



*King Fahd University of Petroleum & Minerals
Department of Electrical Engineering
EE-201 Electric Circuits I*

Exam: Final
Date: Aug. 21st, 2007
Place: Bldg. 59
Time: 7:00 – 9:30 pm

Name: _____

ID: _____

Sec: 01 Dr. A. Zidouri Sec: 02 Dr. H. Al-Zaher (circle one)

Question	Mark
1	/20
2	/20
3	/20
4	/20
5	/20
Total	/100

Instructions:

1. This is a closed-books/notes exam.
2. The duration of this exam is **two and half hours**.
3. Read the questions carefully. Plan which question to start with.
4. **Write explicitly the formulas that you use in your solution (e.g. by KVL ... by KCL). Low or no credit will be given if you do not show your formulas.**
5. Work in your own.
6. Strictly, no mobile phones are allowed.

Good luck

Dr. Abdelmalek Zidouri and Dr. Hussain Al-Zaher

Full mark can be obtained by answering 5 questions correctly.

You can attempt all questions.

Problem # 1 (20 points)**A (18pts)**

For the given resistive circuit, assume that all the resistors are nonzero, and answer the following statements, by writing True [**T**] or False [**F**] in the spaces provided.

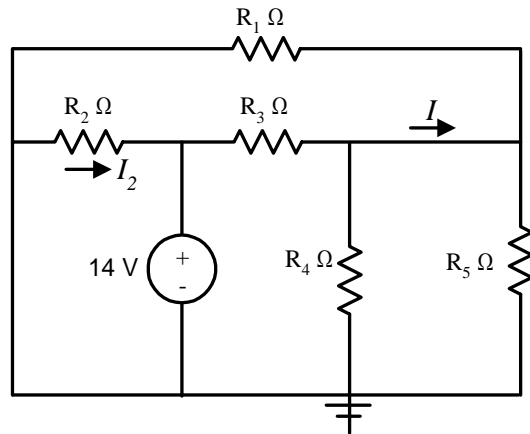
Please note: For each statement:

Correct Answer = 3 points,

No Answer = 0 point,

Wrong Answer = -1 point.

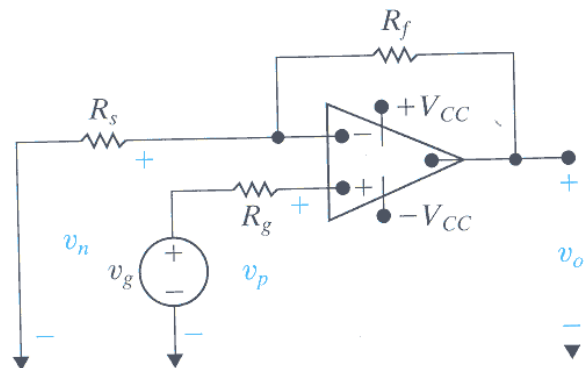
(final score scaled to 18 pts)



- 1- [] R_2 and R_3 are in series connection.
- 2- [] R_1 , R_4 , and R_5 are in parallel connection.
- 3- [] Using the voltage divider rule, the voltage across $R_3 = (14)R_3 / (R_3 + R_4)$.
- 4- [] If $R_2 = 7\Omega$, then the current through it $I_2 = 2A$.
- 5- [] The Thevenin's equivalent resistance seen by R_1 is the parallel combination of R_3 , R_4 , and R_5 .
- 6- [] For the reference point shown, only one node voltage is enough for nodal analysis.

B (2points)

Determine v_o in terms of v_g ?



