V}$$

$$\therefore V_B = V_C + V_{BC} = 400 \mu\text{V} + 300 \mu\text{V} = 700 \mu\text{V}$$

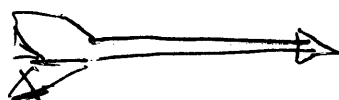
(Level shifting)

③

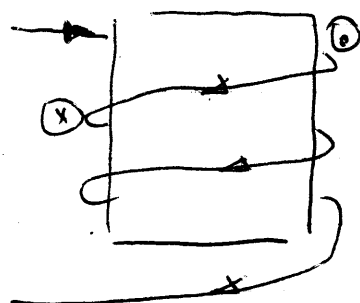
$$V_A = \underbrace{V_B + V_C}_{700 \mu\text{V}} + \underbrace{(I_1 \times 10 \text{ m}\Omega)}_{200 \mu\text{V}} = 900 \mu\text{V}$$

(2)

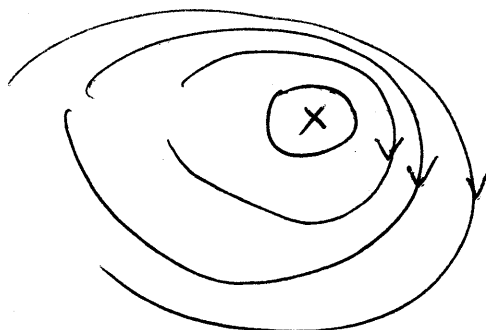
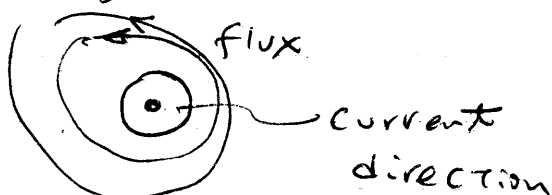
→ Left to right
← Right to Left



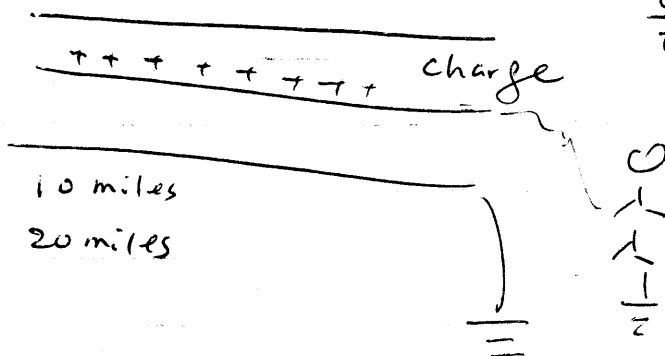
⊙ Front
out of Paper



Right-Hand Rule



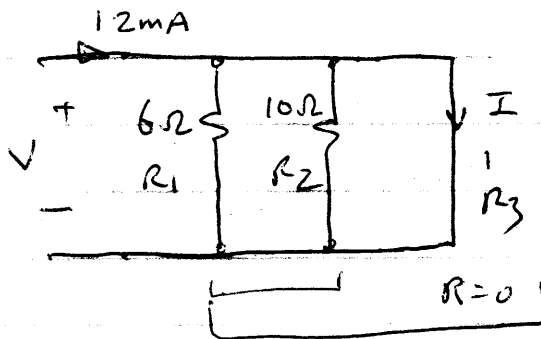
No
Power



$$\frac{Q}{t} = I$$

(3)

Ex 6.27



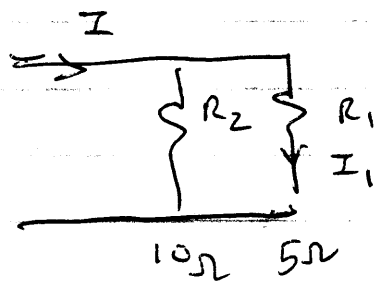
$$I = \frac{12 \text{ mA}}{1}$$

$$V = \frac{0 \text{ V}}{1}$$

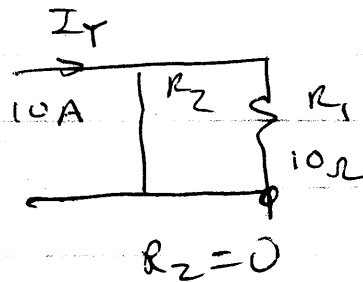
$$V_{R1} = \frac{0 \text{ V}}{1} \quad I_{R1} = \frac{0}{1}$$

$$V_{R2} = \frac{0 \text{ V}}{1} \quad I_{R2} = \frac{0}{1}$$

$$R_T = \left(\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \right) = 0$$



