ECE2150J 2025FA Assignment 1

GLOBAL COLLEGE
SHANGHAI JIAO TONG UNIVERSITY

Due time: 23:59, Oct. 19th, 2025

In order to get full marks, you shall write all the intermediate steps of calculation or proof unless otherwise indicated. This assignment covers content from chapter 1 to 3.

Exercise 1.1 (20%)

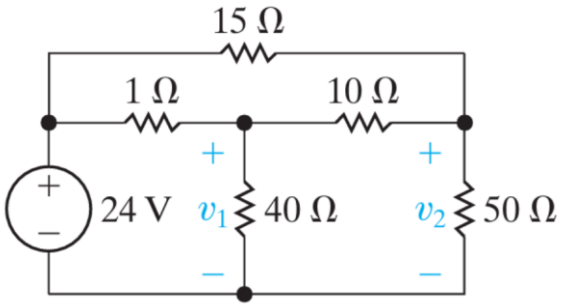
The charge entering the positive terminal of an element is $q = 5\sin 4\pi t$ mC. While the voltage across the element (plus to minus) is $v = 5\cos 4\pi t$ V.

(a) Find the power delivered to the element at t = 0.3 s.

(b) Calculate the energy delivered to the element between 0 and 0.6 s.

Exercise 1.2 (20%)

Please find the voltage v_1 and v_2 in the circuit below by using delta-to-wye transformation.

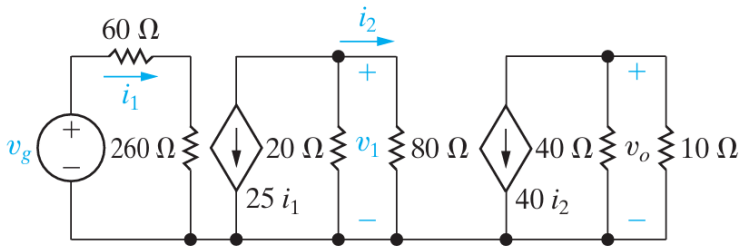


Exercise 1.3 (20%)

In the circuit below

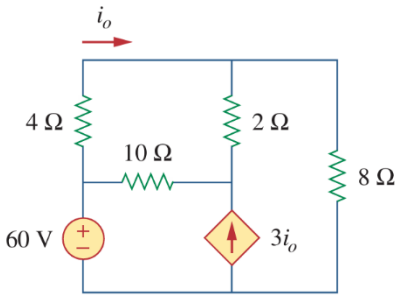
(a) Determine the number of branches, nodes and meshes.

(b) Find v_1 and v_g in the circuit when v_0 equals 5 V. (Hint: Start at the right end ofthe circuit and work back toward v_g)

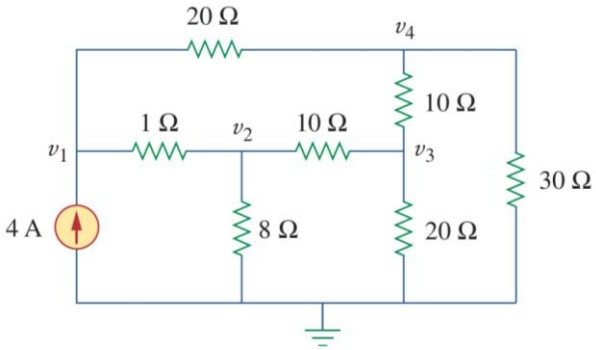


Exercise 1.4 (10%+10%)

(a) Using nodal analysis, find current i_0, in the circuit.

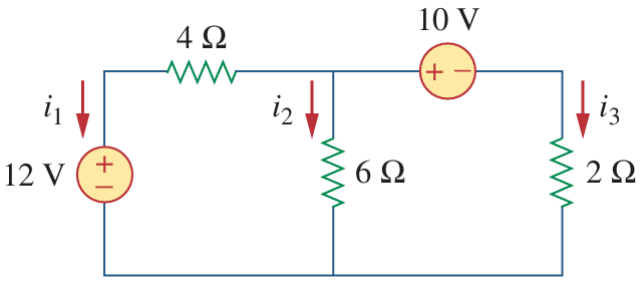


(b) Use nodal analysis to determine the node voltages in the circuit.



Exercise 1.5 (10%+10%)

(a) Use mesh analysis to obtain i_1, i_2 and i_3 in the circuit.



(b) Use mesh analysis to find i_1, i_2 and i_3 in the circuit.