# ECE113: Basic Electronics (BE)

## Quiz-1

Date: **7-Feb-2025** Duration: **30 Minutes** Total Points: **16 Marks**

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**[CO1, CO2] Q1: [1+1 Marks]** Find Norton Current of the network (in Figure-1(a)) and Thevenin Voltage of the network (in Figure-1(b)).

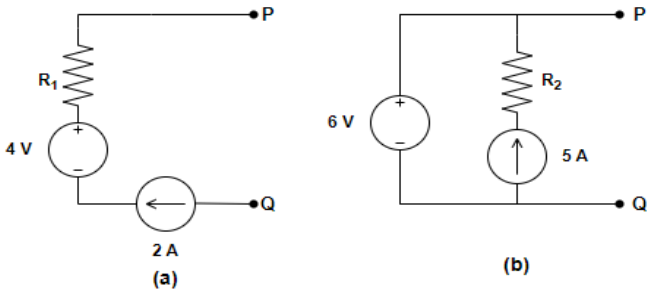


**Figure 1**

**[CO1, CO2] Q2: [4×1 Marks]** For the circuit in Figure-2(a), the $I_L$ -$V_L$ characteristics for variable $R_L$ is shown in Figure-2(b). Do the following:

- **(a)** Find Thevenin Voltage, Norton Current and Thevenin Resistance for "Network-N"
- **(b)** Find value of current "$I_L$" and power delivered to the load (for $R_L$=2 Ω)
- **(c)** Find the value of maximum power delivered to the load "$R_L$"
- **(d)** Assume that Thevenin Voltage and Thevenin Resistance as a practical voltage source, Find the value of Thevenin Resistance for which maximum power can be delivered to the load "$R_L$=2 Ω". Choose the correct option with justification. **(I)** 0.01 Ω **(II)** 0.0001 Ω **(III)** 2 Ω **(IV)** None of these

