EEE 31 Semester 2 AY 2012-13 Problem Set 2

- This problem set is due on Wednesday 27 February 2013. For TH sections, submit your problem sets in the Dropbox provided by the EEEI guard no later than 12 nn. For WF sections, submit to your Instructor at the start of your meeting.
- Write your name, student number, section and teacher at the upper right hand corner of every page of your answer sheet.
- Do not use the reverse side of your answer sheet for your solutions. Anything written at the back will be considered scratch.
- Answer each problem completely. Highlight (e.g. encircle, put in a box, etc.) your final answer.
- Do not use calculator for this problem set. Answers in fractional form must be in simplest form.

1 Problem 1

Use Figure 1. Determine the Norton Equivalent to the left of terminal $a-b$. Calculate i through the 16 Ω resistor.

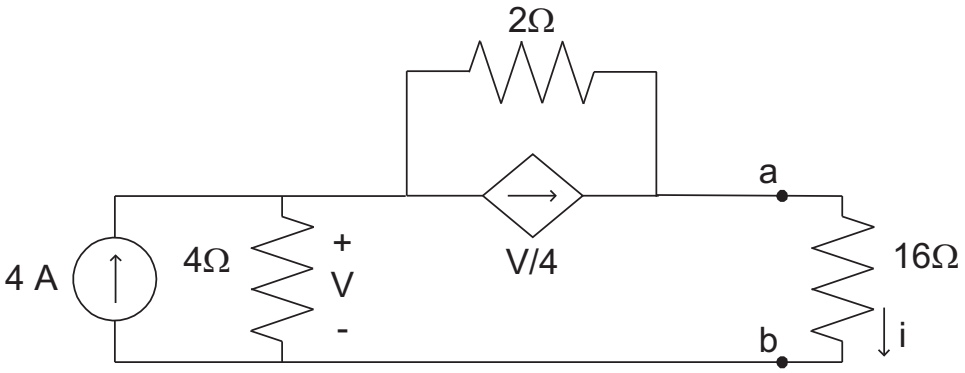

Figure 1: Circuit for Problem 1

2 Problem 2

Use Figure 2. Determine the Norton Equivalent across terminal $a-b$.

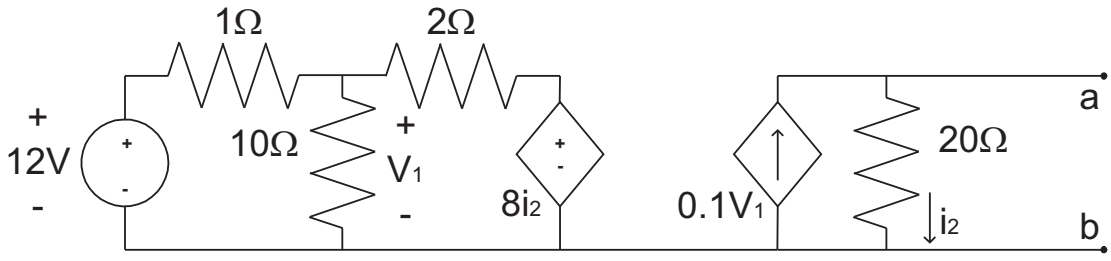

Figure 2: Circuit for Problem 2

3 Problem 3

Use Figure 3. Determine the node voltages: V_a, V_b, V_c, V_d, V_e, V_f, and V_g. Assume the operational amplifiers are ideal.

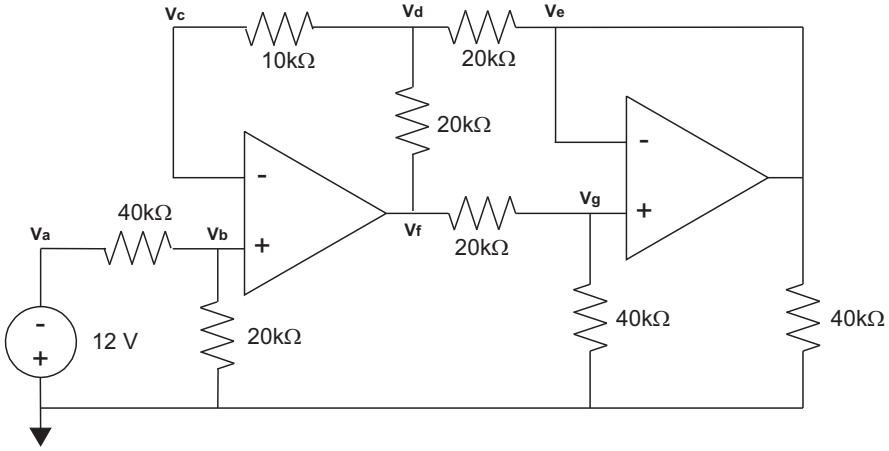

Figure 3: Circuit for Problem 3

4 Problem 4

Use Figure 4. Assume the operational amplifiers are ideal. Calculate i_0.

