# FACULTY OF ENGINEERING

**B.E. 2/4 (ECE) I-Semester (Main) Examination, November / December 2012**

**Subject : Basics Circuits Analysis**

Time : 3 Hours                                              Max. Marks: 75

*Note: Answer all questions of Part - A and answer any five questions from Part-B.*

## PART – A  (25 Marks)

1. State and explain Thevenin's theorem.                                    (3)
2. Define the principle of Duality.                                         (2)
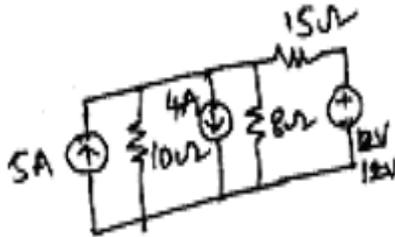3. Convert the figure shown in (a) into a single voltage source in series with
   a resistance.                                                           (3)



Fig. A

4. Define zero input response and zero state response.                      (2)
5. Give examples for first order and second order circuits.
6. Define the relation between self inductance L, mutual inductance m and coefficient
   of coupling.                                                            (3)
7. Draw and explain power Triangle for inductive load.                      (2)
8. Define reciprocity theorem and explain.                                  (3)
9. Draw the equivalent network of h-parameters.                            (2)
10. What are the properties of parallel resonance circuit?                  (3)

## PART – B  (5x10=50 Marks)

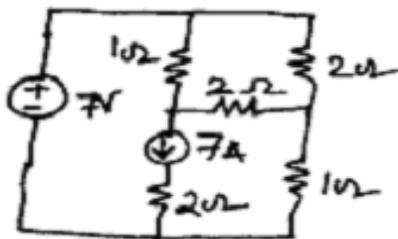11.(a) Evaluate mesh currents in the circuits shown in figure (b)           (7)



Fig. B

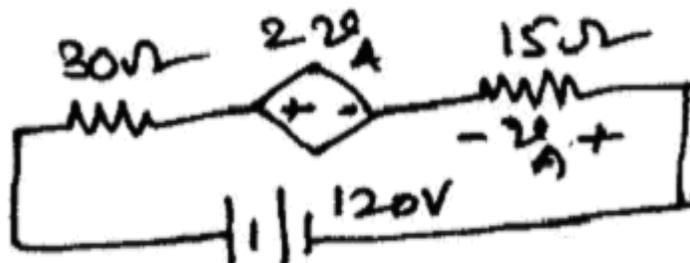(b) Compute power absorbed by each element in ckt show in figure (c)        (3)



Figure C

12. Find the current ic (t) for t>0 in the circuit shown in figure (D). Assume steady state conditions before opening the switch at t=0. (10)
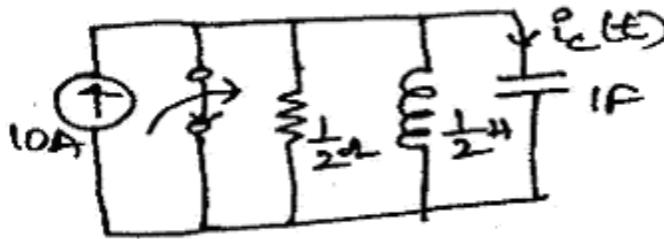


Figure D

13. In a series circuit of figure shown in (E), obtain the equation for voltage across the circuit. Find RMS value of the current and voltage across the circuit and average power delivered to the circuit. (10)

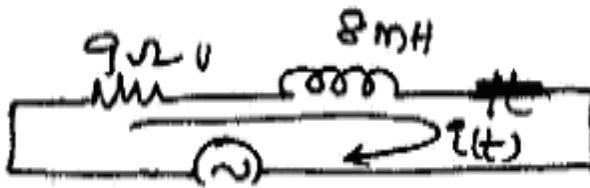i(t) = 5+10 sin(1000t+45°)+100 sin (3000t+60°). v(t) = ?



Figure E

14. (a) Prove that when networks are connected in cascade, the overall ABCD parameters are the matrix multiplication of individual ABCD parameters. (7)
(b) Define inverse h-parameters and draw the equivalent ckt. (3)

15. (a) What are the necessary conditions for driving point functions? (5)
(b) The Laplace transform of current I(s) in a network is given by

$$I(s) \frac{3s}{(s+2)(s+3)}$$ plot the poles and zeros in the s-plane and obtain the

time domain response. (5)

16. For the network shown in figure (F), obtain the tie-set matrix and the network equilibrium equations using KVL. Calculate the loop currents and branch voltage. (10)

17. Write short notes on : (10)
(a) Magnetically coupled circuits
(b) Powers in a.c. circuit
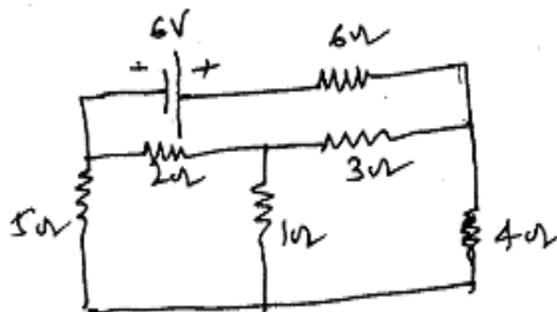(c) Transient and steady state response of a circuit.



Figure F

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