King Fahd University of Petroleum & Minerals
Electrical Engineering Department

EE 204_092 Fundamentals of Electric Circuits

Major Exam I
Wednesday, 24 March 2010
7:00 PM – 8:30 PM

| Name (Capital Letters)	
ID Number	
Lecture Section Number	
Serial Number	
Lab Section Number	

Problem	Maximum	Score
1	6	
2	10	
3	6	
4	5	
5	10	
6	3	
7	5	
8	5	
Total	50	

SHOW ALL OF YOUR WORK IN A CLEAR NEAT WAY

Good luck!

Problem 1:

One of the parameters (current or voltage) is missing in the following resistors. Indicate the direction or polarity of the missing parameter in each figure and calculate its value in the table.

5 Ω
5 V
+   −
(a)

100 Ω   2 A
(b)

10 kΩ
+   2 V   −
(c)

3 A   50 Ω
(d)

1 kΩ
−   5 mV   +
(e)

30 Ω   2 mA
(f)
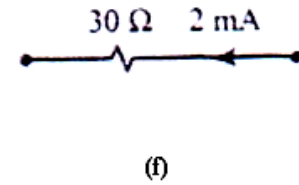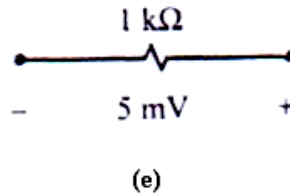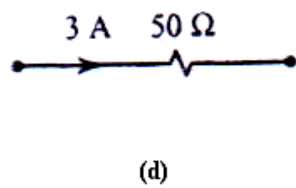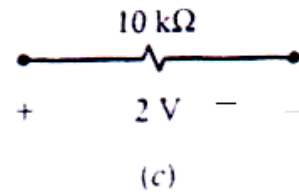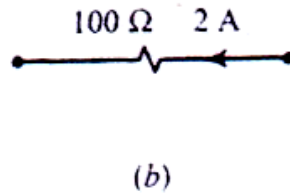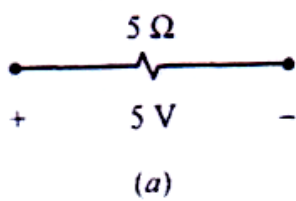
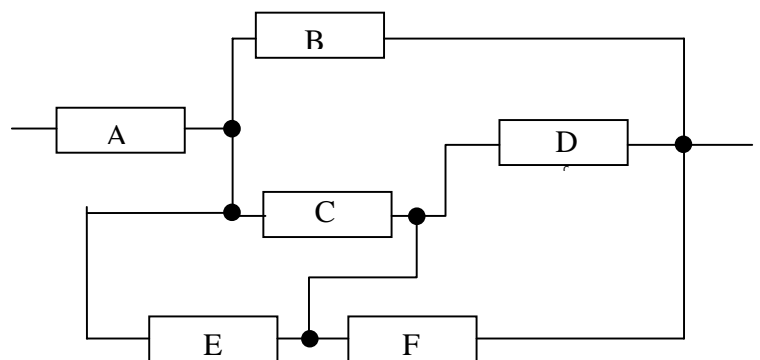| Figure	Current	Voltage
a		5V
b	2A	
c		2V
d	3A	
e		5mV
f	2mA	

Problem 2:

In the circuit below, boxes contain electric elements. State T for true, and F for False for the statements in the table. (We note A+B means A is in series with B; and A//B means A is in parallel with B.

|	Statement	Put T or F
1	A+B	
2	C //E	
3	D// F	
4	(C//E)+(F//D)	
5	C//B + D	
6	A+(C//E+D//F)//B	
7	A+C//E+(D//F//B)	
8	A+(C//E+D//F)//B	
9	A+C//E+D//F//B	
10	(C//E+D//F)//B	

Problem 3:

Consider the circuit shown below with electrical elements represented as boxes with voltages shown across the terminals of each. Determine the value of the voltages V1,V2 and the current I.

+ V2 -   - V1 +

| 1Ω | | 1Ω |

I ↑   + 3v -   + 5v -

+ 2v -
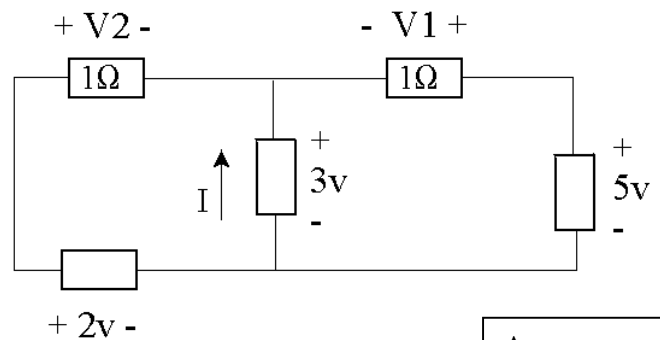
Answers:

V1=

V2=

I=

Problem 4:
Use current dividers to find I1 and I2 in the circuit shown below:

