



King Fahd University of Petroleum & Minerals
Electrical Engineering Department

EE204 : Fundamentals of Electric Circuits

Semester 101

Final Exam

Time : 2 hr 30 min

Section No. _____

Student Name _____

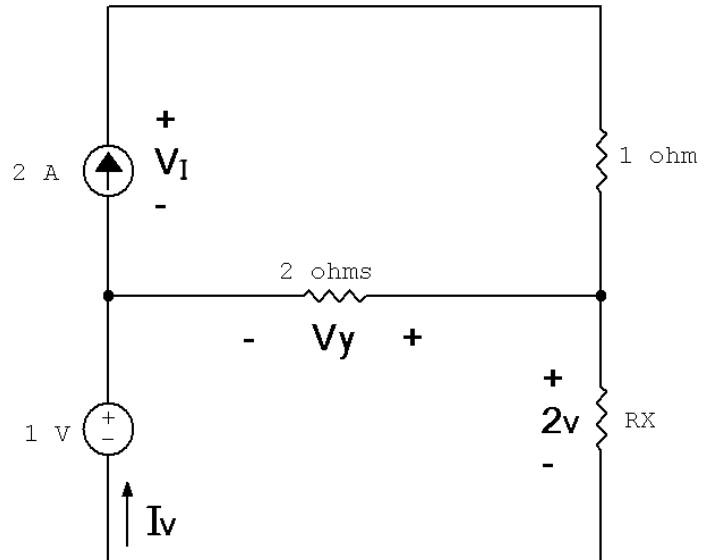
Student ID _____

Q#1	20	
Q#2	20	
Q#3	20	
Q#4	20	
Q#5	20	
TOTAL	100	

Problem I:

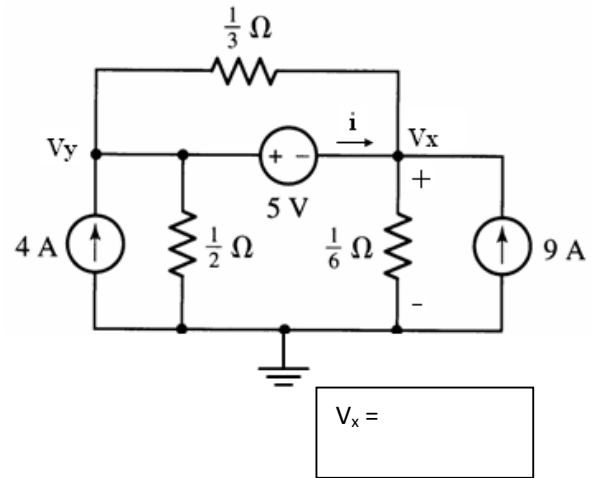
The circuit shown below has an unknown resistance R_x with a voltage of 2 volts across its terminals. Use KVL, KCL and ohms law **ONLY** to compute the followings:

- 1- First compute V_y
- 2- Compute the voltage across the 2 ampere current source, V_I
- 3- Compute the current passing through the 1 volt voltage source I_v
- 4- Compute the unknown resistance R_x



Problem II:

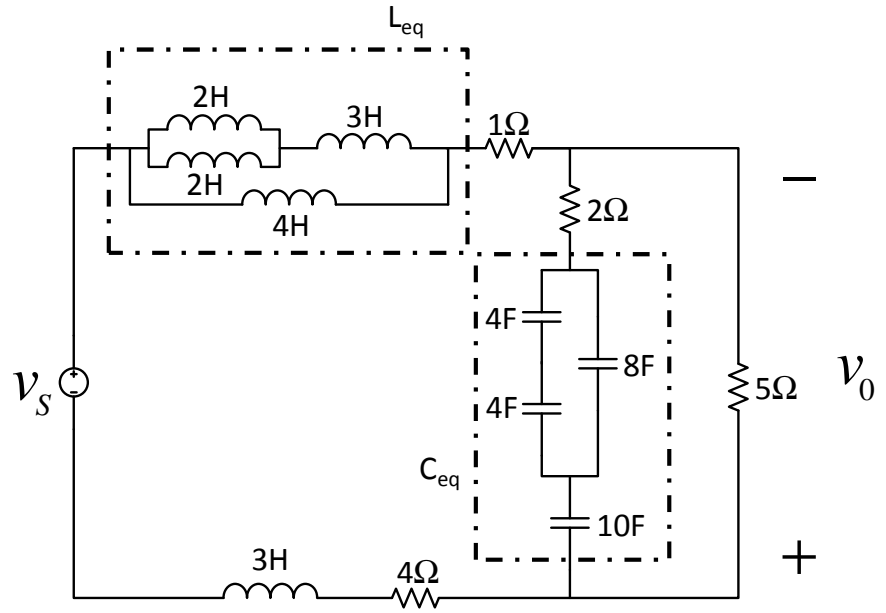
Using node voltage analysis method to find the voltage v_x in the circuit below.



Problem III:

For the circuit below,

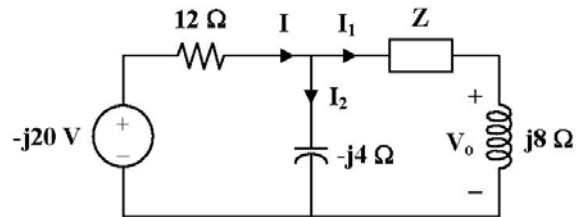
1. Calculate the equivalent inductance L_{eq} for the inductors included in the dashed box.
2. Calculate the equivalent capacitance C_{eq} for the capacitors included in the dashed box.
3. For $v_s = 12V$, calculate the voltage v_0 shown across the 5Ω resistor.



Problem IV:

In the circuit of the following figure, given that $V_o = 4\angle 0^\circ\text{V}$

- Find the current I_1
- Use mesh analysis technique to find I
- Then, find the value of the impedance Z
- Find the value of the reactive element (L or C) of the impedance Z if the frequency is 60 Hz.



Problem V:

A load absorbs an average power of 1600 W at a lagging power factor of 0.8 when the voltage across it is 200 V_{rms}. This load is supplied by a source V_s through a transmission line having an impedance of $5+j2.5$ (Ohms). Find

1. The current flowing in the load
2. The impedance of the load
3. The apparent power absorbed by the load
4. The average power loss in the line.
5. What is the value of the capacitor when placed parallel to the load will correct the power factor to unity if the frequency $f=60$ Hz.