Final - exam

Fundamentals of Electrical Eng'g

ADAMA SCIENCE AND TECHNOLOGY UNIVERSITY

SCHOOL OF ENGINEERING & INFORMATION TECHNOLOGY

ELECTRICAL AND COMPUTER ENGINEERING DEPARTMENT

FUNDAMENTAL OF ELECTRICAL ENGINEERING: EENG 2201

Final EXAM

MAX MARK: 45%

DATE: Feb .08/2013

TIME ALLOTTED—3:00hrs

NAME .....

ID.NO.....

GROUP.....

INSTRUCTIONs

- Attempt all questions
- Check there are 5 Questions.
- Clean and neat answer is worthy.
- Do not use pencil and red pen.
- Show your steps and answers on the answer sheet.

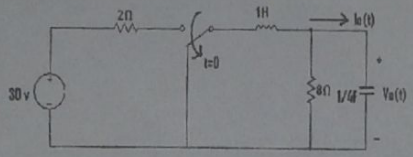
	1				2	3			4	5		
	a	b	c	d		a	b	c		a	b	c
weight	2	2	3	4	6	4	3	3	7	4	4	2
Score												

1

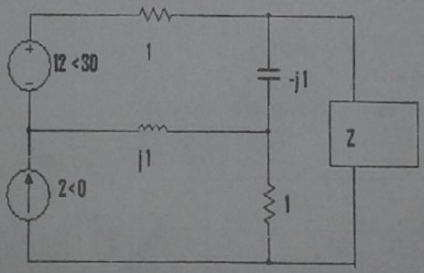
Feb., 08, 2013

7.80

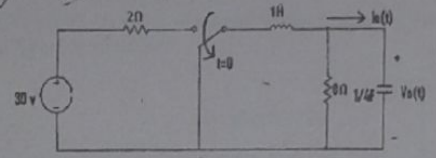
1. A 4Ω resistor, 125mH inductor and 10μF capacitor are connected in series to a 230V, 50Hz AC supply. Calculate
   a. The current flowing, **(2pts)**
   b. The phase difference between the supply voltage and current, **(2pts)**
   c. The voltage across each circuit element,.....**(3pts)**
   d. Draw the phasor and impedance diagram.....**(4pts)**
2. When connected to a 230 V (peak), 60-Hz power line, a load absorbs 10 kW at a lagging power factor of 0.8. Find the value of capacitance necessary to raise the pf to 0.9. **(6pt)**
3. A240-Vpeak 60Hz supply serves a load that is 20kw, 15Kvar(capacitive) and 20kVAR(inductive).find:
   a. Apparent power .....**(3pts)**
   b. The current drawn from the supply.....**(3pts)**
   c. The kVAR rating and capacitance required to improve the power factor to 0.98 0.95lagging.....**(5pts)**
4. Find **Io(t)** and **Vo(t)** for t > 0.....**(7pts)**



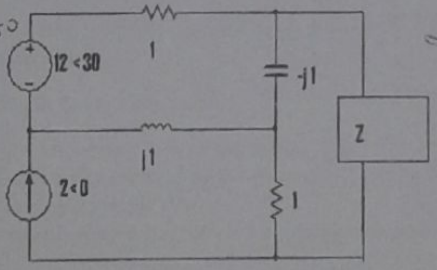
5.
   a. What must be the value of Z for maximum power transfer to it?.....**(4pts)**
   b. What is amount of the average power absorbed by the impedance?.....**(4pts)**
   c. How much is the maximum power?.....**(2pts)**



1. A 4Ω resistor, 125mH inductor and 10μF capacitor are connected in series to a 230V, 50Hz AC supply. Calculate
   a. The current flowing, **(2pts)**
   b. The phase difference between the supply voltage and current, **(2pts)**
   c. The voltage across each circuit element,.....**(3pts)**
   d. Draw the phasor and impedance diagram.....**(4pts)**
2. When connected to a 230 V (peak), 60-Hz power line, a load absorbs 10 kW at a lagging power factor of 0.8. Find the value of capacitance necessary to raise the pf to 0.9. **(6pt)**
3. A240-Vpeak 60Hz supply serves a load that is 20kw, 35Kvar(capacitive) and 20kVAR(inductive).find:
   a. Apparent power .....**(3pts)**
   b. The current drawn from the supply.....**(3pts)**
   c. The kVAR rating and capacitance required to improve the power factor to 0.9 lagging..._____**(5pts)**
4. Find io(t) and Vo(t) for t > 0.....**(7pts)**



5. a. What must be the value of Z for maximum power transfer to it?.....**(4pts)**
   b. What is amount of the average power absorbed by the impedance?.....**(4pts)**
   c. How much is the maximum power?.....**(2pts)**



Fundamentals of E.E. Final Exam

Fundamental of electrical engineering final exam (40%)

1. A certain load has voltage and current variation of a form given by: **(6 points)**

$$v(t) = 12\sin(50t + 30°)\,V \text{ and}$$

$$i(t) = 5\sin(50t - 45°)\,A$$

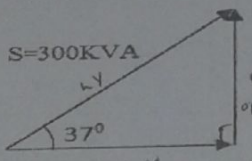
Find:

a. The phase relation between the current and voltage.

b. The instantaneous power at t=1sec.

c. The average power consumed by the load.

2. A 600V, 300KVA small electrical utility supplies a factory with the power triangle shown in the figure here under. **(6 points)**



Determine:

a. Total reactive power and real (true) power.

b. Total current.

3. Referring to figure 1 determine: **(12 points)**

a. Total impedance seen by the source (Z_T).

b. Total current supplied by the source (I_T).

c. The output voltage (Vo).

d. Draw the phasor diagram and impedance diagram.

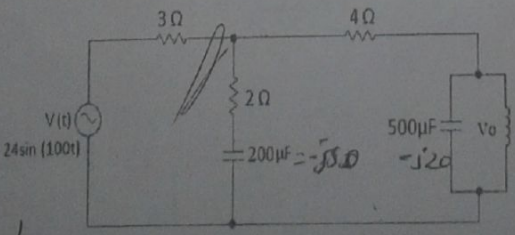


Fig 1

4. Referring to fig 2 Determine: **(6 points)**

a. The value of ZL to transfer maximum power to the load.
b. Maximum power transfer to the load under this condition.

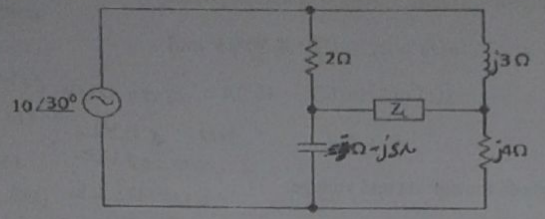


Fig. 2

5. Referring to figure 3 determine $V_C(t)$ for $t>0$ and draw the response graph (use the appropriate method). **(10 points)**

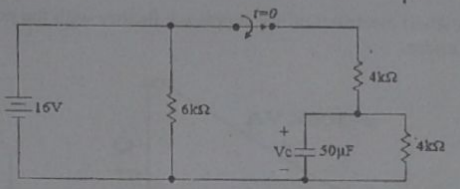


Fig.3

Bonus question

6. Referring to figure 4 find **i(t)** for $t>0$ **(5points)**

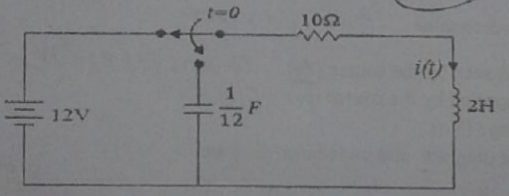


Fig 4