



**Birzeit University**  
**Faculty of Engineering**  
**Electrical Engineering Department**  
**Network Analysis I , ENEE 231**  
*Final Exam*

**14 May 2012      Mr. Hussein Zeitawi & Mr. Ashraf Al-Rimawi      Time: 150 min**

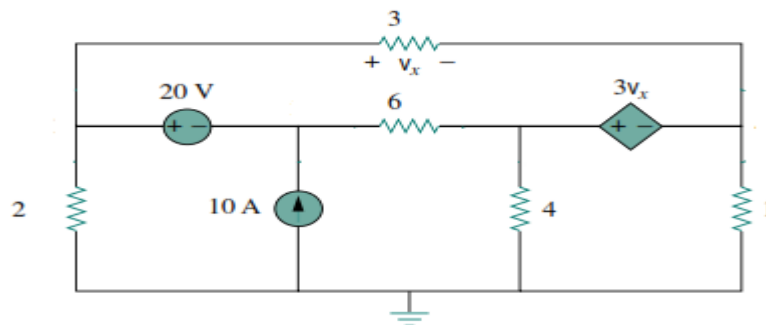
**Student Name:**

**ID Number:**

**Instructions:**

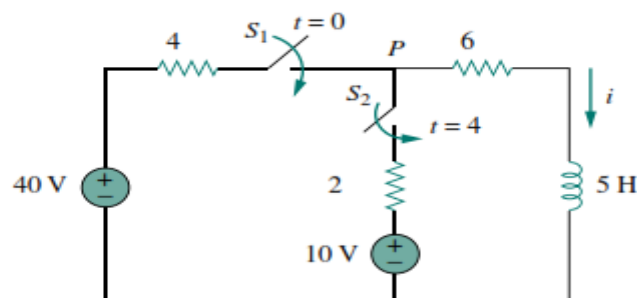
1. Closed book, closed notes, open-mind exam.
2. Write neatly and clearly for partial credit.
3. Cross out any material you don't want to be graded.
4. Work all problems in the exam booklets

**Question #1 (20 Marks):** For the circuit shown in figure 1 , find  $v_x$  using Nodal Analysis Only



**Fig 1**

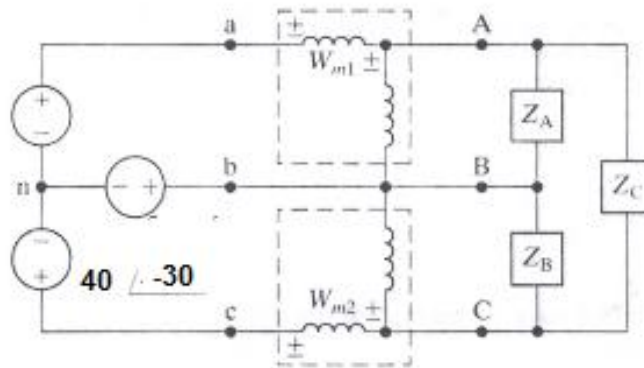
**Question #2 (20 Marks\_10 each):** For the circuit as shown in figure 2



**Fig2**

- a. Find  $i$  for  $t \geq 0$
- b. Calculate  $i$  for  $t = 2$  sec, and  $t = 5$  sec

**Question #3 (20 Marks\_10 each):** The unbalanced -three phase loads shown in figure 3 is fed from balanced , positive (abc) sequence three phase Y-connected source, if  $Z_A = 20\angle 30^\circ \Omega$  ,  $Z_B = 60\angle 0^\circ \Omega$ ,  $Z_C = 20\angle -30^\circ \Omega$  .



**Fig 3**

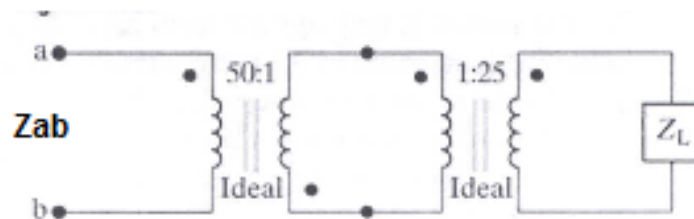
- Calculate the reading of each wattmeter
- Verify that the sum of the two wattmeter readings equals the total average power delivered to the load.

**Question #4 (20 Marks):**

Three 100 Vrms loads are connected in parallel. Load 1 is a 50 Ω resistor in series with an inductive reactance of 40 Ω. Load 2 absorbs an average power of 500 W at 0.75 lagging power factor. Load 3 absorbs an apparent power of 600 VA at 0.9 lagging power factor. Assume the circuit is operating at 60 Hz. Compute the value of a capacitor that would correct the power factor to 1 if placed in parallel with the loads.

**Question #5 (20 Marks\_10 each):**

- Find the impedance  $Z_{ab}$  in the circuit in figure 4 if  $Z_L = 200 + j150 \Omega$



**Fig 4**

**B)** For the circuit in figure 5 , find  $v_0(t)$  using **Source Transformation**



*Best wishes*