1 ohm

1A ⊕   I2 ↓   1 ohm   1 ohm   ⊕ 2A

I1 ↑
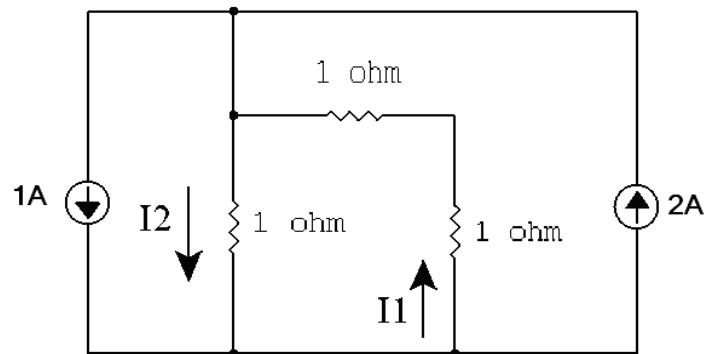
Answers:

I1=

I2=

Problem 5:
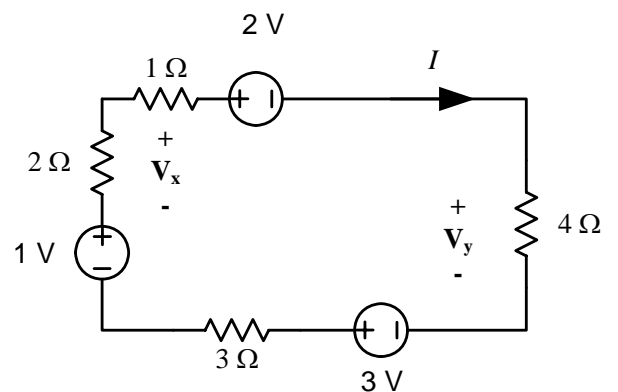
Use a series of source transformations to find the current **I** in the circuit shown below.
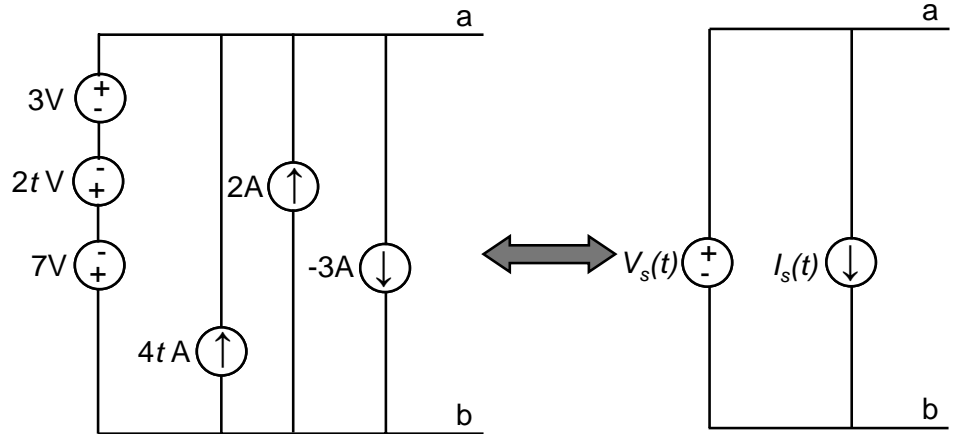(Redraw all steps of source transformations)
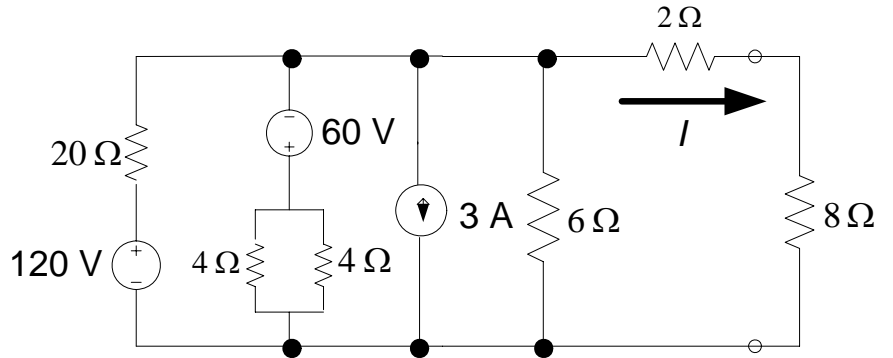
Answer:

$I =$

Problem 6:

Determine **I**, $\mathbf{V}_x$ and $\mathbf{V}_y$ in the circuit shown?

Put your answers here
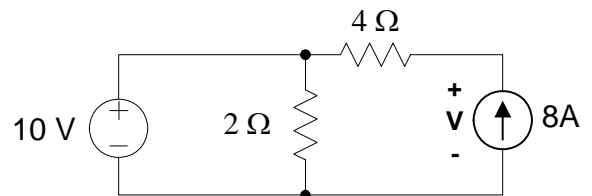I =
$\mathbf{V}_x =$
$\mathbf{V}_y =$

Problem 7:

Reduce the circuit on the left to the circuit on the right to calculate $V_s(t)$ and $I_s(t)$ for t = 0s, 3s and 5s. Put the answers in the table shown. The time t is in seconds

t	$V_s(t$	$I_s(t)$
0		
3		
5		

Problem 8:

Determine the voltage V in the circuit using direct method and the power absorbed by the independent voltage source?

Put your answers here

V =

P$_{10V}$ =