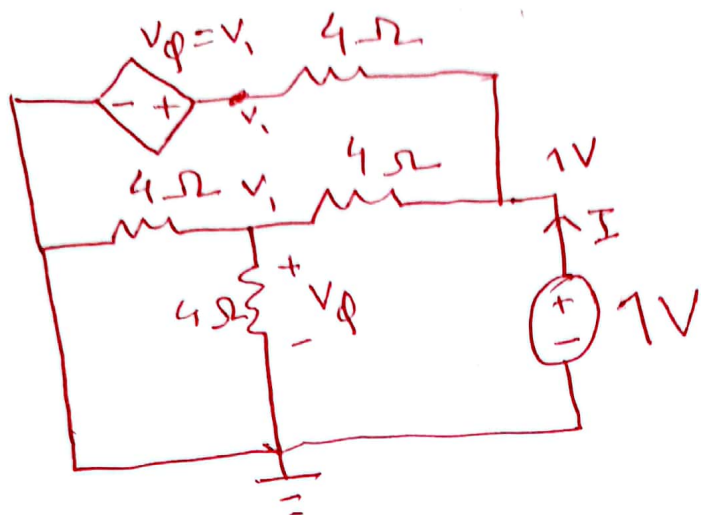


## Problem - 6

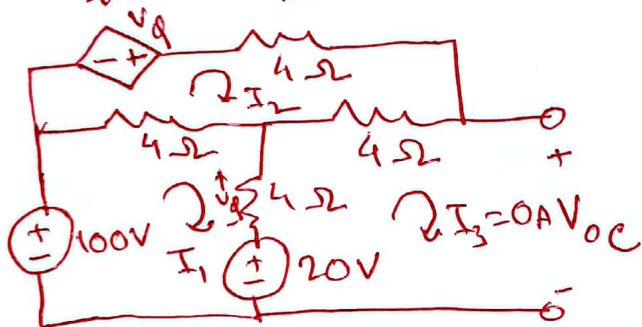


$$\frac{v_1}{4} + \frac{v_1}{4} + \frac{v_1 - 1}{4} = 0$$

$$\text{or, } v_1 = \frac{1}{3} \text{ V}$$

$$I = \frac{1 - v_1}{4} + \frac{1 - v_1}{4} = \frac{1}{3} \text{ A}$$

$$\therefore R_{th} = \frac{1}{I} = 3 \Omega$$



$$\text{Mesh-1} \Rightarrow -100 + 4(I_1 - I_2) + 4I_1 + 20 = 0$$

$$\text{or, } 8I_1 - 4I_2 = 80 \quad \text{--- (i)}$$

$$\text{Mesh-2} \Rightarrow -v_\phi + 4I_2 + 4I_2 + 4(I_2 - I_1) = 0$$

$$\text{or, } -8I_1 + 12I_2 = 0 \quad \text{--- (ii)}$$

Solving equation (i) and (ii) we get,  $[v_\phi = 4I_1]$

$$I_1 = 15 \text{ A}, I_2 = 10 \text{ A}$$

$$\text{Mesh-3} \Rightarrow -20 - 4I_1 - 4I_2 + V_{oc} = 0$$

$$\therefore V_{oc} = 20 + 4I_1 + 4I_2$$

$$= 120\text{V} = V_{th}$$

$$\therefore R = 3\Omega$$

$$P_{max} = \frac{V_{th}^2}{4R_{th}} = 1200\text{W} = 1.2\text{kW}$$