



## UNITED INTERNATIONAL UNIVERSITY (UIU)

Dept. of Computer Science & Engineering

Course No: EEE 2113 Title: Electrical Circuits (Fall 2024)

Assignment - 1

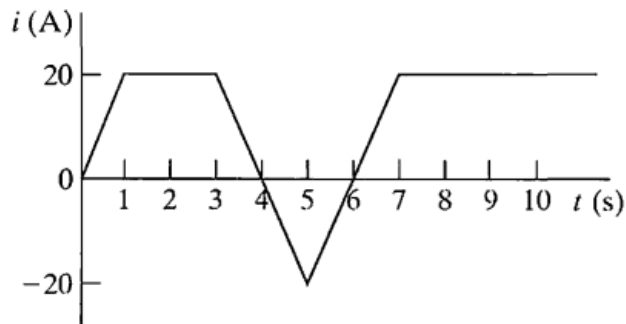
### Problems to solve:

1. The voltage and current at the terminals of a circuit element are zero for  $t < 0$ . [20]  
For  $t > 0$ ,

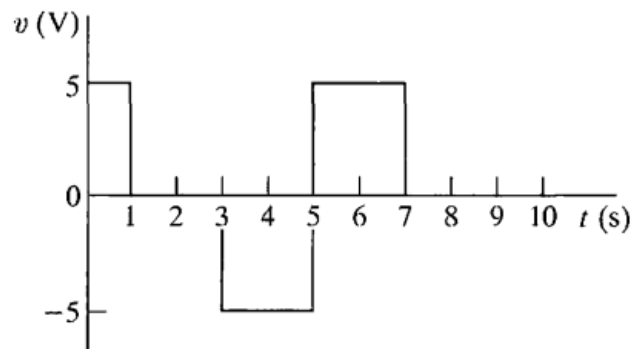
$$v = (16,000t + 20)e^{-800t} \text{ V},$$

$$i = (128t + 0.16)e^{-800t} \text{ A}.$$

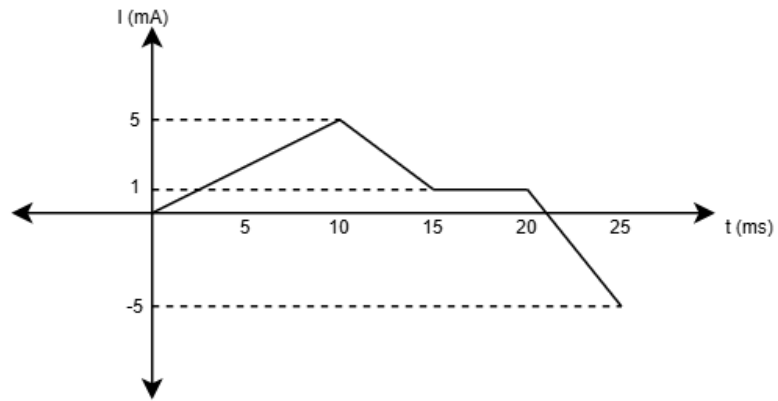
- a) At what instant of time is maximum power delivered to the element?  
b) Find the maximum power in watts.  
c) Find the total energy delivered to the element in millijoules.
2. The voltage and current at the terminals of a circuit element are shown in Fig below. [20]  
a) Sketch the power versus time plot for  $0 < t < 10$  s.  
b) Calculate the energy delivered to the circuit element at  $t = 1, 6$ , and  $10$  s.



