



United International University (UIU)  
Dept. of Computer Science & Engineering (CSE)  
**Mid-Term Exam: Trimester: Summer 2023**

Course Code: EEE 2113; Course Title: Electrical Circuits  
Total Marks: 30; Duration: 1 hour 45 minutes

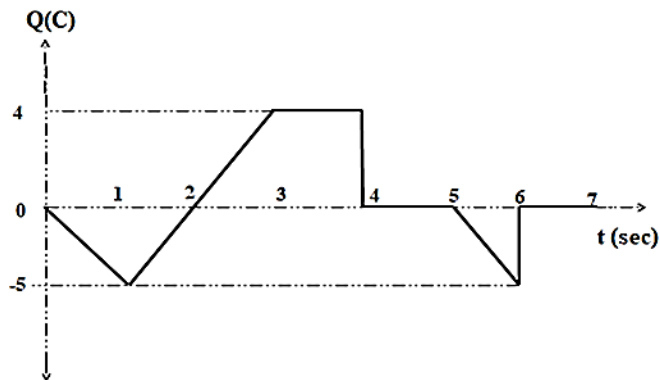
Any examinee found adopting unfair means would be expelled from the trimester/ program as per UIU disciplinary rules.

**Question 1: Answer all the questions.**

**(6 Marks)**

The charge flowing in a wire having  $20\ \Omega$  resistance is shown in **Figure 1**. Answer the following questions: [4+2]

- Clearly** sketch the corresponding current and find current at  $t = 2.5$  sec and  $t = 5.5$  sec.
- Determine** the time when maximum power is delivered to the element. Also, **find** the maximum power.



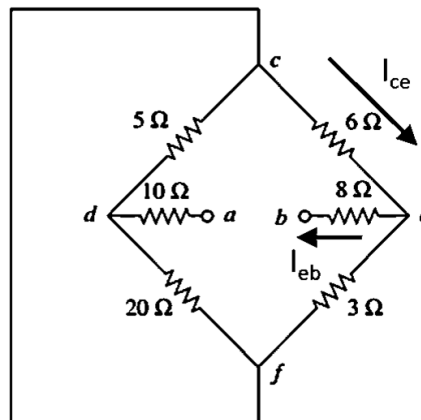
**Figure 1.**

**Question 2: Answer all the questions.**

**(6 Marks)**

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

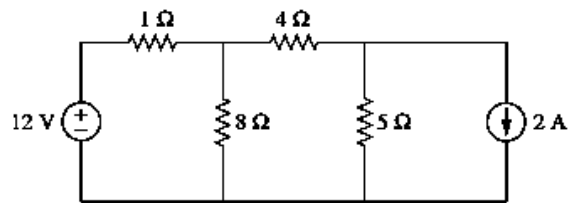
- Find the equivalent resistance across the terminals **a-b**.
- A **30 V** voltage source is connected to the terminals **a-b**, the **positive** terminal of the source is connected to **a** and the **negative** terminal is connected to **b**. Find the currents  $I_{ce}$  and  $I_{eb}$  using **current division rule**.



**Figure 2.**

**Question 3: Answer all the questions****(6 Marks)**

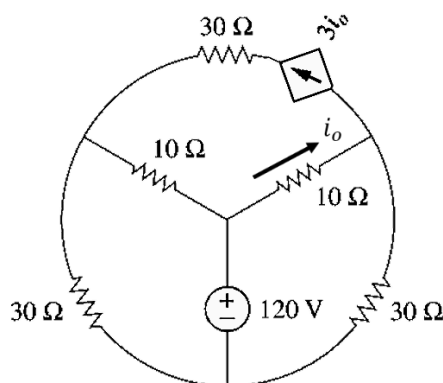
[6]

**Figure 3.**

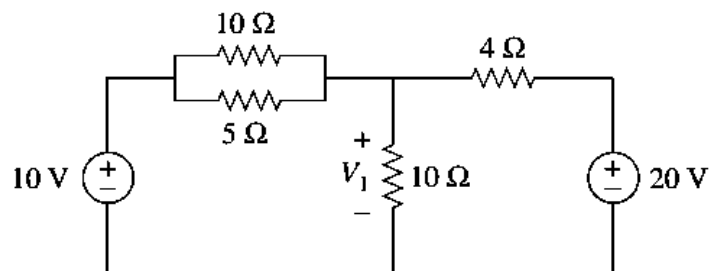
Use Kirchoff's Current Law (**KCL**) and Kirchoff's Voltage Law (**KVL**) to find **all the branch currents and node voltages** of the above circuit in **Figure 3**.

**Question 4: Answer all the questions.****(6 Marks)**

For the circuit shown in **Figure 4**, determine  $i_o$  and current through the battery using **mesh** [3+3] **analysis**.

**Figure 4.****Question 5: Answer all the questions.****(6 Marks)**

[3+3]

**Figure 5.**

For the circuit shown in **Figure 5**, answer the followings using **node analysis**:

- Determine** the current through the  $5\Omega$  resistor and  $V_1$ .
- Evaluate** which voltage source is supplying power to the circuit.