

LAHORE UNIVERSITY OF MANAGEMENT SCIENCES
Department of Electrical Engineering

EE240 Circuits I
Quiz 04 - Section 2 - Solutions

Name: _____

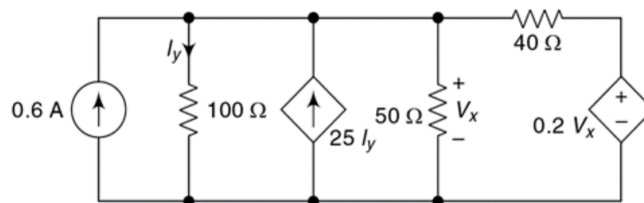
Campus ID: _____

Total Marks: 10

Time Duration: 20 minutes

Question 1 (6 marks)

For the circuit given below, use the nodal analysis to determine the voltage V_x .



Solution:

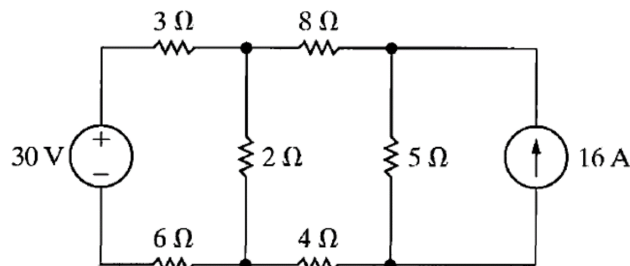
Considering the bottom node as ground and applying KCL at the upper node gives

$$\underbrace{\frac{V_x}{100}}_{I_y} + \frac{V_x}{50} + \frac{V_x - 0.2V_x}{40} - 25I_y - 0.6 = 0, \implies \frac{V_x}{100} + \frac{V_x}{50} + \frac{0.8V_x}{40} - 25\frac{V_x}{100} = 0.6$$

$$\frac{V_x}{100} + \frac{V_x}{50} + \frac{V_x - 0.2V_x}{40} - 25\frac{V_x}{100} = 0.6, \implies -\frac{V_x}{5} = 0.6 \implies V_x = -3V.$$

Question 2 (4 marks)

Use either nodal, loop or *source transformation* to determine the current through the 8Ω resistor.



Solution:

By transforming the current to voltage source and transforming voltage to current and back to voltage after solving parallel combination of 9Ω and 2Ω, we can obtain a circuit with voltage source of voltage 820/11V, 8Ω resistor and 117/11Ω resistor. By applying voltage division rule, we obtain the voltage, denoted by V_8 , across 8Ω resistor with higher potential on the right hand side as

$$V_8 = 4V$$