الجامعة الإسلامية العالمية ماليزيا

INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

END OF SEMESTER EXAMINATION
SEMESTER I, 2013/2014 SESSION

KULLIYYAH OF ENGINEERING

Programme	: ENGINEERING	Level of Study	: UG 1
Time	: 2:30 pm-5:30 pm	Date	: 28/12/2013
Duration	: 3 Hrs		
Course Code	: ECE 1311	Section(s)	: ALL
Course Title	: **Electric Circuits**		

This Question Paper Consists of **Five (5)** Printed Pages (Including Cover and a blank page) with **Five (5)** Questions.

INSTRUCTION(S) TO CANDIDATES

DO NOT OPEN UNTIL YOU ARE ASKED TO DO SO

- A total mark of this examination is **100**.
- This examination is worth **50%** of the total assessment.
- Answer **ALL FIVE (5)** questions.

Any form of cheating or attempt to cheat is a serious offence which may lead to dismissal.

Q.1 [20 marks]

(a) The current, *i(t)*, passing through an element is shown in **Fig. 1(a).** Determine the total charge that passed through the element at $t = 1s$, $3s$ and $5s$.

(10 marks)

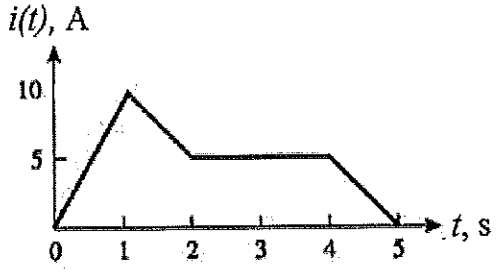

Fig. 1(a)

(b) Find V_o in the two-way power divider circuit in **Fig. 1(b).** **(10 marks)**

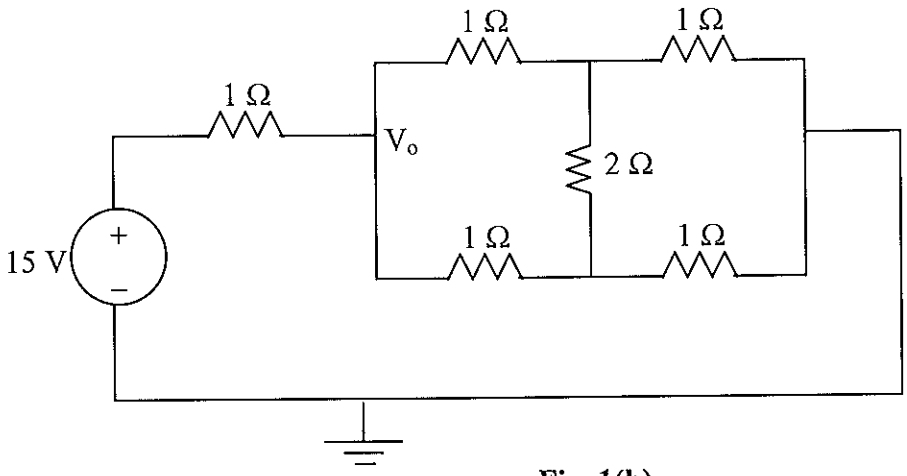

Fig. 1(b)

Q.2 [20 marks]

a) Obtain the node-voltage equations for the circuit in **Fig 2(a)** by inspection. Then solve for V_0.

(12 marks)

