Mansoura University
Faculty of Engineering
Dept. of Electrical Engineering

Subject: **Electrical Engineering**
Year: **1st Grade CSE**
Time: **Three Hours for the Two Parts**

Final Term Examination June 2012

Answer the following questions ***(Total: 45 Marks)***

First Question (Total 15 marks)

1-1) In the circuit shown in Fig. (1-1), if the source voltage is 60 V, $R_1 = 20\ \Omega$, $R_2 = 120\ \Omega$, $R_3 = 120\ \Omega$, $R_4 = 120\ \Omega$, $R_5 = 60\ \Omega$. Find:
a) the current, voltage and power associated with every resistor.
b) the total current delivered from the supply,
c) the circuit equivalent resistance and
d) the total circuit power **(8 Marks)**

1-2) Find the input resistance (i.e. the resistance between terminals **A** and **B**) in the circuit shown in Figure (1-2). Find also the source current.
(Hint: Apply Δ/Y transformation) **(7 Marks)**

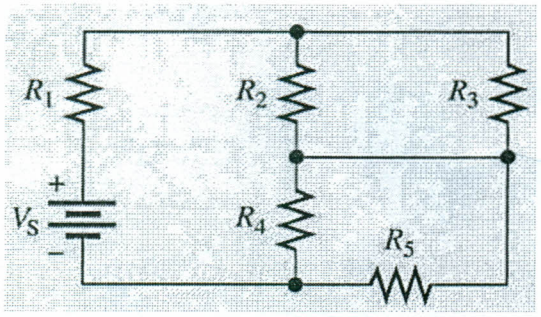

Fig. (1-1)

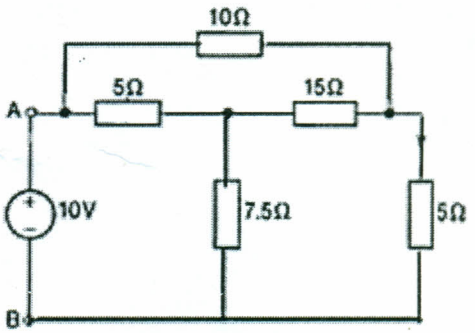

Fig. (2-1)

Second Question (Total 15 marks)

2-1) Use Norton's theorem to determine the current flowing in the $4\frac{2}{3}\ \Omega$ resistor of the circuit shown in Fig. (2-1). **(6 Marks)**

2-2) Calculate the value of **R** that allows maximum power transferred in the circuit shown in Fig. (2-2). **(5 Marks)**

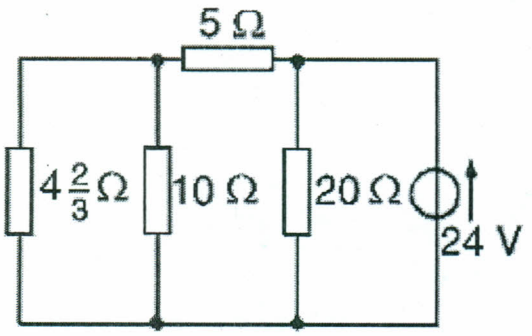

Fig. (2-1)

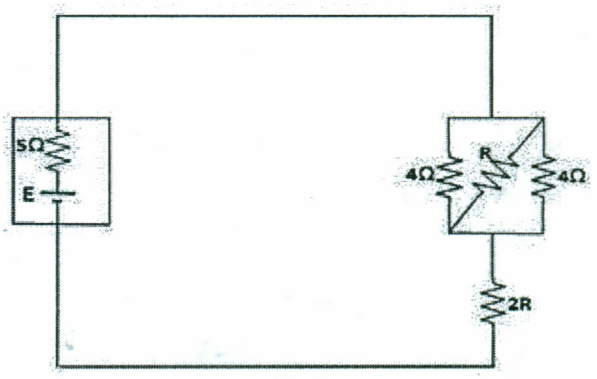

Fig. (2-2)

☞ أسئلة هذا الجزء من صفحتين من فضلك اقلب الورقة ☜

2-3) State Thevenin's theorem and explain how it can be used in electric circuit with the help of sketch **(4 Marks)**

Third Question (Total 15 marks)

3-1) What is the resonance frequency?. Derive a formula to express the resonance frequency in a series RLC circuit. **(3 Marks)**

3-2) For the circuit shown in Fig. (3-2), what is the voltage across R at resonance. Find X_L, X_C, Z and I at the resonance frequency **(4 Marks)**

3-3) A coil of resistance 5 Ω and inductance 120 mH in series with 100μF capacitor, is connected to a 300 V, 50 Hz supply. Calculate:
(a) the current flowing,
(b) the phase difference between the supply voltage and current,
(c) the voltage across the coil and
(d) the voltage across the supply **(8 Marks)**

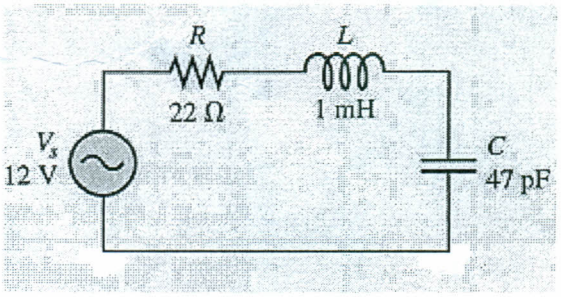

Fig. (3-2)

With my best Wishes
Prof. Dr. Magdi El-Saadawi
9/6/2012