Assiut University
Faculty of Engineering
Final Exam, Jan.2015

Elec. Eng. Dept.
2nd Year Mechanical
Time: 3 Hours

Electric and Electronic Circuits (جميع الطلاب)

Answer all questions: (Total Marks 100)

Q1: The circuit shown in Fig.1 has three components with indicated loads.
  a) Calculate the total complex power (S) absorbed (4 Marks)
  b) Calculate the supply current. Will the circuit breaker trip or not and why? (3 Marks)
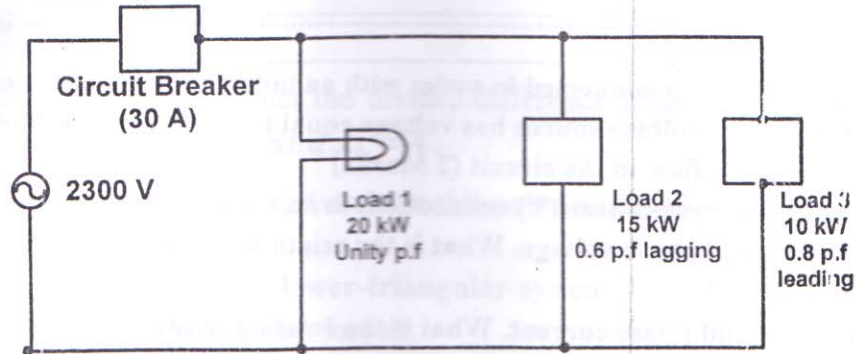 c) What is the total impedance of the network? (3 Marks)

Fig.1

Q2: For the circuit shown in Fig.2, Find:
  a) I using loop analysis method (10 Marks)

  b) Check your answer using node analysis method (8 Marks)
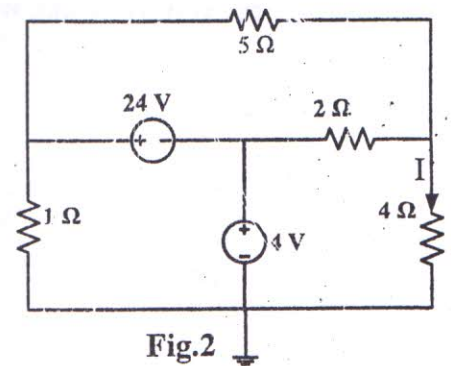 c) Check power balance in the circuit. (7 Marks)

Fig.2

Q3: For the circuit shown in Fig.3, Find:
  a) Norton equivalent (I_N and R_N) (10 Marks)
  b) The resistance R_L to be connected between a and b to absorb maximum power (5 Marks).
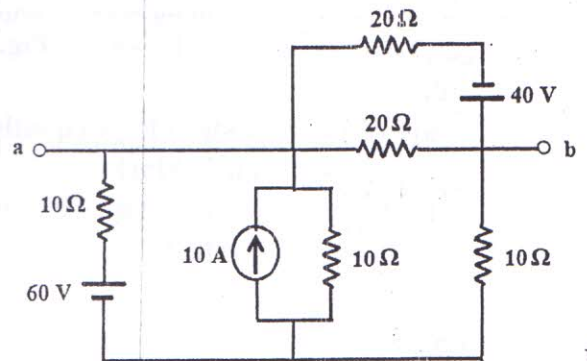 c) Calculate the maximum power (5 Marks)

Fig. 3

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Q4: For the circuit shown in Fig.4, find:

a) Current I_T (5 Marks)

b) I_1, I_2, I_3 (9 Marks)

c) Check active power balance in the circuit (3 Marks)

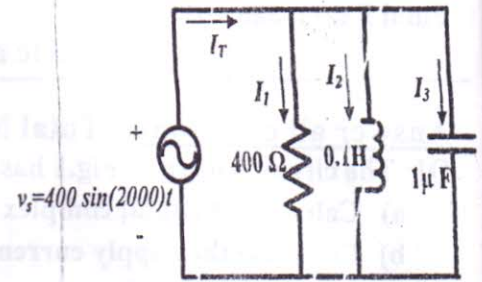d) Check reactive power balance in the circuit (3 Marks)

Fig. 4

$v_s = 400 \sin(2000)t$

Q5:

a) If a 30 Ω resistance is connected in series with an inductor 1 mH and a capacitor 1 μF and supplied from DC voltage source has voltage equal to 220 V, what will be the maximum and minimum current flow in the circuit (2 Marks)

b) In a three- phase system star (Y) connection, draw the connection and indicate the following

  I. Line voltage and phase voltage. What is the relation between line and phase voltages (2 Marks)

  II. Line current and phase current. What is the relation between line and phase currents (2 Marks)

c) Find the time period (T), frequency, average value and root mean square (effective) values of the voltage signal, which it is shown in Fig.5 (4 Marks)
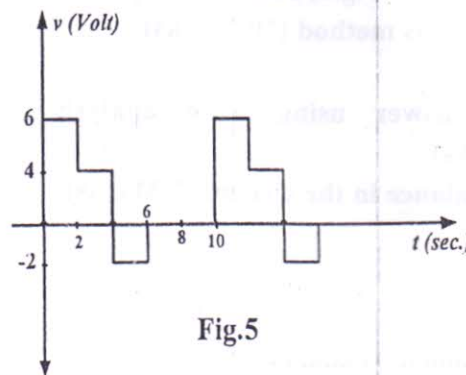

Fig.5

Q6: For the circuit shown in Fig. 6, find:

a) Write the node voltage equations of the circuit (5 Marks)

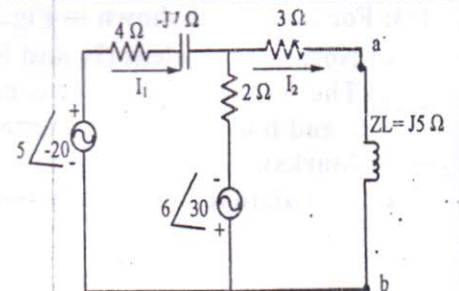b) Find voltage V_{ab} using Thevenin Theory (10 Marks)

Fig.6

Good Luck

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