United International University **(UIU)**

Dept. of Computer Science & Engineering **(CSE)**

Mid-Term Exam, Trimester: Fall 2023

Course Code: CSE 113/EEE 2113**; Course Title:** Electrical Circuits

Total Marks: 30**; Duration:** 1 hour 45 minute(s)

Any examinee found adopting unfair means would be expelled from the trimester/ program as per UIU disciplinary rules.

Question 1: Answer all the questions. (8 Marks)

The charge flowing in a resistive load is shown in **Figure 1**. Based on the figure, answer the following questions: [4+2+2]

i) Sketch the corresponding current clearly.

ii) If the voltage across the load is 5V at t = 3.5s, what power will the load absorb at that time? Also, determine the resistance of this load.

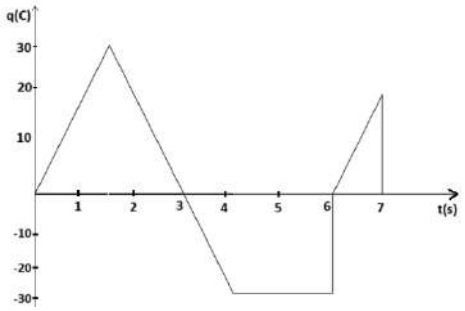

Figure 1.

Question 2: Answer all the questions. (8 Marks)

For the circuit shown in **Figure 2**, answer the following questions: [2+3+3]

i) Apply KCL at Node A and write the current equation. Then, find the value of I_3.

ii) Apply KVL for the first loop (I_1) and find the value of I_1.

iii) Apply KVL in the second loop (I_2) and write the equation. Then find the value of V_x as indicated in the circuit.

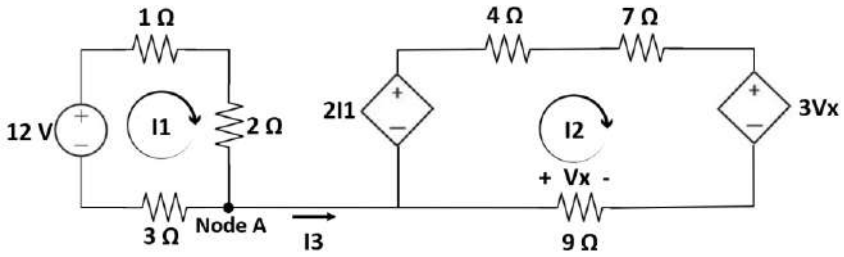

Figure 2.

Question 3: Answer all the questions (6 Marks)

Answer the follwing questions for the circuit shown in **Figure 3 (a-b)**: [3+3]

i) Find R_{ab} for the circuit shown in **Figure 3(a)**.

ii) Determine each current (i_1, i_2, i_3, i_4) in the circuit shown in **Figure 3(b)**.

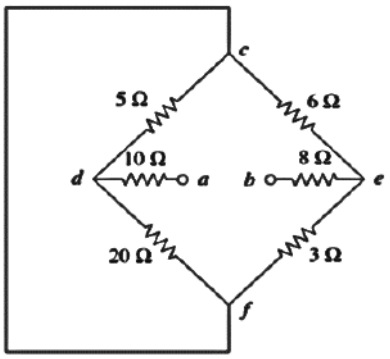

Figure 3(a)

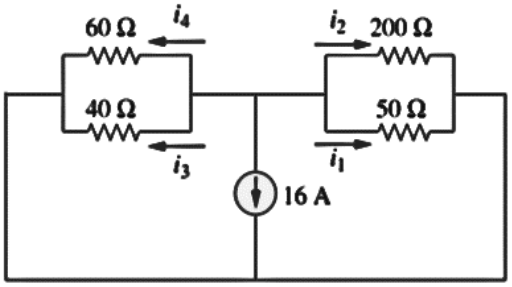

Figure 3(b)

Question 4: Answer all the questions. (4 Marks)

For the circuit shown in **Figure 4**, determine i_o and v_o using **mesh analysis**. [2+2]

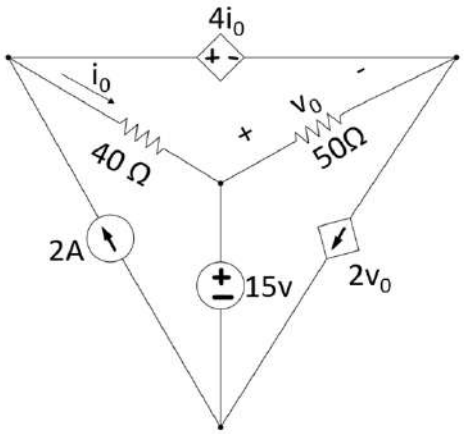

Figure 4.

Question 5: Answer all the questions. (4 Marks)

Let's assume the Vx node voltage is 20V in the circuit shown in **Figure 5**. Now, answer the following questions using **node analysis**: [2+2]

i) Calculate all the other node voltages in the circuit using node analysis.

ii) Determine the power supplied or absorbed by the source(s) in the circuit.

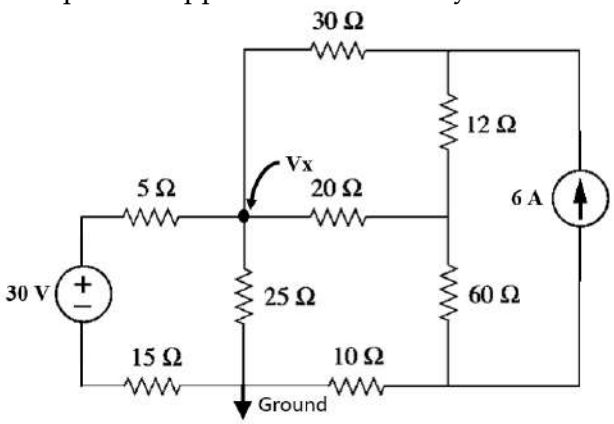

Figure 5.