Fig 1

EEE

18.2.23

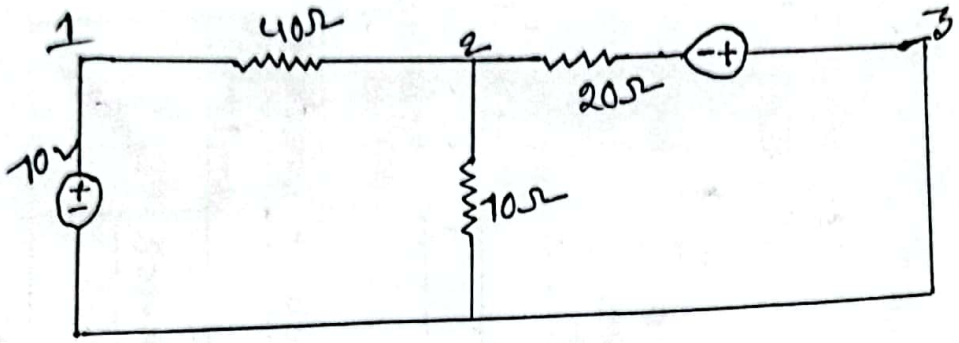
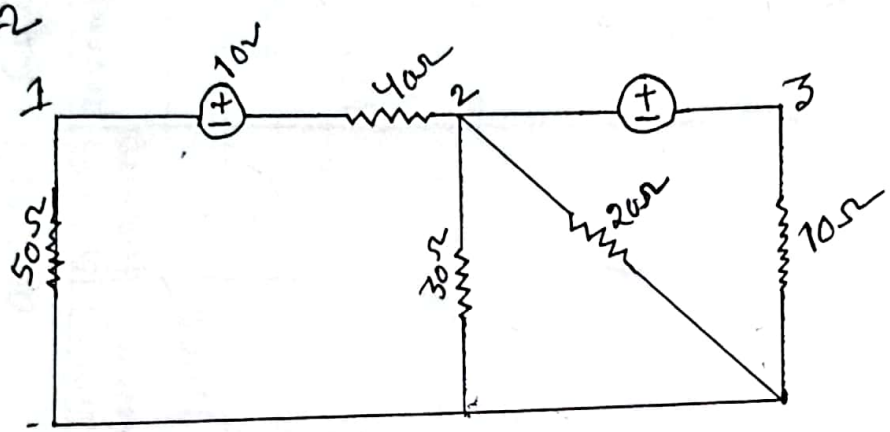


Fig 2



Nodal Analysis

~~equation~~

Fig-1)

$1 \Rightarrow V_1 = -10\ V \quad -(i)$

using 4el in 2

$2 \Rightarrow \frac{V_2 - V_1}{10} + \frac{V_2 - 20}{20} = 0$

$\Rightarrow \frac{2V_2 - 2V_1 + V_2 - 20}{20} = 0$

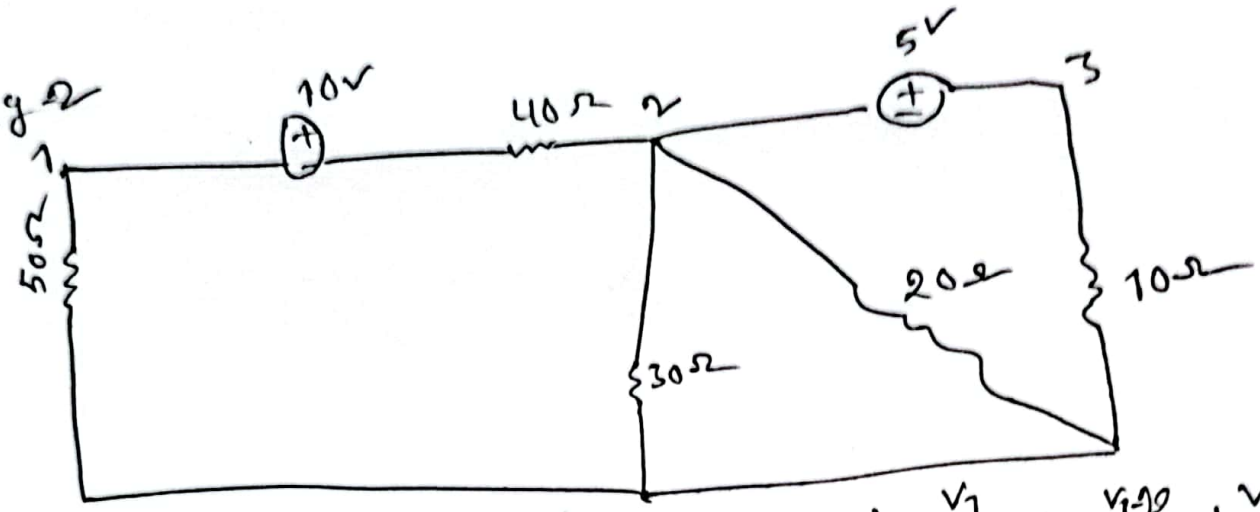
$\Rightarrow 3V_2 - 2V_1 - 20 \quad -(ii)$

~~Anal~~ Analysis between (i) and (ii)

$V_1 = -10V$

$V_2 = -25V$

Fig 2



1) $\Rightarrow \frac{V_1}{50} + \frac{V_1-20}{40} + \frac{V_1-V_2}{30} = 0$

$\Rightarrow \frac{12V_1 + 15V_1 - 300 + 20V_1 - 20V_2}{600} = 0$

$\Rightarrow 47V_1 - 20V_2 = 300 \quad \text{---(i)}$

1) $\frac{V_1}{50} + \frac{V_1-20}{40} + \frac{V_1-V_2}{30} = 0$

$\Rightarrow \frac{12V_1 + 15V_1 - 300 + 20V_1 - 2}{600}$

$= 47V_1 - 20V_2 = 300$

② $30 \parallel 20 \Rightarrow \frac{30 \times 20}{30+20}$

$\Rightarrow 12\Omega$

$\therefore \frac{V_2 - V_1}{12} + \frac{V_2}{5} + \frac{V_2}{10} = 0$

$\Rightarrow \frac{25V_2 - 5V_1 + 12V_2 + 6V_2}{60} = 0$

$\Rightarrow 23V_2 + 5V_1 = 0$

$\Rightarrow -5V_1 + 23V_2 = 0 \quad \text{---(ii)}$

Analysing (i) and (ii)

$V_1 = 7.0336\,V$

$V_2 = 1.52\,V$