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~~Chapter 5&6 Exercise~~ 5.6 → ~~22, 23, 25, 38~~

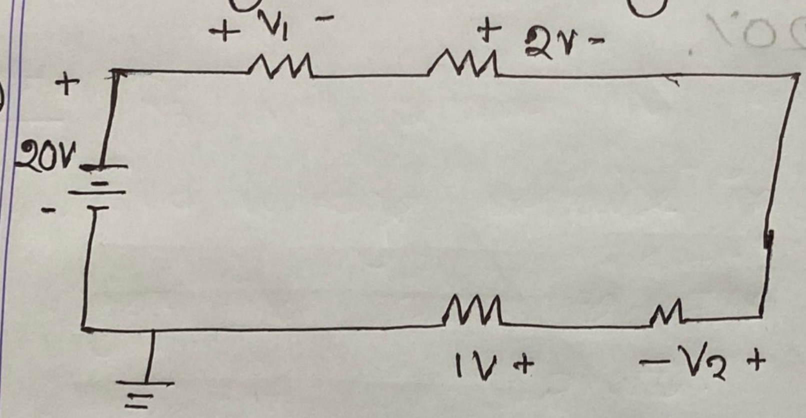
5.7 → ~~24, 38, 39~~

~~25~~, 38

## 5.6

23. Using KVL, finding the unknown voltage.

(a)




Applying KVL

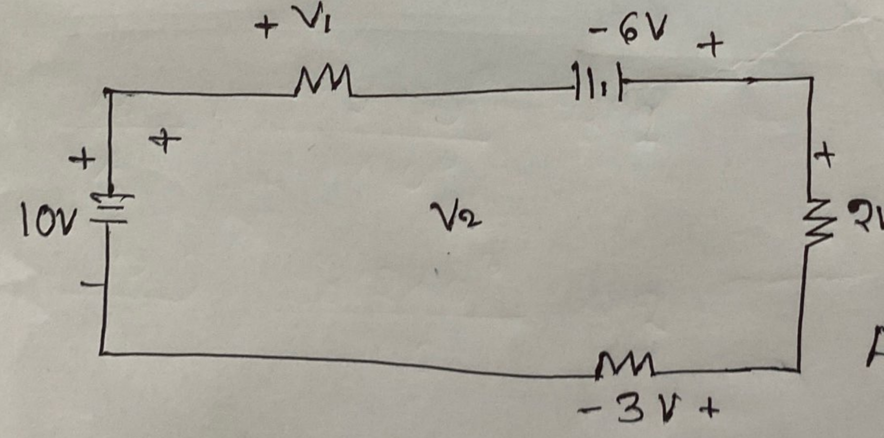
$+20V - V_1 - 10V - V = 0$

$\therefore V_1 = 9V$

and, $10V - 2V - V_2 = 0$

$\therefore V_2 = 8V$

(b)




$10V - V_1 + 6V - 2V - 3V = 0$

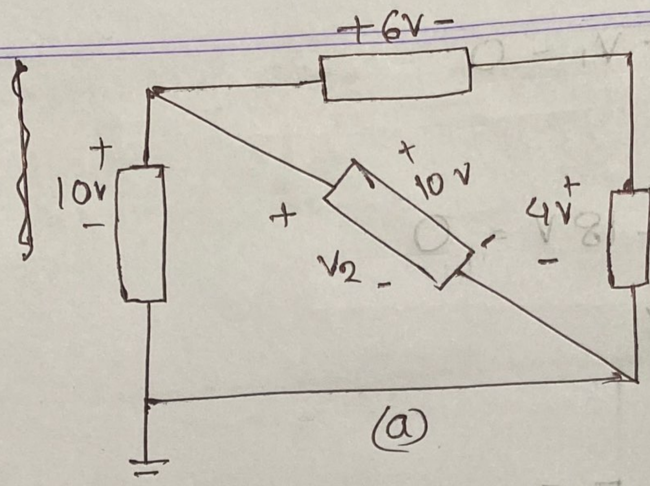
$V_1 = 11V$

Again,

$10V - V_2 - 3V = 0$

$\therefore V_2 = 7V$

22.

