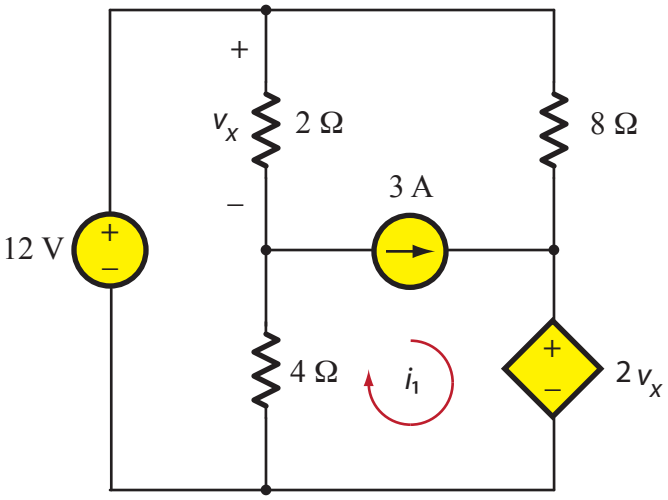
University of Calgary
Department of Electrical and Computer Engineering

ENGG 225 - Fundamentals of Electrical Circuits and Machines
Winter, 2017

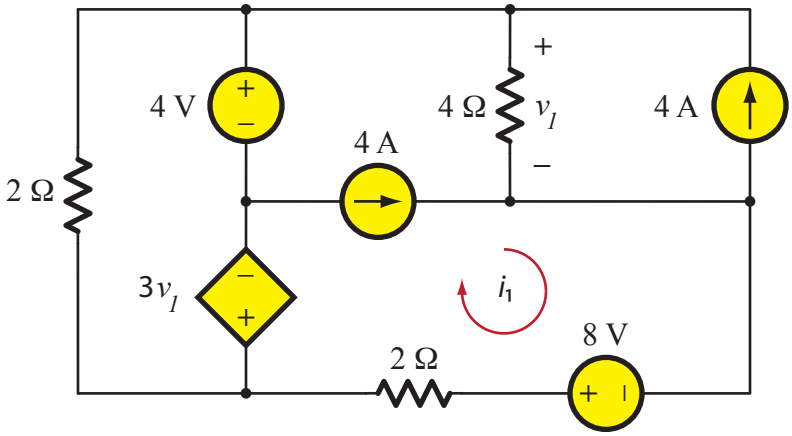
Problem Assignment #4

Use the mesh-current method to solve Questions 1-3, and then use any circuit analysis method you wish to calculate the Thévenin equivalent circuits in problem 4-9.

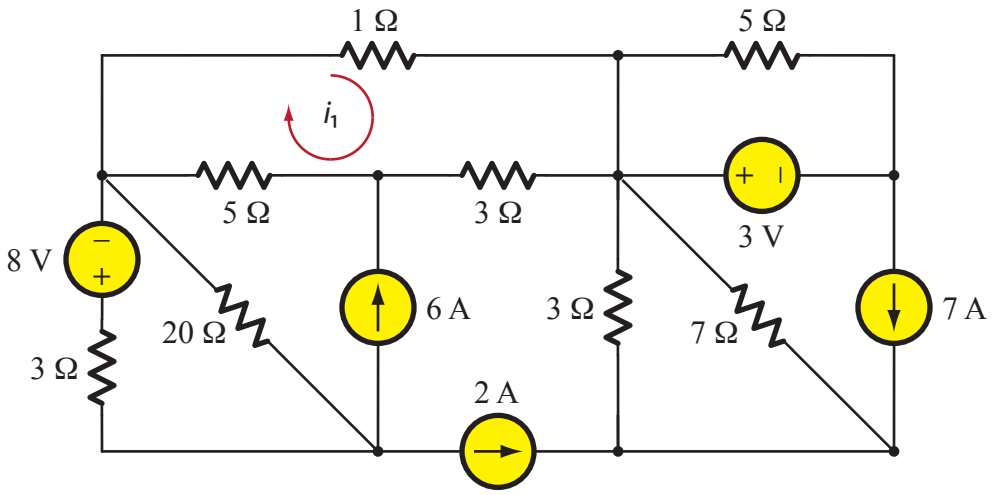
1. **[2 marks.]** Use the mesh-current method to solve for mesh current i_1 as shown. Give your answer in Amperes.