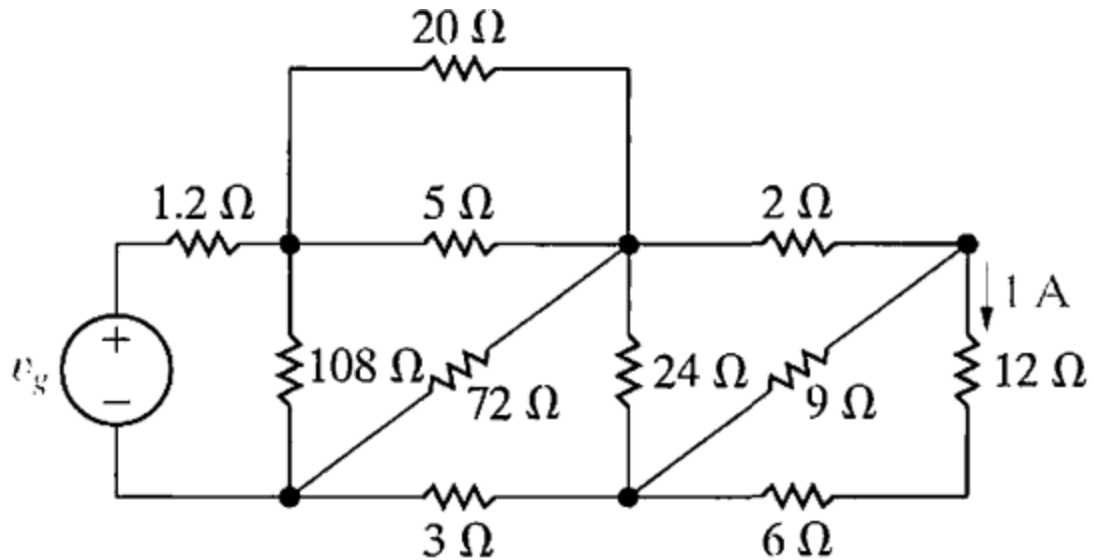
(a)



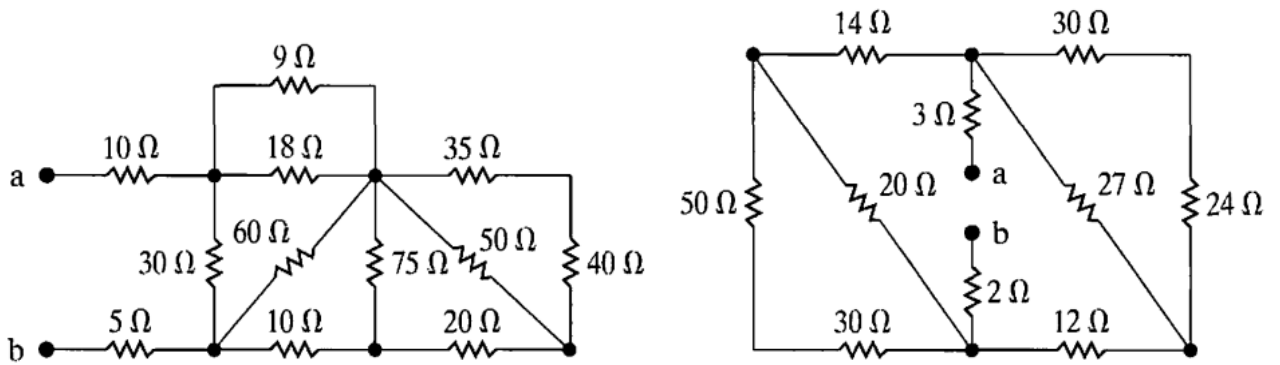
3. The current through an element is shown in figure below. Determine: [20]
- The total charge entering the element from  $t = 10\text{ms}$  to  $t = 17\text{ms}$
  - Draw the charge vs time graph for the element till  $t = 25\text{ms}$



