KING FAHD UNIVERSITY OF PETROLEUM AND MINERALS

ELECTRICAL ENGINEERING DEPARTMENT

SECOND SEMESTER 2007/2008

EE 201 MAJOR EXAM I

DATE: WEDNESDAY 19-3-2008

TIME: 10:00-10:55 AM

LOCATION: IN CLASS

Student's Name:..... KEY

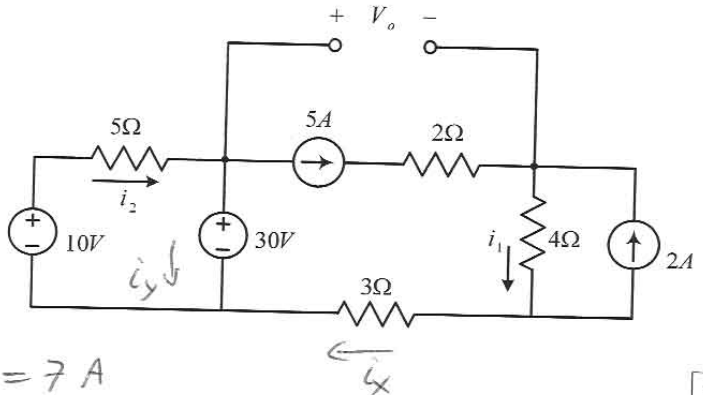
Student's I.D. Number:.....

	Maximum Score	Score
Problem 1	**40**	
Problem 2	**20**	
Problem 3	**40**	
Total	**100**	

Problem 1 [40 pts]

In the circuit shown below, find:

a) i_1
b) i_2
c) V_o
d) Power absorbed by the $30V$ source.



a) $i_1 = 5 + 2 = 7\ A$

b) $i_2 = \frac{10 - 30}{5} = -4\ A$

c) $i_x = i_1 - 2 = 7 - 2 = 5\ A$

$V_o = 30 - 5 \times 3 - 4 \times 7 = -13V$

d) $i_y = i_2 - 5 = -4 - 5 = -9\ A$

$P_{30V} = 30 i_y = -270\ W$

Answers:

$i_1 = 7\ A$

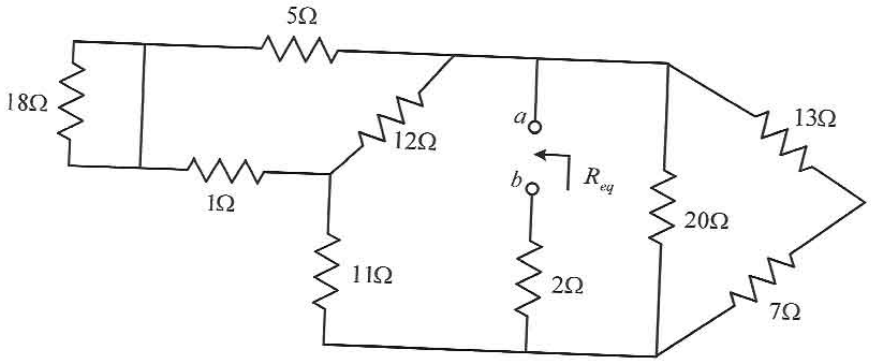
$i_2 = -4\ A$

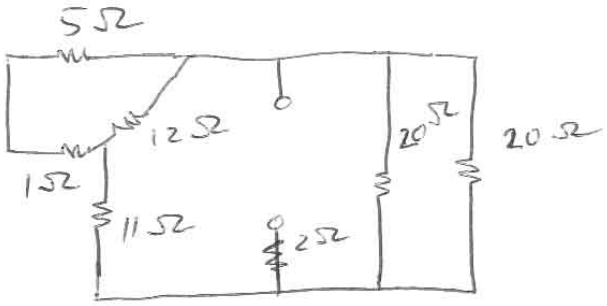
$V_o = -13\ A$

$P_{30V} = -270W$

Problem 2 [20 pts]