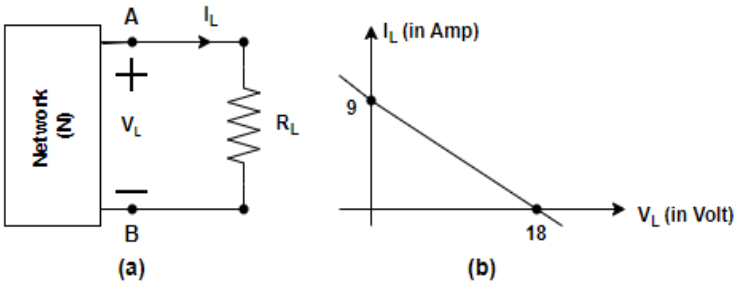


**Figure 2**

**[CO1, CO2] Q3: [4 Marks]** Find the value of current through 2 Ω resistance (in Figure-3).

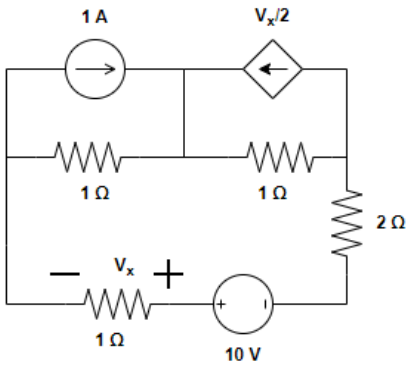


**Figure 3**

**[CO1, CO2] Q4: [1 Mark]** Find the value of current flowing through the voltage source (in Figure-4(a)).

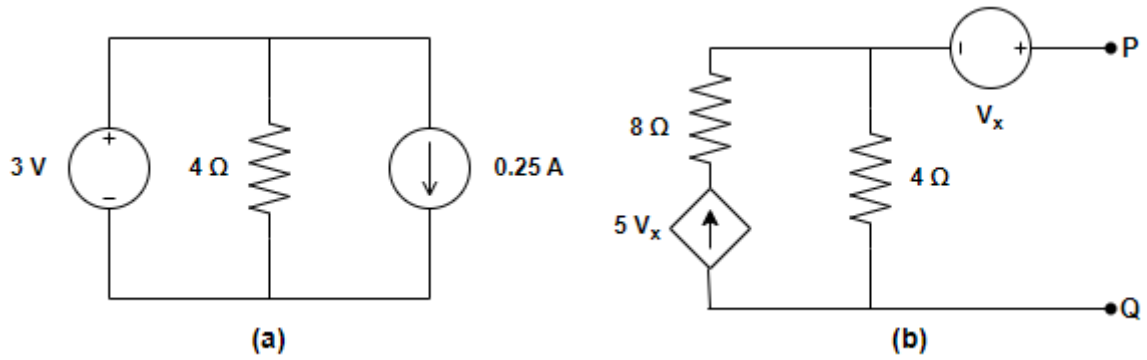


**Figure 4**

**[CO1, CO2] Q5: [1 Mark]** Find Norton resistance across point P and Q (in Figure-4(b)).

**[CO1, CO2] Q6: [1 Mark]** Find the voltage $V_0$ (in Figure-5(a)). Choose the correct option with justification:
**(a)** 5 V **(b)** 9 V **(c)** -1 V **(d)** None of these

**[CO1, CO2] Q7: [1 Mark]** Find the voltage $V_x$ (in Figure-5(b)).

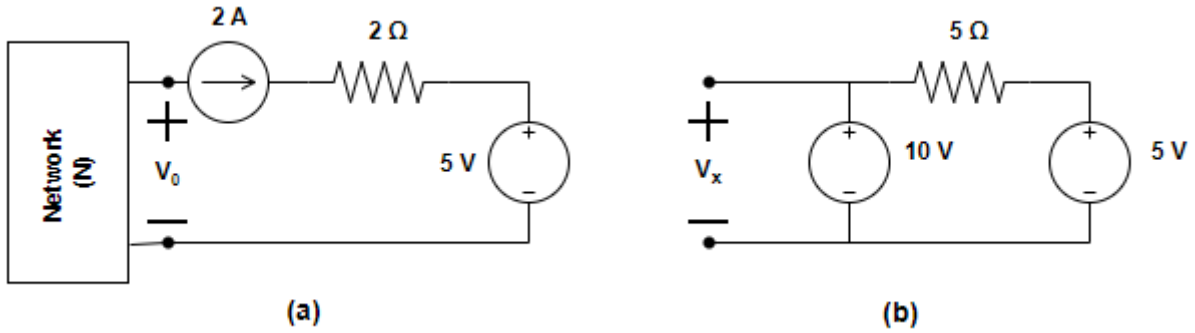


**Figure 5**

**[CO1, CO2] Q8: [2 Marks]** Can we solve for $I_1$, $I_2$ and $I_3$ from the below three equations? Justify your answer.

KVL in the loop (a-b-e-a), $V_1 = I_1R_1 + (I_1+I_2)R_2$
KVL in the loop (b-c-e-b), $(I_1+I_2)R_2 + I_2R_3 - (I_3-I_2)R_4 = 0$
KVL in the loop (a-b-c-e-a), $V_1 = I_1R_1 - I_2R_3 + (I_3-I_2)R_4$

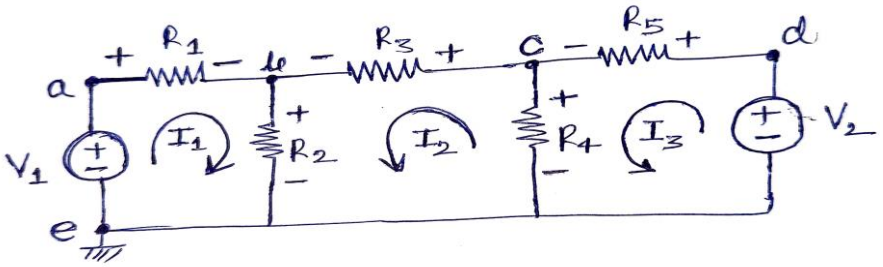


**Figure 6**