

LAHORE UNIVERSITY OF MANAGEMENT SCIENCES
 Department of Electrical Engineering

EE 240 Circuits I
Quiz 3 Solutions

Name: _____

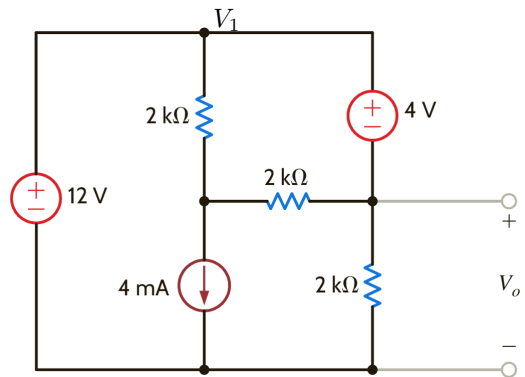
Campus ID: _____

Total Marks: 10

Time Duration: 15 minutes

Question 1 (2 marks)

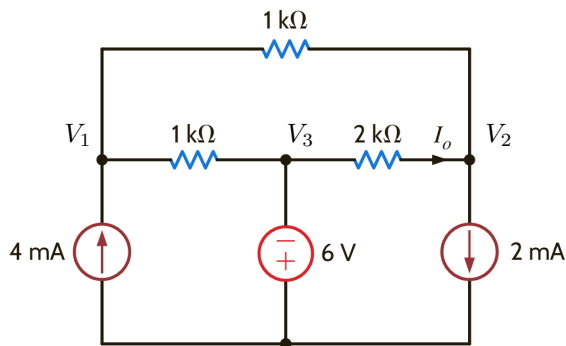
Find V_o in the following circuit. The question does not require any tedious calculations.



Solution: $V_1 = 12V$
 $V_1 - V_o = 4V$
 $12V - V_o = 4V$
 $V_o = 8V$

Question 2 (5 marks)

Apply nodal analysis to find I_o in the following circuit.



Solution: Node 3: $V_3 = -6V$

$$\text{Node 1: } 4 = \frac{V_1 - V_2}{1K} + \frac{V_1 - (-6)}{1K}$$
$$2V_1 = V_2 - 2 \text{ (Eq 1)}$$

$$\text{Node 2: } 2 = \frac{-6 - V_2}{2K} + \frac{V_1 - V_2}{1K}$$
$$2V_1 - 3V_2 = 10 \text{ (Eq 2)}$$

Solving Eq1 and Eq2 simultaneously:

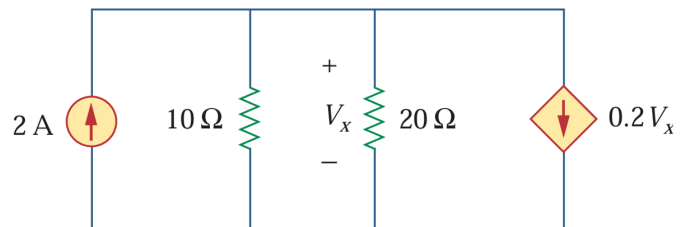
$$V_1 = -4V$$

$$V_2 = -6V$$

$$I_o = \frac{V_3 - V_2}{2K} = \frac{-6 - (-6)}{2K} = 0$$

Question 3 (3 marks)

Apply nodal analysis to find V_x in the following circuit.



Solution: $2 = \frac{V_x}{10} + \frac{V_x}{20} + 0.2V_x$

$$V_x = \frac{40}{7} \text{ V}$$