

ECSE 2010  
Electric Circuits  
Exam 1  
Fall 2005

Name \_\_\_\_\_

Section Number (please circle one)

**1**

MR  
10-12  
Kraft

**2**

MR  
12-2  
Millard

**3**

MR  
4-6  
Parsa

Problem No.	Pts.	Score
1	20pts	
2	20pts	
3	20pts	
4	20pts	
5	20pts	
Total	100pts	

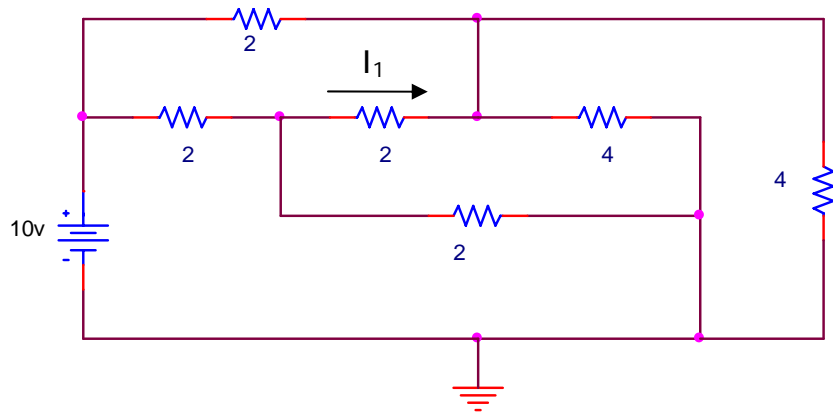
Please Note:

- \* Place all your answers in the spaces provided.
- \* You MUST show your work to receive any credit.

Problem 1 (20pts)

Name \_\_\_\_\_

a.) Find  $I_1$  for the circuit shown. (10pts)

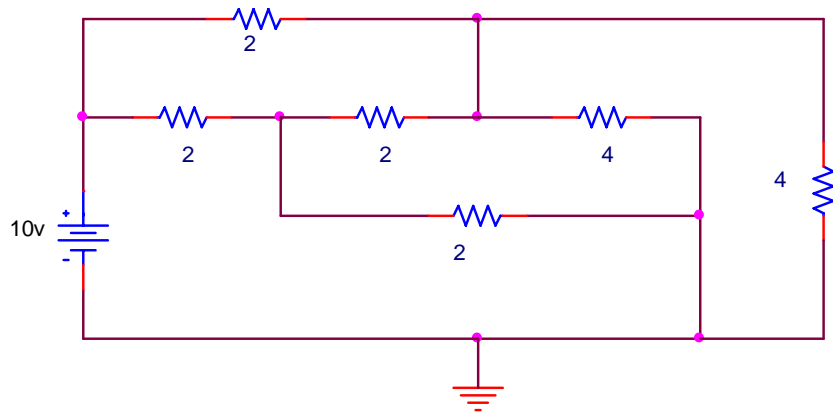


$I_1$	
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Problem 1 (cont)

Name \_\_\_\_\_

b.) Find the power supplied by the 10v source in the circuit shown. (10pts)

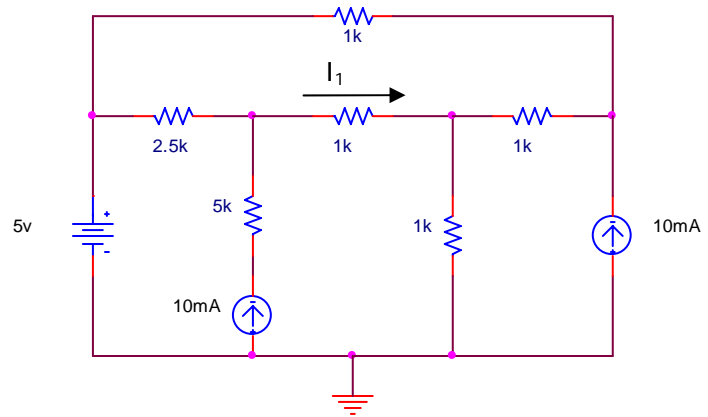


$P_{\text{source}}$	
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Problem 2 (20pts)

Name \_\_\_\_\_

a.) Find  $I_1$  for the circuit shown. (10pts)

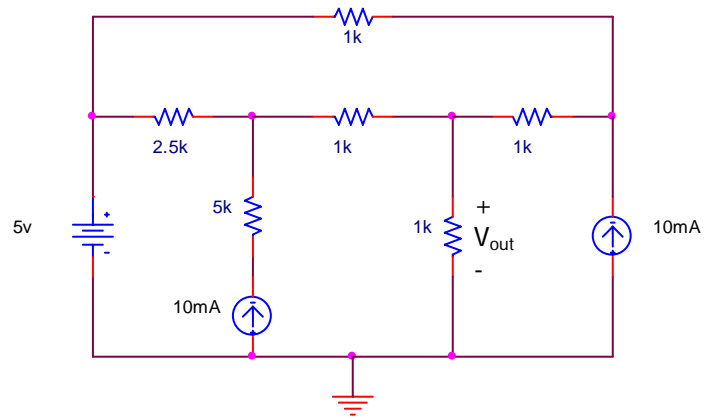


$I_1$	
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Problem 2 (cont)

