



United International University
Department of Computer Science and Engineering
 EEE 2113: Electrical Circuits

Mid-Term Exam: Spring 2023 Time: 1 hour 45 minutes Marks: 30

There are five questions here. Answer all of them

1. Determine the followings for the circuit shown in Figure 1:

- (a) Equivalent Resistance of the circuit across the voltage source. [2]
- (b) Voltage across $3\ \Omega$ and $2\ \Omega$ resistors with appropriate polarities using VDR. [2]
- (c) Current through $50\ \Omega$ and $12\ \Omega$ resistors with proper directions using CDR. [2]

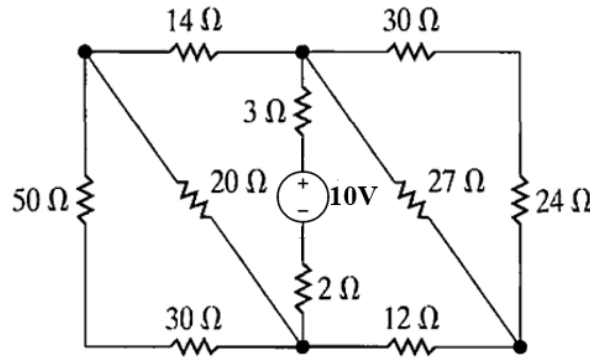


Figure 1: Circuit for Q-1

2. The charge flowing through a $10\ \Omega$ resistor is given below:

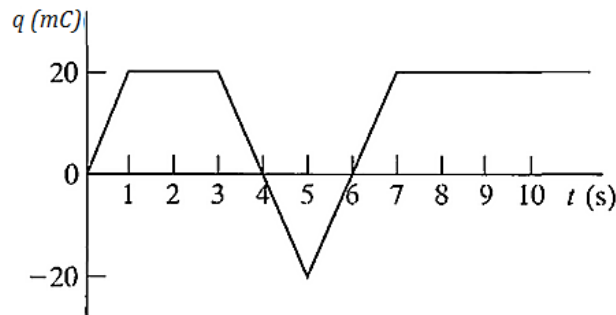


Figure 2: Charge distribution for Q-2

- (a) Derive the equation of current of this resistor and sketch it as a function of time. [4]
- (b) Calculate the total energy delivered between 0 sec and 6 sec. [2]

3. For the circuit shown in Figure 3,

- (a) Use Kirchoff's laws to determine all branch currents and node voltages. [4]
- (b) Calculate the power dissipated through all the elements of the circuit. Determine which elements are supplying power to the circuit and which elements are absorbing power. [2]

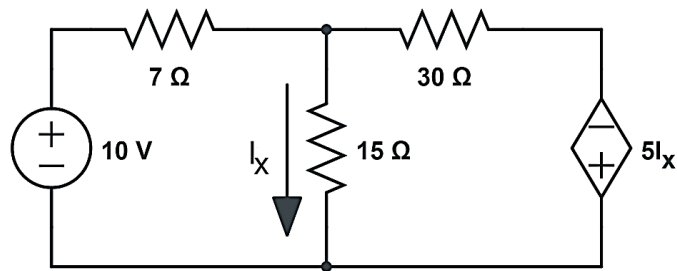


Figure 3: Circuit for Q-3

4. (a) Use the mesh analysis method to determine mesh currents in the circuit. [4]
 (b) Find the power dissipated in $1\ \Omega$ resistor. [2]

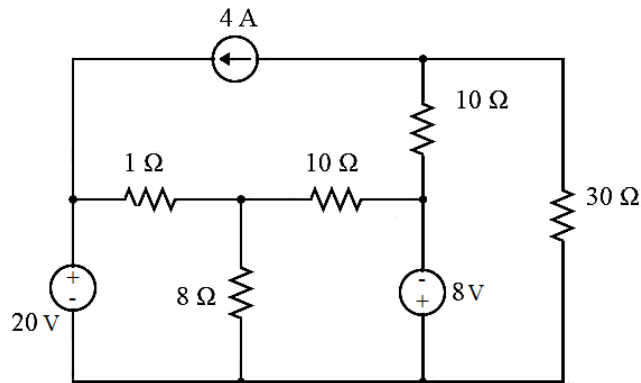


Figure 4: Circuit for Q-4

5. Consider the following circuit:

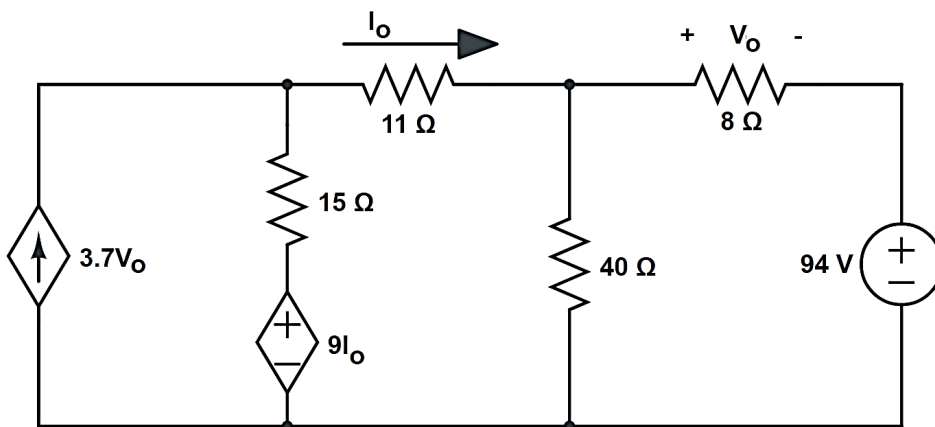


Figure 5: Circuit for Q-5

- (a) Find all node voltages in the above circuit using Nodal Analysis method. [4]
 (b) Calculate V_o and I_o in the circuit. [2]