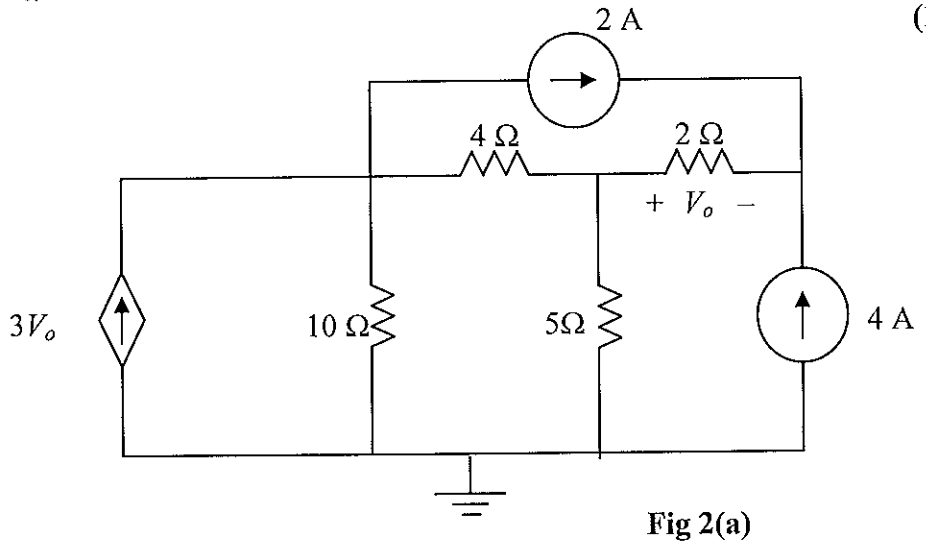

Fig 2(a)

b) Use source transformation to find V_0 in the circuit of **Fig 2(b).** **(8 marks)**

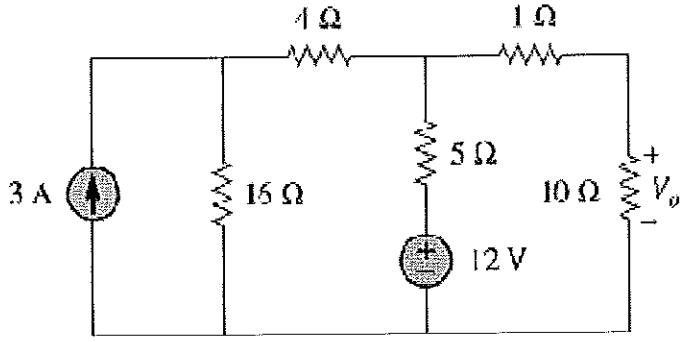

Fig 2(b)

Q.3 [20 marks]

(a) For the circuit in **Fig. 3 (a)**, determine:

i. the voltage across each capacitor **(5 marks)**

ii. energy stored in each capacitor **(5 marks)**

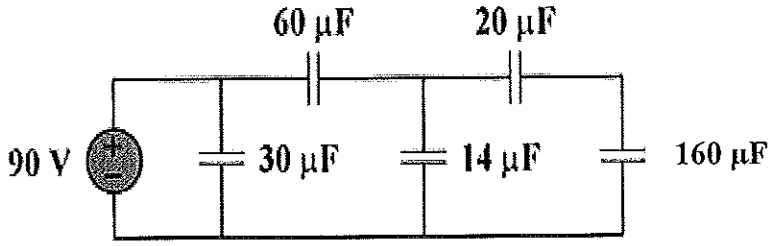

Fig. 3(a)

(b) Find the equivalent impedance of the circuit in **Fig. 3(b).** **(10 marks)**

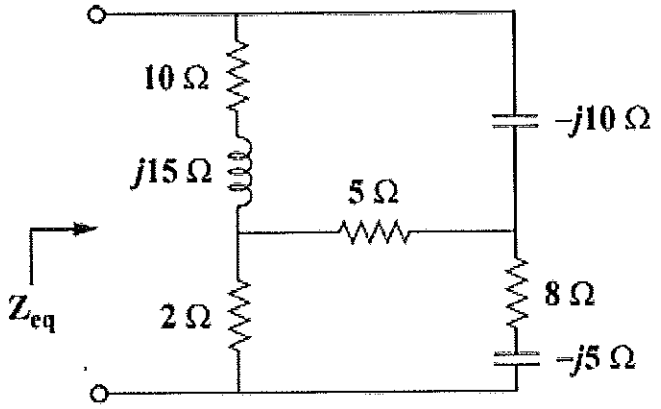

Fig. 3(b)