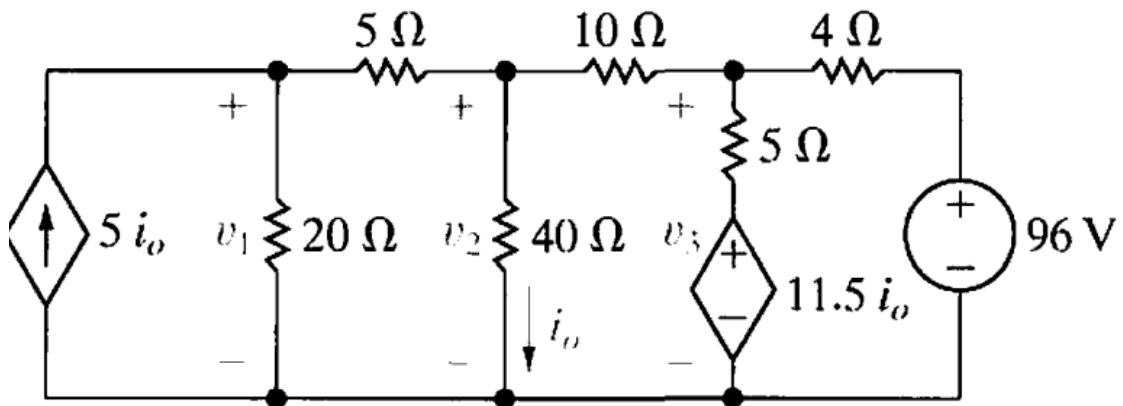
4. The current in the 12 ohm resistor in the circuit in Fig. below is 1 A, as shown.
- Find  $v_g$ .
  - Find the power dissipated in the 20 ohm resistor. [10]



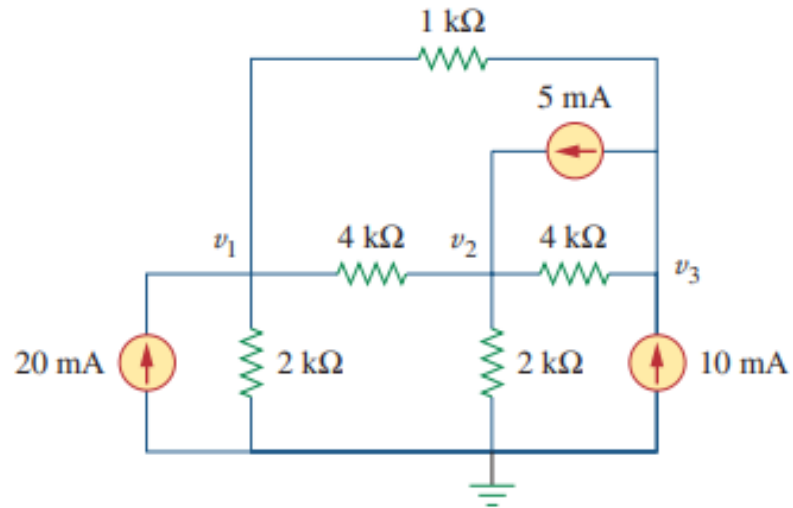
5. Find the equivalent resistance for each of the circuits in Fig. below. [10]



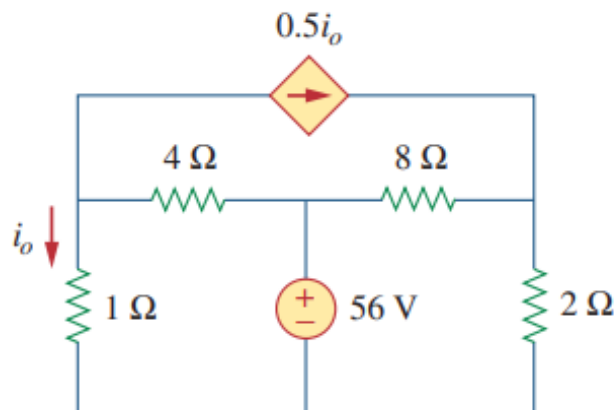
6. a) Find the **node voltages**  $V_1$ ,  $V_2$ , and  $V_3$  in the circuit in Fig. below.  
b) Find the total power dissipated in the circuit. [10]



7. a) Determine the node voltages in the circuit shown below using node analysis.  
 b) If 5mA current source is removed from the circuit, then determine the current through the two 2k ohm resistors as well as the node voltages using mesh analysis only. [10]



8. Determine the power dissipated in each resistor for the following circuit shown below. Use mesh or node analysis. [10]



9. Use mesh analysis to find  $v_{ab}$  and  $i_o$  in the circuit [10]