Name \_\_\_\_\_

b.) Find  $V_{out}$  in the circuit shown. (10pts)

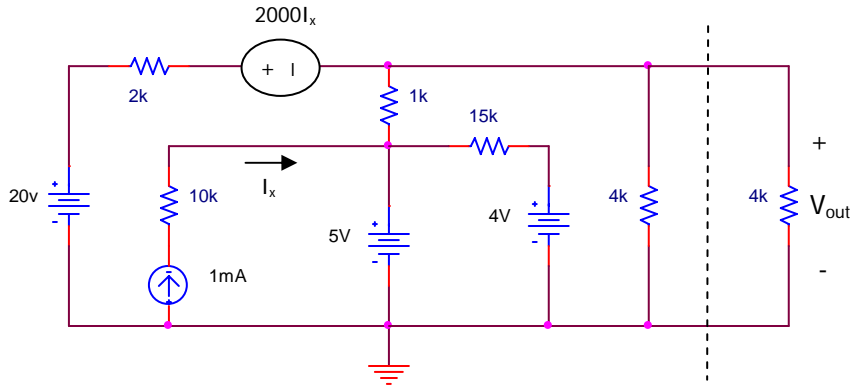


$V_{out}(t)$	
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Problem 3 (20pts)

Name \_\_\_\_\_

Find the Thevenin equivalent (to the left of the dashed line) for the circuit shown below and then use it to find  $V_{out}$ .

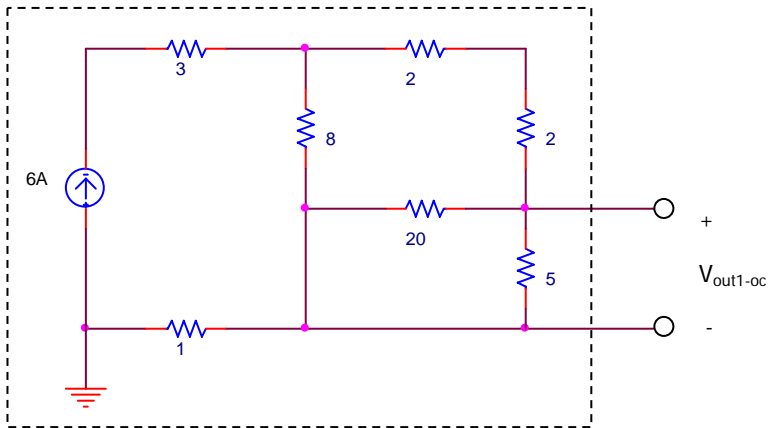


$V_{th}$	
$R_{th}$	
$V_{out}$	

**Problem 4 (20pts)**

Name \_\_\_\_\_

Given the following circuit:



a.) Find  $V_{out1-oc}$ , the open circuit output voltage. (5pts)

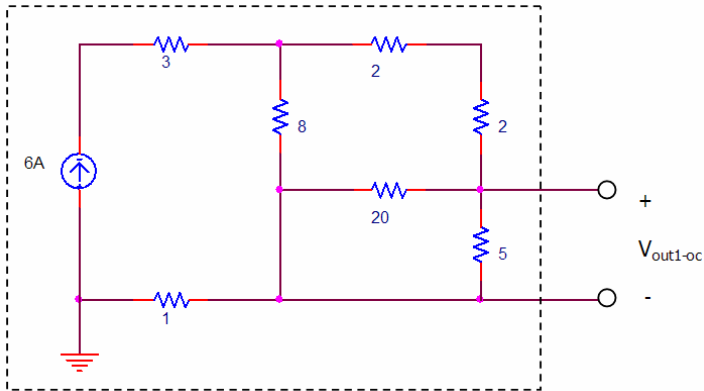
$V_{out1-oc}$	
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b.) Find the equivalent resistance ( $R_{th}$ ) that a meter would read across the two wires that exit the box. (5pts)

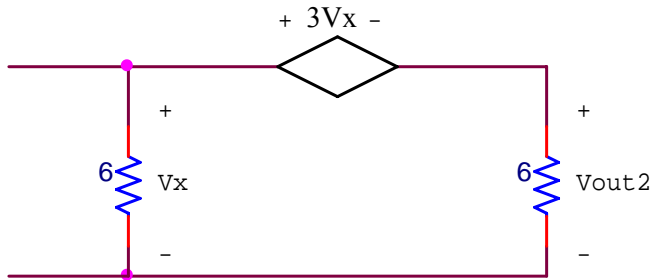
$R_{th}$	
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Problem 4 (cont.)