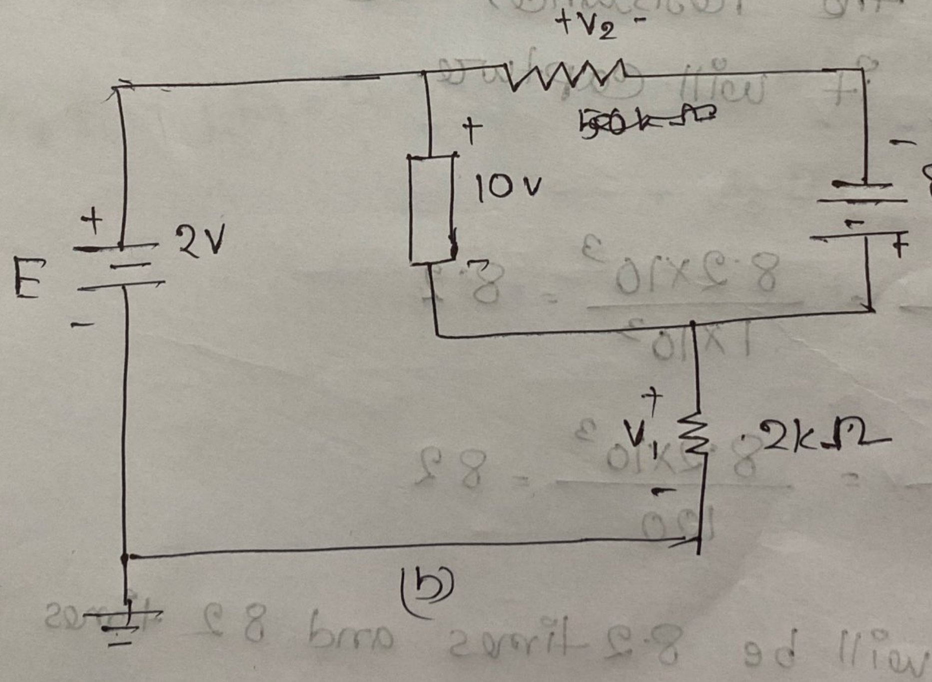



$+10\,V - V_2 = 0$

$V_2 = 10\,V$

$+10\,V - 6\,V - V_1 = 0$

$V_1 = 4\,V$



$+24V - 1 - V - V_1 = 0$

$\Rightarrow V_1 = 14\,V$

$+10V - V_2 - 18V = 0$

$\Rightarrow V_2 = 18V$

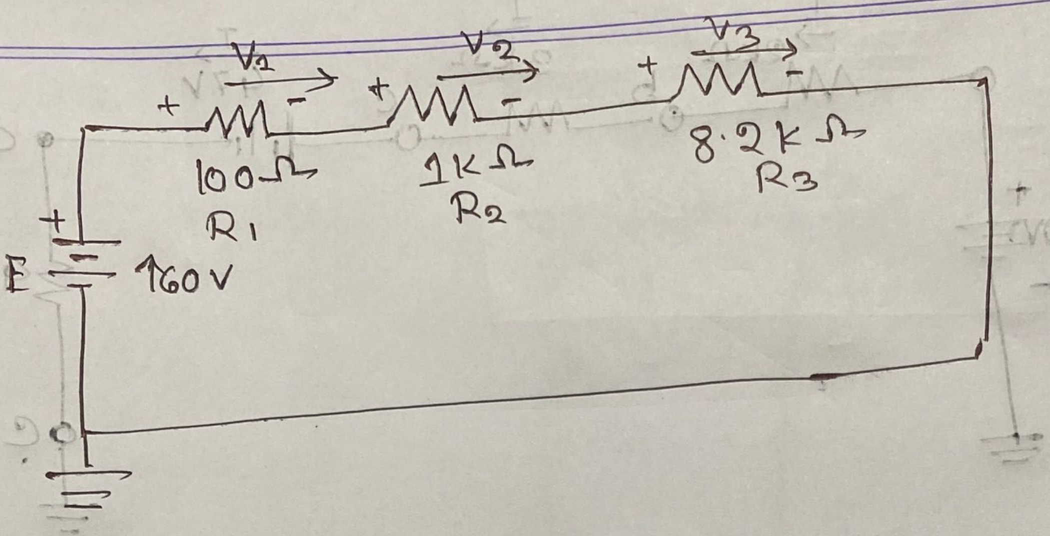
5.7

25(a) $R_3$ will receive the largest share of the applied voltage because in a series circuit the larger the resistance, the more of the applied voltage it will capture.

