Minia University	**Faculty of Engineering**
Computer and Systems Eng. Dept.	**First Year**
LAB(1), CS 113	**June -- , 2017**
Final Exam	**Time allowed: 3 Hrs.**

Notes:

- Please verify that there are **5** pages in your exam booklet.
- Do all of your answers in the spaces provided in this examination booklet, or on the back side of the page preceding the question.
- Good Luck!

QUESTION (I) (20 points):

(1.1) State the superposition theorem.

(1.2) List the steps in applying the theorem.

(1.3) Describe how you can verify it experimentally.

QUESTION (II) (20 points):

(2.1) Verify the meters readings in Figure 1 and determine if there is a fault in the circuit.

(2.2) If R_2 opens, what will meters read?

(2.3) If the voltage source V_s has an internal resistance $R_s = 100\Omega$, determine its effect on the meters readings.
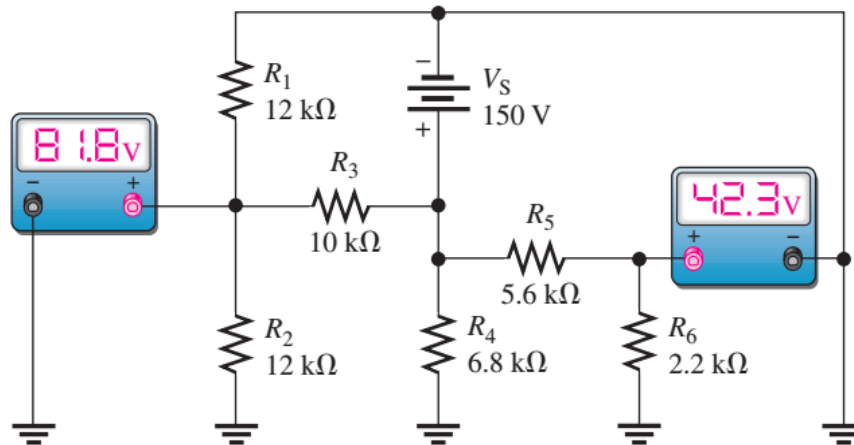

Figure 1

QUESTION (III) (20 points):

(3.1) What is the resonant frequency and what are the applications of the resonant circuits?

(3.2) Describe how you can verify the response of a series R-L-C circuit experimentally.

(3.3) Describe how you can find experimentally Q factor of a coil using a series R-L-C circuit.

QUESTION (IV) (20 points):

Complete the following sentences:

1. Two series capacitors (one $1\mu F$, the other of unknown value) are charged from a 12 V source. The $1\mu F$ capacitor is charged to 8 V and the other to 4 V. the value of the unknown capacitor is ………………………………………………………..……

2. The tolerance of a resistor of nominal value 2 kΩ and a measured resistance of 2020 Ω is ……………………………………………………………………………...

3. the term "Voltage Regulation" means …………………………..……………………….

4. In a band-stop filter, the output voltage at the critical frequencies is ……………

5. A meter has a scale of 5 percent of FSD on the 10 mA scale. The meter reads 4 mA. the smallest value that the actual current may be is ………………….....…………

6. Maximum power is transferred from a source to a load when …………………...

7. The primary purpose of a resistor is to …………………………………………...

8. A resistor that has the colored bands blue-gray-orange-silver has a minimum value of ……………………………………………….

9. A certain circuit produces 15 V across its open output terminals, and when a load is connected across its output terminals, it produces 12 V. The Thevenin equivalent for this circuit is…………………………...…………………………..

10. For the circuit described in Question 9, maximum power is transferred to ……………………………………………………..………………

11. A sine wave has an average value of 10 V. Its rms value is ………

12. A 10 kHz pulse waveform consists of pulses that are 10 μs wide. Its duty cycle is ……………………………….

13. In a four-branch parallel resistor circuit, there are 10 mA of current in each branch. If one of the branches opens, the current in each of the other three branches is …………………………………………………..

14. An ohmmeter is connected across an inductor and the pointer indicates an infinite value. The inductor is ………………………………………………………….

15. At the critical frequency, the output of a filter is down from its maximum by ……………………….………………..

16. When the current through a 10kΩ resistor is 10 mA, the power is ……………

17. In an RC low-pass filter, the output is taken across ……………………………….

18. An inductor, a resistor, and a switch are connected in series to a 12 V battery. At the instant the switch is closed, the inductor voltage is ………………….………

19. When the frequency of the source voltage is increased, the impedance of a parallel RC circuit ……………………………………………………………………….

20. One period of a 2 kHz sine wave is found to occupy 5 cm on an oscilloscope screen. The time base must be set at …………………………………………………...

QUESTION (V) (20 points):

(5.1) Design and show how to verify experimentally a full wave rectifier circuit.

(5.2) Briefly discuss the ripple effect on the output from a filtered rectifier circuit.

(5.3) What is the effect of using the zener diode in rectifier circuits?

With my best wishes,   *Prof. Dr. M. Moness*