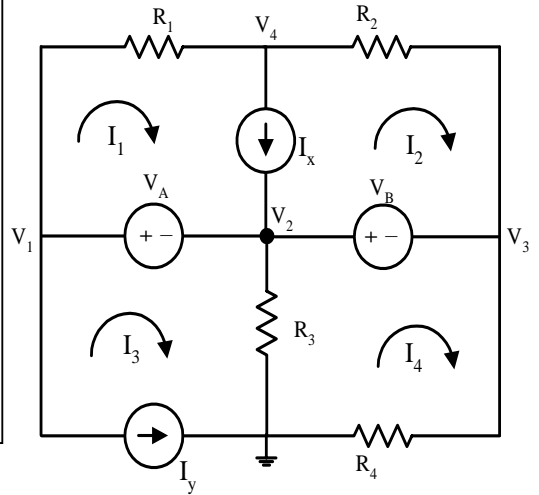
Problem. #2 (20 points)

(a) For the circuit given, write the nodal equations required to analyze the circuit, using the reference and node voltages indicated.

(b) For the same circuit, write the mesh analysis equations needed to analyze the circuit.

Note: do not simplify or solve the equations.

All R's are in Ohms, Voltage sources in Volts, and Current sources in Amperes. Write your answer in the table below.



(a)

Equation 1	
Equation 2	
Equation 3	
Equation 4	

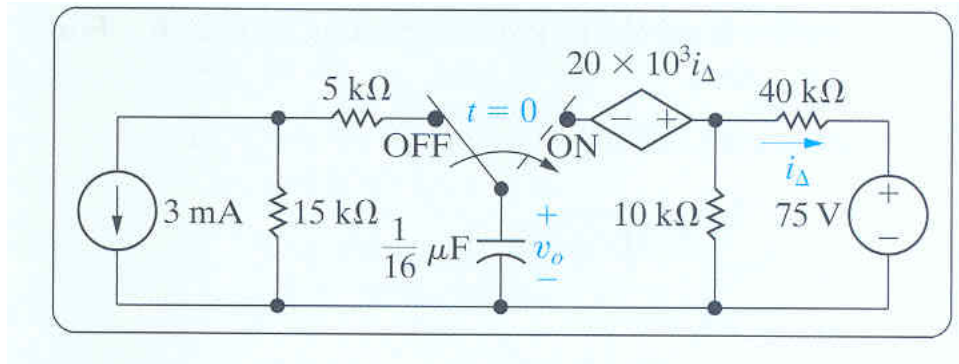
(b)

Equation 1	
Equation 2	
Equation 3	
Equation 4	

Problem # 3 (20 points)

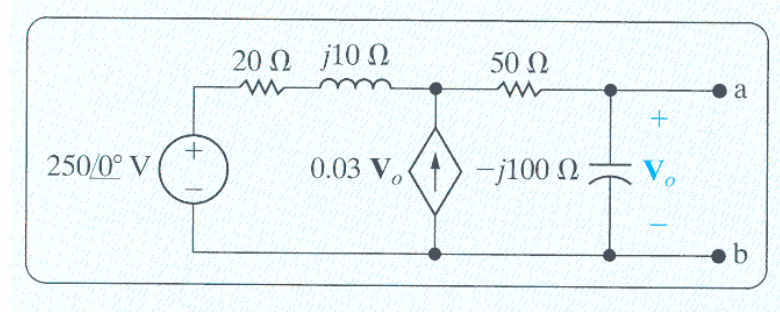
The switch in the circuit seen below has been in the **OFF** position for a long time. The switch moves instantaneously to position **ON** at $t = 0$.

Find $v_o(t)$ for $t \geq 0$,



Problem. #4 (20 points)

Find the Thevenin equivalent with respect to the terminals a, b of the circuit below. What is the value of Z to be put between a, b to get maximum power transfer to it?



Problem. #5 (20 points)

Three loads are connected in parallel across a 250 V (rms) line, as shown below:

Load 1 absorbs 16kW, and 18 kVAR.

Load 2 absorbs 10kVA, at 0.6 pf lead.

Load 3 absorbs 8kW, at unity power factor.

- Find the equivalent impedance of the 3 loads?
- Find the power factor of the equivalent load as seen from the line's input terminals.