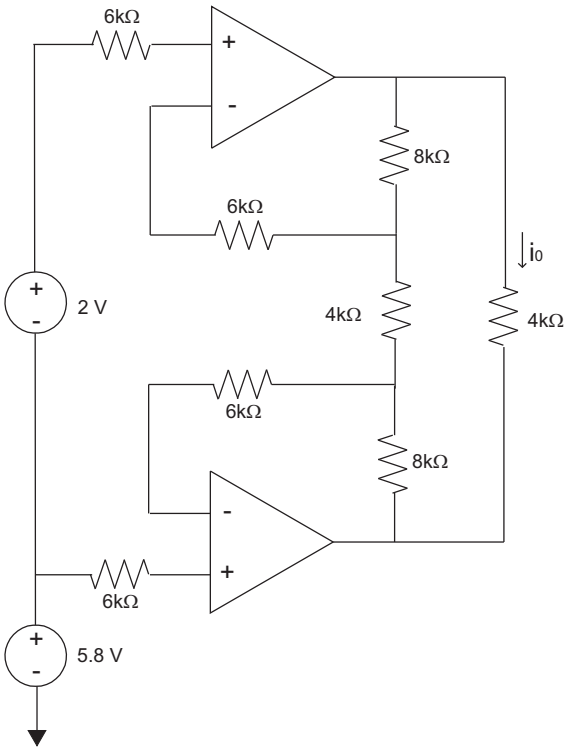

Figure 4: Circuit for Problem 4

5 Problem 5

Use Figure 5. Assume the operational amplifiers are ideal.

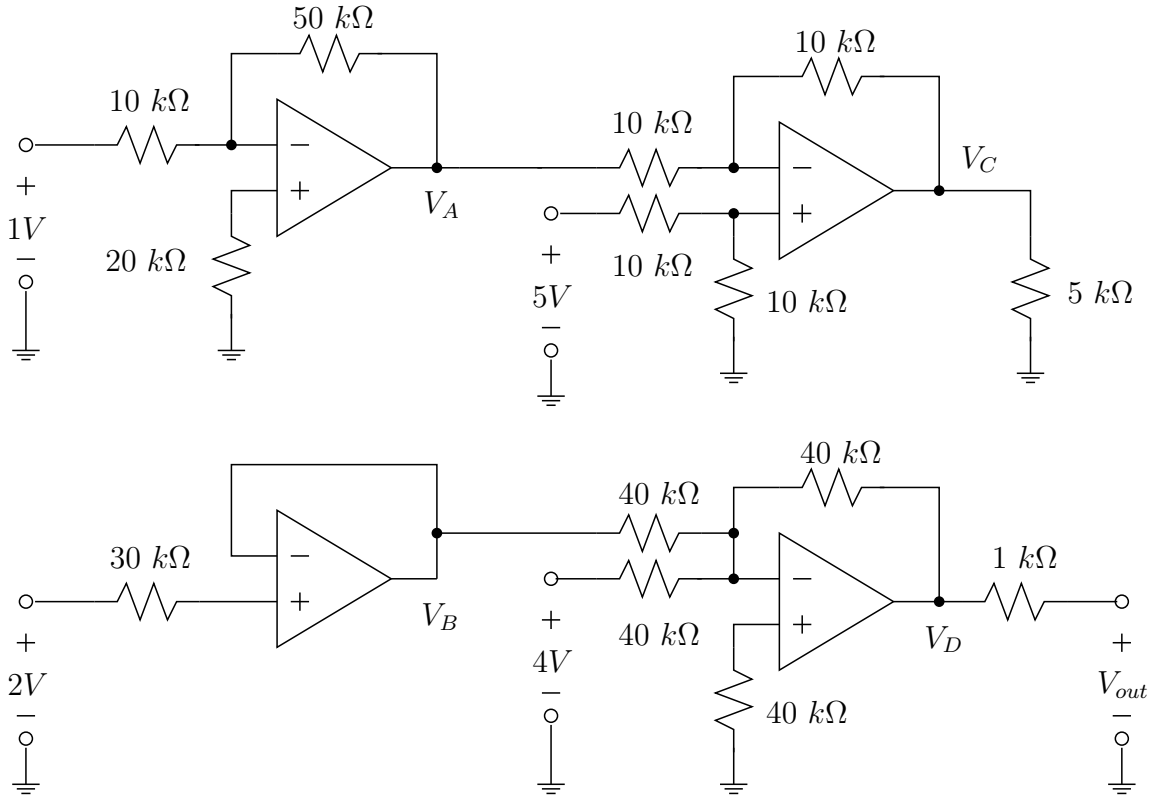

Figure 5:

a. Determine V_A.
b. Determine V_B.
c. Determine the power dissipated by the 5 $k\Omega$ resistance.
d. Determine V_{out}.