$$I_1 = \left(\frac{R_2}{R_1 + R_2} \right) I$$



$$I_{R1} = \frac{R_2}{R_1 + R_2} \cdot I$$

$$= \frac{0}{10 + 0} \cdot 10 \text{ A}$$

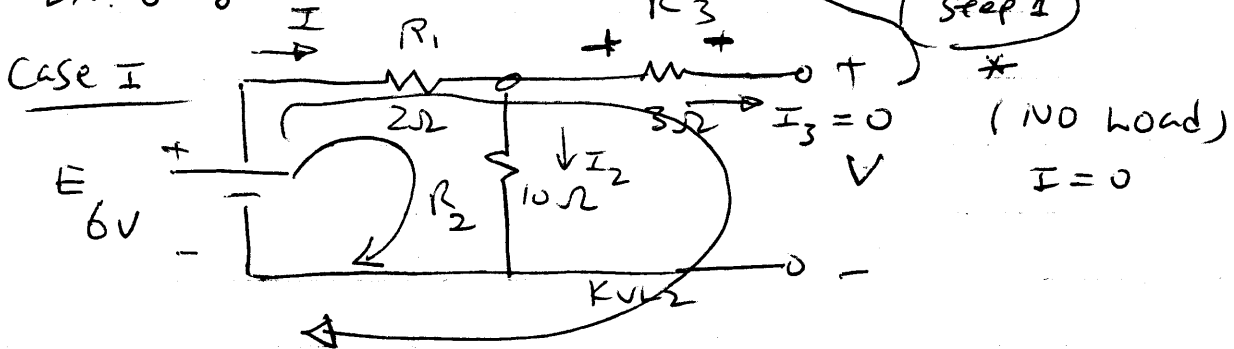
$$= \frac{0}{10} \cdot 10 \text{ A}$$

$$= 0 \cdot 10 = 0 \text{ A}$$

(4)

Ex. 6.28

Case I



Step 3: KVL 1

$$E = I_1 R_1 + I_2 R_2$$
$$6 = I(2) + I_2(10)$$

$$I_1 = I_2 = I$$

$$I = \frac{6}{12} = 0.5 \text{ A}$$

KVL 2

$$E = I \cdot R_1 + I_3 R_3 + V$$

$$V = \text{---} ?$$

Step 4 $V = \text{---}$

KVL 2

$$E = I \cdot R_1 + \boxed{I_3 \cdot R_3} + V$$

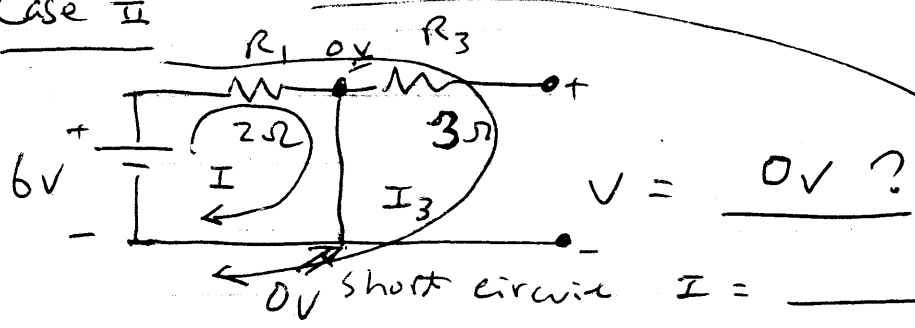
$$6 = 0.5 \text{ A} \cdot 2\Omega + \phi + V$$

$$6 - 1 = V \Rightarrow \underline{5 \text{ V}}$$

Normal circuit

V

Case II



$$V = 0 \text{ V} ?$$

0V short circuit

$$I = \text{---}$$

$$I_3 = 0$$

Rating of R_1

$$I = \frac{6 \text{ V}}{R_1} = \frac{6}{2} = 3 \text{ A}$$

$$P_{\text{Watt}} = P_{R_1} = E \cdot I = I^2 \cdot R_1 = 3^2 \cdot 2 = 9 \cdot 2 = 18 \text{ Watt}$$

Over heat $\Rightarrow$ Fire (paper)

Risk

Assess

Manage

Mitigate

Over current

Fuse

— Spark

Gas

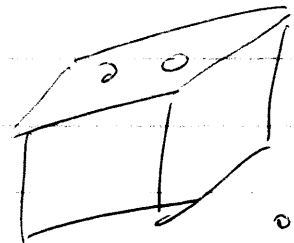
→ Air

Explosion

NFB

• Relay Overcurrent Relay

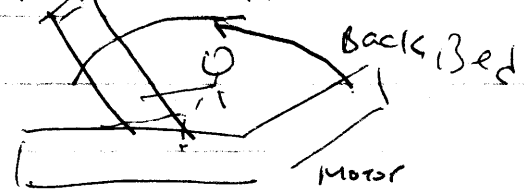
Trip circuit



Battery Pack

Medical Electrical System

• Power Lift



Cost

\$10K.

MATH

Physics