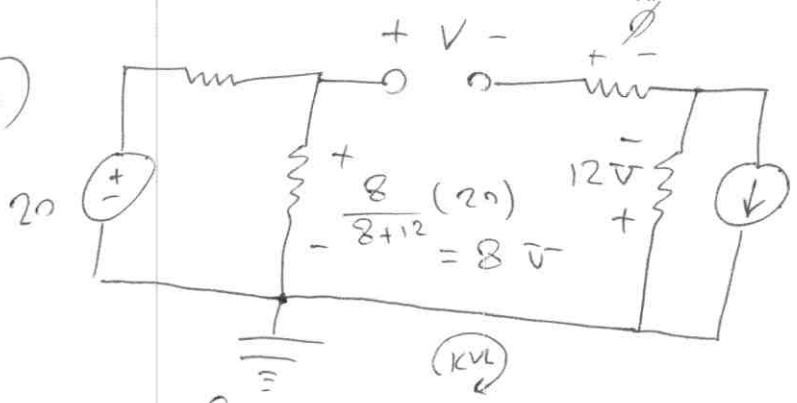
Q1

(1)



KVL :

$-8 + V + \emptyset - 12 = 0$

$\Rightarrow V = 20$ Volt

(2) Power absorbed by 2A Source $= 2(-6) = -12$ W

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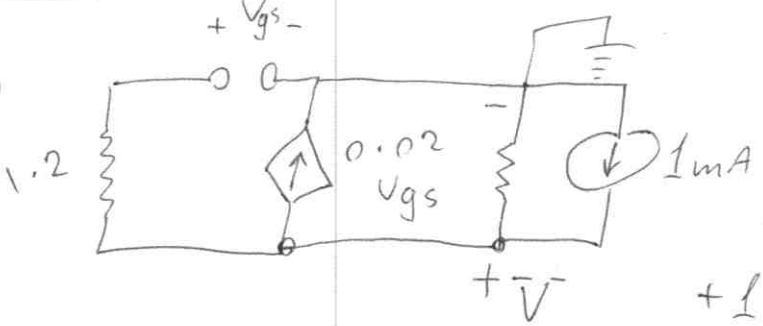
(3)



$V_{1.2\,k\Omega} = \emptyset$

$\Rightarrow V = V_{gs}$

Apply KCL @ Node V

$+1 - \frac{V}{1} - 0.02V = 0$

$\Rightarrow V = 0.98$ volt

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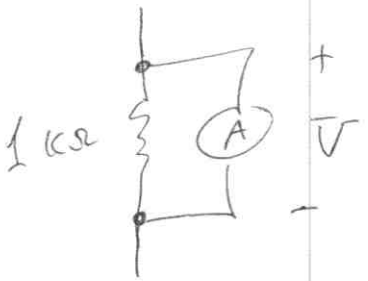
(4)



$V = 0$

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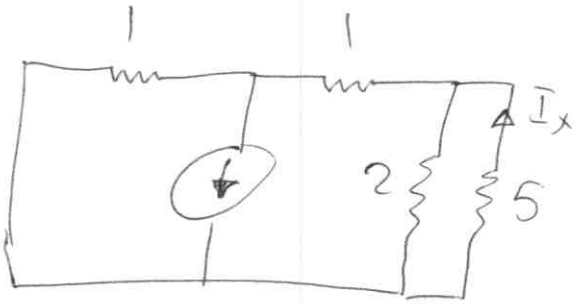
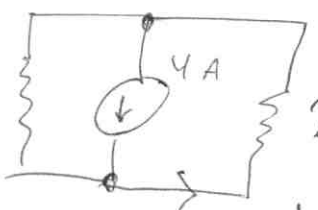
(5)

$I_x = \frac{2}{2+5}(I_y)$ ---- ⇐



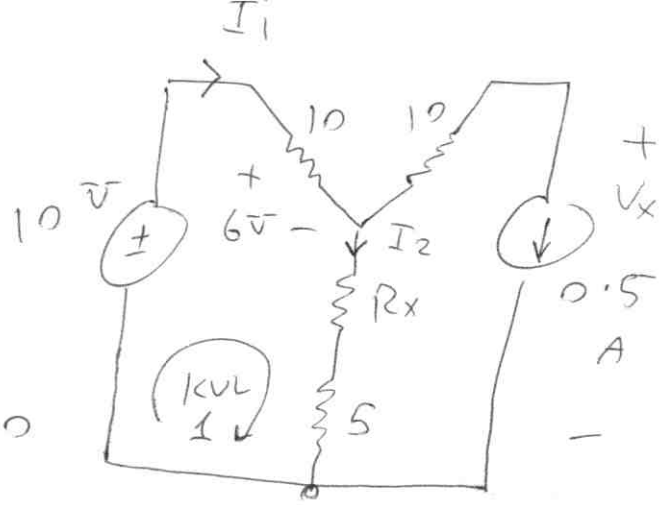
III



$I_y = \frac{1}{3.43}$ (4)