6 Problem 6

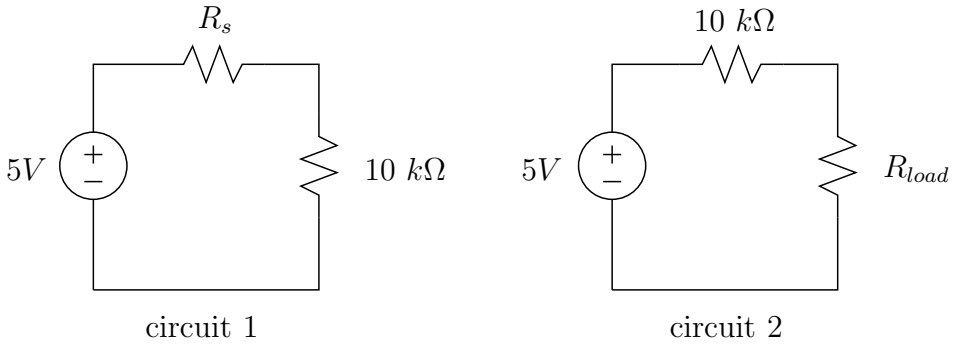

Figure 6:

a. Given circuit 1 in Figure 6, what value of R_s will give maximum power to 10 $k\Omega$ resistance?
b. Given circuit 2 in Figure 6, what value of R_{load} will give maximum power to the load?

7 Problem 7

Use Figure 7. Assume the operational amplifiers are ideal.

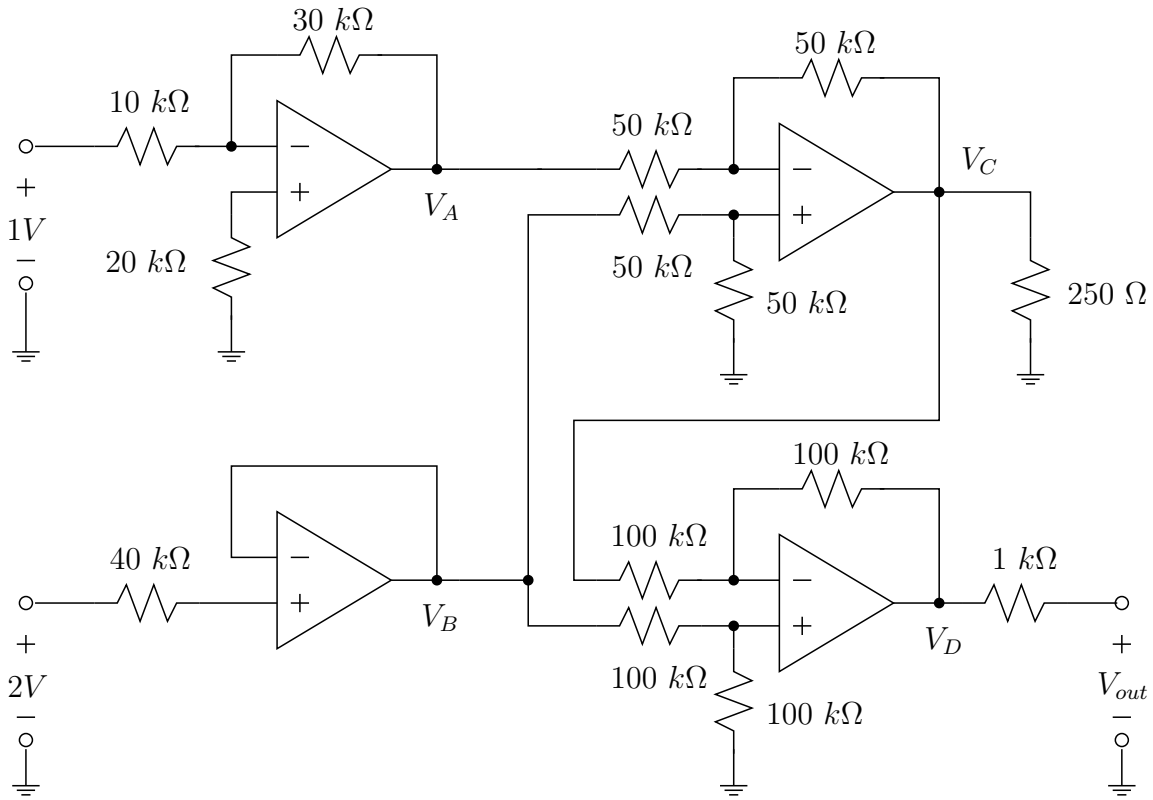

Figure 7:

a. Determine V_A.
b. Determine V_B.
c. Determine the power dissipated by the 250 Ω resistance.
d. Determine V_{out}.

8 Problem 8

Problem 5.42 from Nilsson and Reidel, Electric Circuits 9th edition (Philippine edition).