(b) $\frac{V_3}{V_2} = \frac{8.2 \times 10^3}{1 \times 10^3} = 8.2$

$\frac{V_3}{V_1} = \frac{8.2 \times 10^3}{100} = 82$

$\therefore V_3$ will be 8.2 times and 82 times larger compared to $V_2$ and $V_1$ respectively




(c) $V_{R_3} = R_3 \dfrac{E}{R_T}$

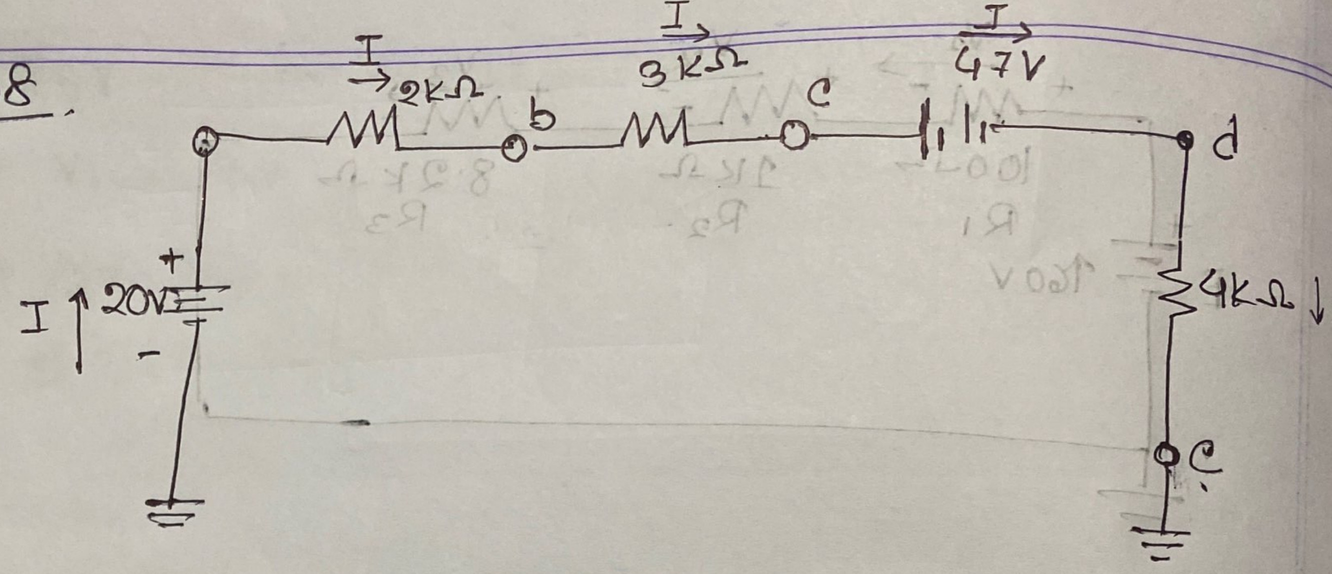
$= 8.2\times10^3 \dfrac{60}{9.3\times10^3}$

$= 52.9V$

(d) $V_{R_2 R_3} = (R_2 + R_3)\cdot\dfrac{E}{R_T} = (1+8.2)\times10^3 \cdot \dfrac{60}{9.3\times10^3}$

$= \cancel{5.94} = 59.4V$

38.




a) $I = \dfrac{47V - 20V}{2k\Omega + 3k\Omega + 4k\Omega} = 3mA$

$V_{R_1} = 3mA \times 2k\Omega = 6V$

$V_{R_2} = 3mA \times 3k\Omega = 9V$

$V_{R_3} = 3mA \times 4k\Omega = 12V$

$V_a = 20V$

$V_b = 20V + 6V = 26$

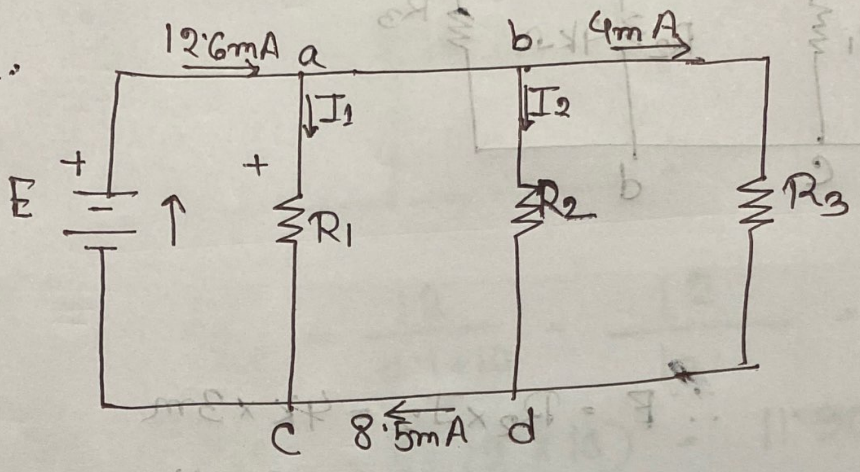
$V_c = 20V + 6V + 9V = 35V$

$V_d = -12$

$V_e = 0V$

## Chapter - 6

24.