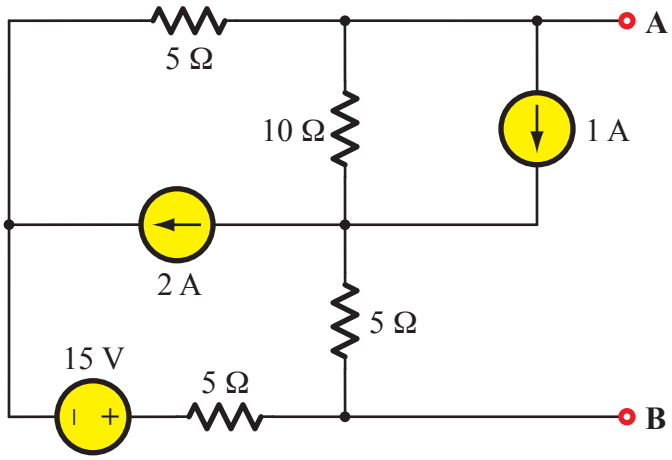
2. **[2 marks.]** Use the mesh-current method to solve for mesh current i_1 as shown. Give your answer in Amperes.



3. **[1 mark.]** Use the mesh-current method to solve for mesh current i_1 as shown. Give your answer in Amperes. *(Hint: This circuit looks rather intimidating; however, not all meshes are needed to find the answer!)*

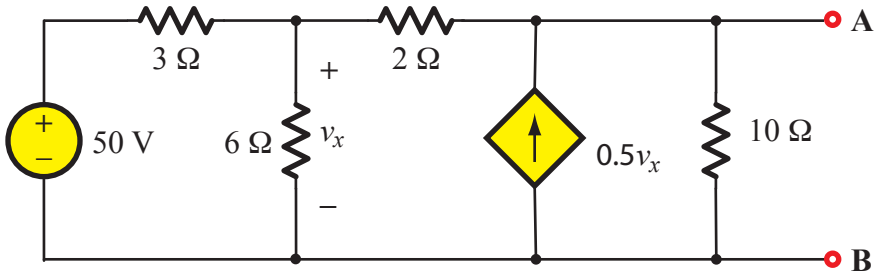


4. **[2 marks.]** Determine the Thévenin equivalent of the following circuit, and give the Thévenin voltage $v_t = v_{AB}$ in Volts.



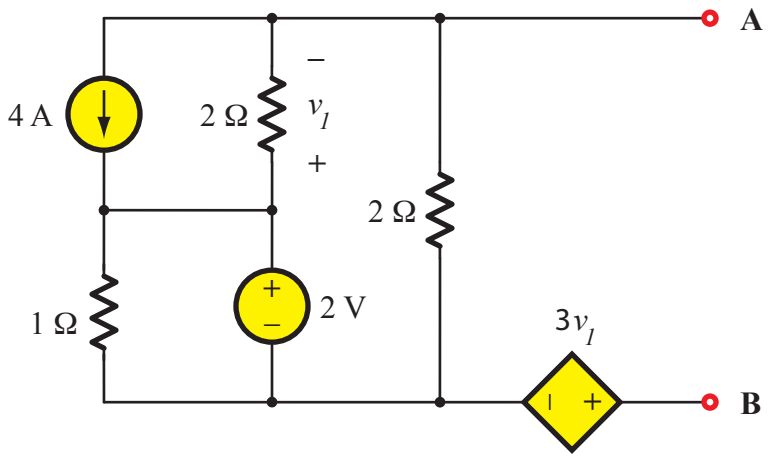
5. **[1 mark.]** For the circuit above in Question 4, give the Thévenin resistance R_t in Ohms.

6. **[2 marks.]** Determine the Thévenin equivalent of the following circuit, and give the Thévenin voltage $v_t = v_{AB}$ in Volts.



7. **[2 marks.]** For the circuit above in Question 6, give the *short-circuit current* $i_{sc} = i_{AB}$ in Amperes. Assume that the direction of the current is from A to B.

8. **[1 mark.]** Determine the Thévenin equivalent of the following circuit, and give the Thévenin voltage $v_t = v_{AB}$ in Volts.



9. **[1 mark.]** For the circuit above in Question 8, give the *short-circuit current* $i_{sc} = i_{AB}$ in Amperes. Assume that the direction of the current is from A to B. *(Hint: A KVL equation around a loop containing the two voltage sources could help!)*