Name \_\_\_\_\_



c.) Find  $V_{out2}$  if the following load network is added to the output of the above circuit. (10pts)

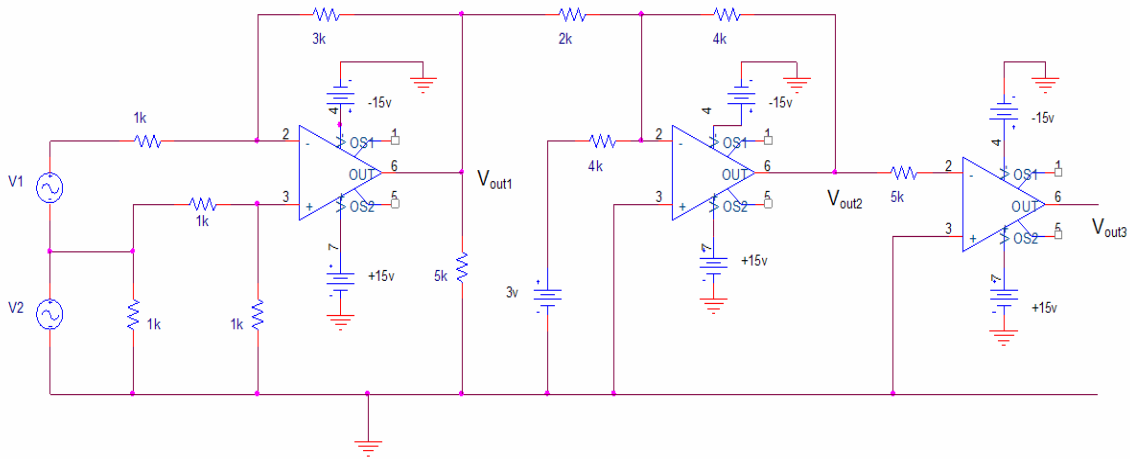


$V_{out2}$	
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**Problem 5 (20pts)**

Name \_\_\_\_\_

For the following circuit (assume that all the Op Amps use  $\pm 15\text{V}$  supplies):



a.) Find  $V_{out1}$  in terms of  $V1$  and  $V2$  in the form  $V_{out1} = (A \times V1) + (B \times V2) + (C)$ . Find the constant terms A, B, & C in the equation for  $V_{out1}$ . (5pts)

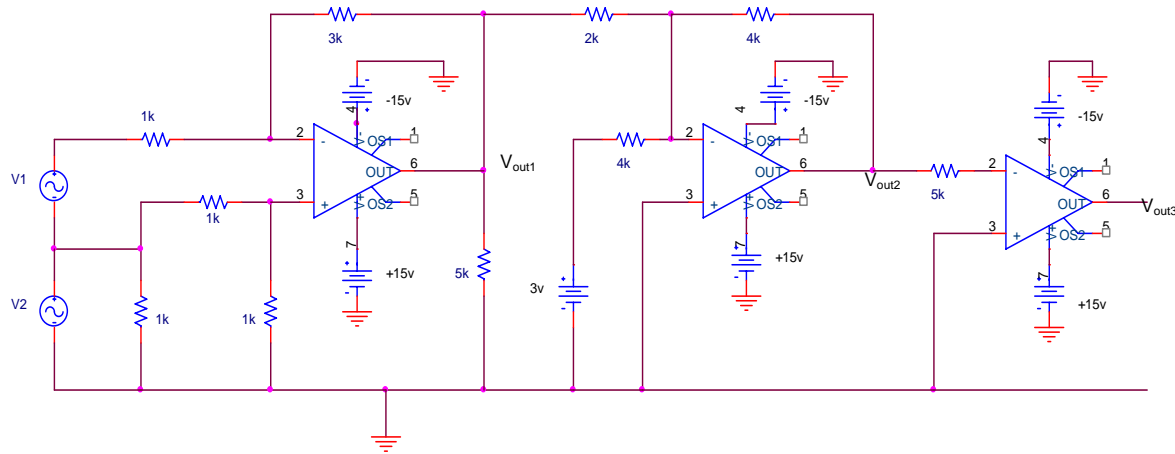
$V_{out1}$	
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b.) Find the expression relating  $V_{out2}$  to  $V_{out1}$ . (5pts)

$V_{out2}$	
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Problem 5 (cont.)

Name \_\_\_\_\_



c.) Find  $V_{out2}$  in terms of  $V1$  and  $V2$  in the form  $V_{out2} = (A \times V1) + (B \times V2) + (C)$ . (5pts)

$V_{out2}$	
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d.) With  $V1 = +1v$  and  $V2 = -1.0v$ , find the value of  $V_{out3}$ . (5pts)

$V_{out3}$	
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Extra space (if needed)

Name \_\_\_\_\_

Extra space (if needed)

Name \_\_\_\_\_