Q.4 [20 marks]

a) Using the circuit of **Fig 4(a),** determine the mesh currents i_1 and i_2. Let v_1=10 cos4t **V** and v_2=20 cos(4t-30°) **V.** **(10 marks)**

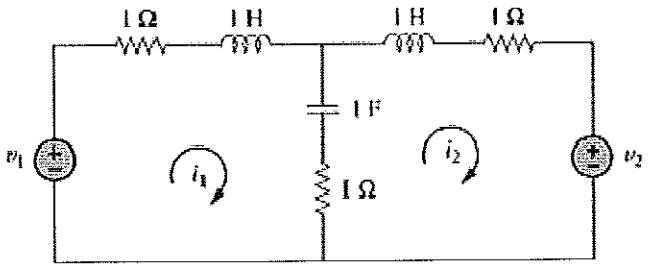

Fig 4(a)

b) Use superposition principle to obtain v_x in the circuit of **Fig 4(b)**. Let v_s = 50 sin 2t **V** and i_x = 12 cos (6t+10°) **A.** **(10 marks)**

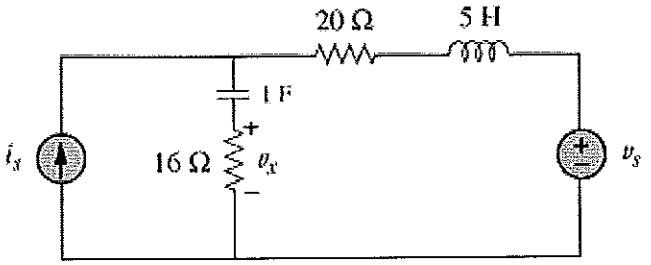

Fig 4(b)

Q.5 [20 marks]

a) Find the Thevenin and Norton equivalent circuits at terminals a-b of the circuit in **Fig. 5(a)**. Then, assuming that the load impedance is to be purely resistive, what load should be connected to terminals a-b of the circuits in **Fig. 5(a)** so that the maximum power is transferred to the load?

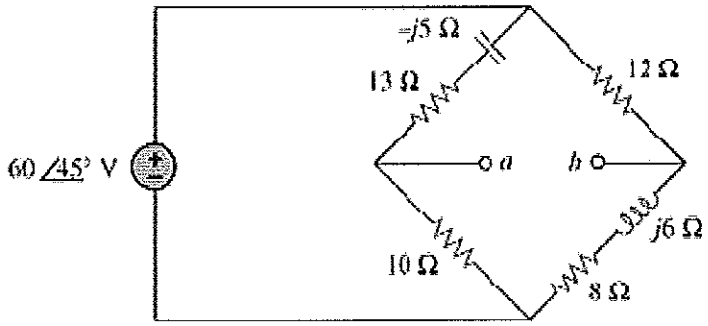

Fig. 5(a)

b) Referring to the circuit in **Fig. 5(b)**, determine:

i. the power factor

ii. the average power delivered by the source

iii. the reactive power

iv. the apparent power

v. the complex power

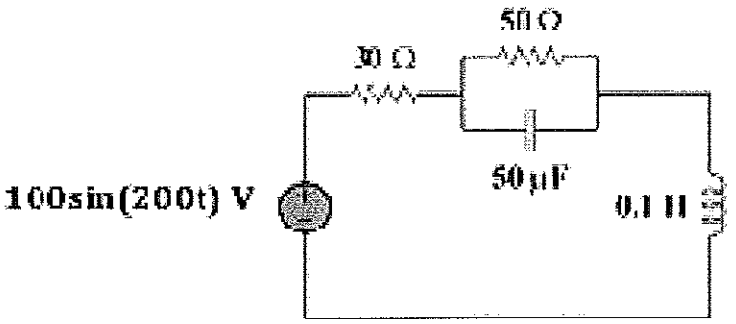

Fig. 5(b)