At a,

$12.6 = I_1 + I_2 + 4mA$

$I_1 + I_2 = 8.6mA$

$\therefore I_1 = 8.6 - 4.5$

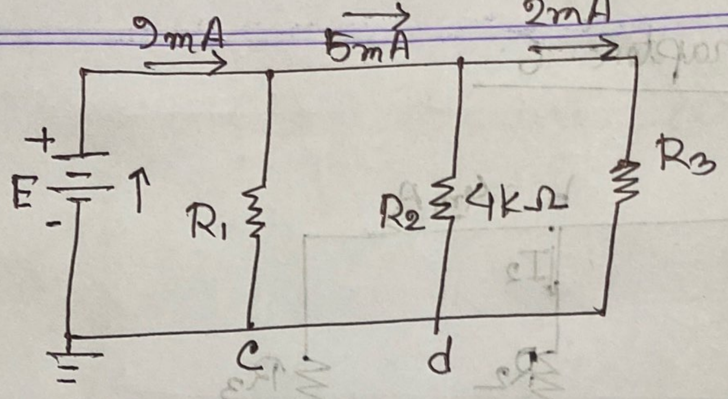
$= 4.1mA$

At d,

$I_2 + 4 = 8.5$

$I_2 = 4.5mA$

27.




At b,

$5 = I_2 + 2$

$I_2 = 3mA$

$\therefore E = R_2 \times I_2 = 4k \times 3m$

$= 12$ volts

At a,

$9 = I_1 + 5$

$I_1 = 4mA$

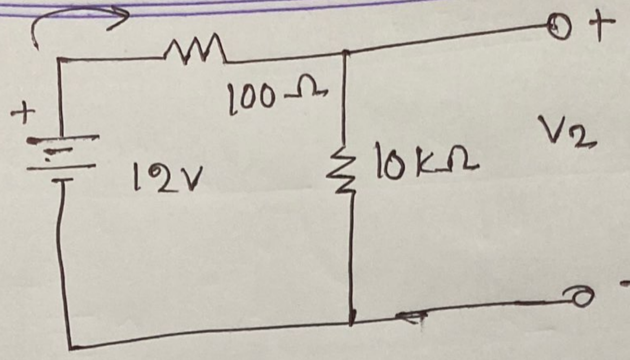
$R_3 = \frac{E}{2m} = \frac{12}{2m} = 6k\Omega$

$\therefore R_1 = \frac{E}{I_1} = \frac{12}{4m} = 3k\Omega$

$\therefore \frac{1}{R_T} = \frac{1}{3k} + \frac{1}{4k} + \frac{1}{6k}$

$R_T = 1.33k\Omega$

38.



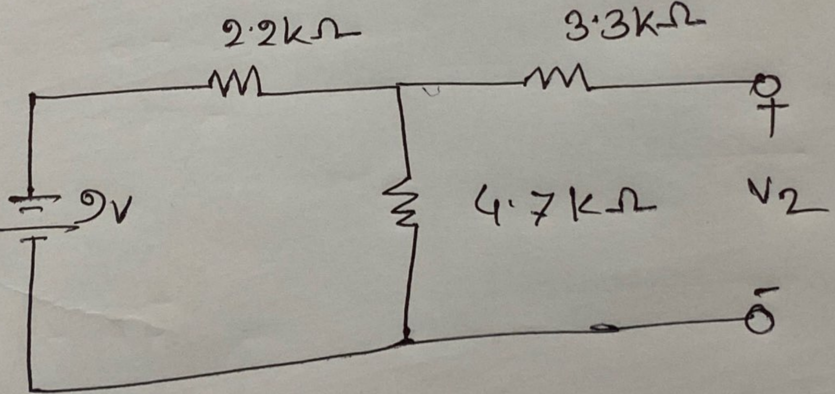

(a) $I_s = E/R_T = \frac{12}{0.1+10} = \frac{12}{10.1} = 1.188\ mA$

$V_2 = I_s R_2 = (1.19 \times 10) = 11.90V$

(b) $I = \frac{12V}{100} = 120\ mA$

(c) $V_2 = E = 12V$

39/




$V_2 = \frac{4.7 \times 9}{4.7+2.2} = \frac{42.3}{69} = 0.61$

(b) $V_2 = E = 9V$

(c) $V_2 = E = 9V$

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