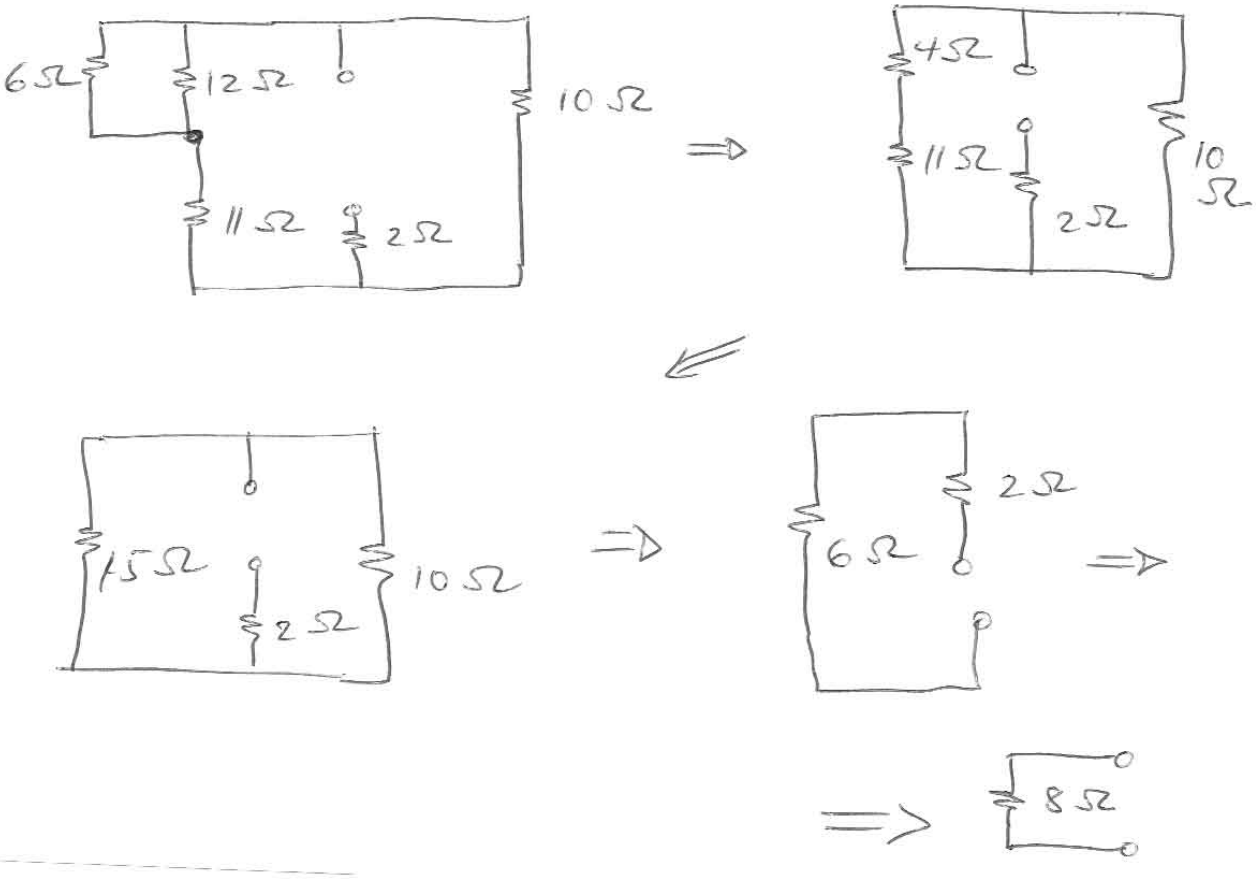
In the given circuit, calculate the equivalent resistance seen between the terminals a & b.





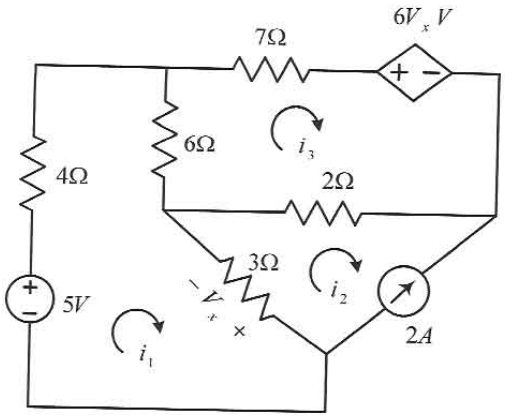
Answer:

R_{eq} =



Problem 3 [40 pts]

Calculate the mesh currents i_1, i_2, i_3 in the given circuit.



$i_2 = -2\,A$

$-5 + 4i_1 + 6(i_1 - i_3) + 3(i_1 - i_2) = 0$

$\therefore 13i_1 - 6i_3 = -1$ (1)

$7i_3 + 6V_x + 2(i_3 - i_2) + 6(i_3 - i_1) = 0$

$V_x = 3(i_2 - i_1)$

$\therefore -24i_1 + 15i_3 = 32$ (2)

solving

$i_1 = 3.47\,A$, $i_3 = 7.69\,A$

Answers:

$i_1 = 3.47\,A$

$i_2 = -2\,A$

$i_3 = 7.69\,A$