(6) $I_1 = \frac{6}{10} = 0.6$ A

$I_2 = I_1 - 0.5 = 0.1$ A



Apply KVL 1 :

$-10 + 6 + 0.1 R_x + 0.1(5) = 0$

$\Rightarrow R_x = 35\ \Omega$

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(7) Apply KVL @ the external loop

$-10 + 6 + 0.5(10) + V_x = 0 \Rightarrow V_x = -1$ volt

$\Rightarrow P_{diss.} = 0.5(-1) = -0.5$ W

$\Rightarrow P_{gen.} = +0.5$ W

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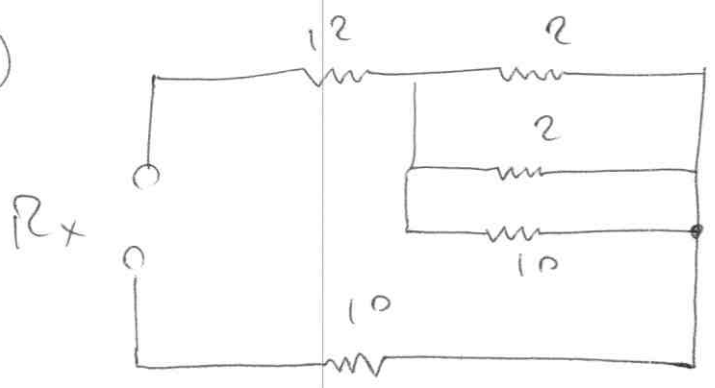
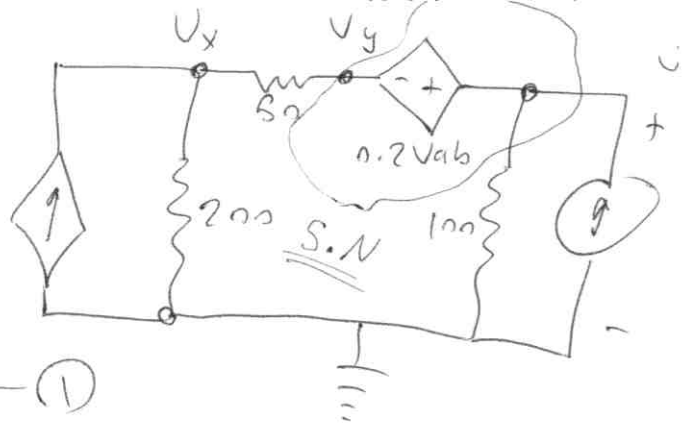
(8)



$R_x = 12 + (2 // 2 // 10) + 10$

$= 22.9\ \Omega$

Q2



a) $\frac{V_x - V_y}{5} - \frac{V_{ab}}{100} + 1 = 0$ $\quad 0.01\ V_{ab}$

——— (1)

$V_{ab} - V_y = 0.2\ V_{ab}$ ——— (2)

$0.01\ V_{ab} - \frac{V_x}{200} - \frac{V_x - V_y}{50} = 0$ ——— (3)

$V_x =$
$V_y =$
$V_{ab} =$

$P_{gen.} = V_{ab}(1)$ Watt

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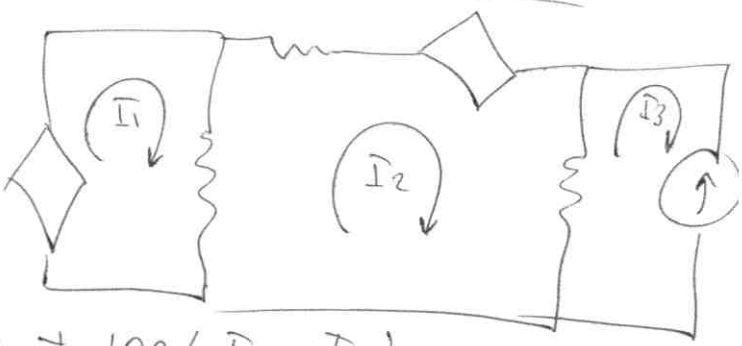
b) $I_1 = 0.01\ V_{ab}$

——— (1)



$200(I_2 - I_1) + 50 I_2 - 0.2 V_{ab} + 100(I_2 - I_3) = 0$

$I_3 = -1$ ——— (3) ——— (2)

$I_2 =$ - - - - $\Rightarrow P_{abs.} = -0.2 V_{ab}(I_2)$

$V_{ab} =$ - - -

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c) $\sum P_{generated} = 0$

$P_{gen} + P_{generated} + P_{gen} = 0$

(1A Source) (dependent v.s) (dependent c.s)