

FACULTY OF ENGINEERING  
 B.E. 2/4 (ECE) I Semester (Old) Examination, December 2011  
 BASIC CIRCUIT ANALYSIS

Time: 3 Hours]

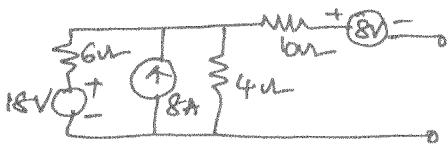
[Max. Marks: 75

**Note :** Answer all questions from Part A. Answer any five questions from Part B.

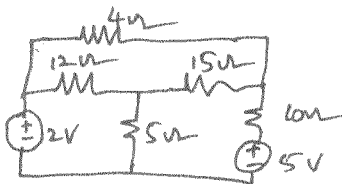
PART – A

(25 Marks)

1. Define Thevenin's Theorem and write the equivalent circuit. 2
2. Obtain a single current source with shunt impedance for the network shown : 3



3. Define Transient and Steady state responses. 2
4. What are the various solutions depending upon the type of roots obtained for an RLC circuit ? 3
5. Define true and apparent powers with expressions. 2
6. Define poles and zeros of a network function. 2
7. Define band width and quality factor and relate them. 3
8. Draw atleast two possible trees and their corresponding co-trees for the circuit shown : 3

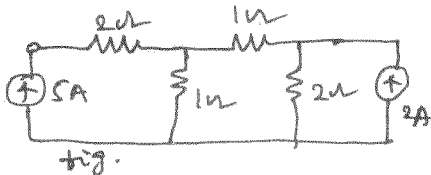


9. Define Incidence matrix and Tie-set matrix. 2
10. Define zero input response, zero state response and complete responses. 3

PART – B

(50 Marks)

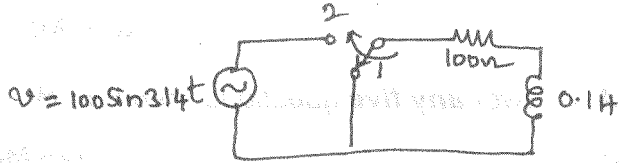
11. a) Using Nodal Analysis, find the current in each resistor of the following network : 8



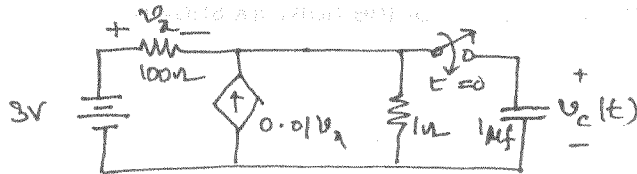
- b) Define Norton's Theorem. 2



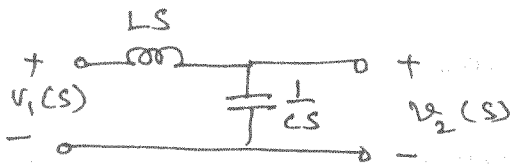
12. Obtain the current at  $t > 0$ , if a.c. voltage  $v$  is applied, when the switch 'K' is moved to 2 from 1 at  $t = 0$ . Assume a steady state current of 1A in the RL circuit when the switch was at position 1, for the following circuit. 10



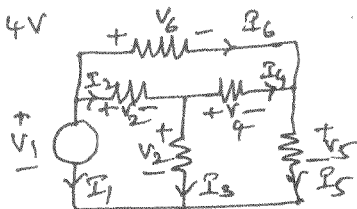
13. Find  $v_c(t)$  for the following circuit for  $t \geq 0$ . 10



14. a) Define Resonance of a circuit. What are the properties of parallel resonance circuit? 5  
 b) Find  $V_2(S)/V_1(S)$  in the figure shown below: 5



15. a) In the network shown check the validity of Tellegen's Theorem, provided  $V_1 = 8V$ ,  $V_2 = 4V$  and  $V_4 = 2V$ . Also  $I_1 = 4A$ ,  $I_2 = 2A$  and  $I_3 = 1A$ . 5



- b) Plot the variation of capacitive, inductive reactances, overall reactance, Impedance and current with frequency for a series RLC circuit. 5
16. a) Define principle of Duality. Explain procedure of obtaining a Dual network for any network. 5  
 b) Obtain the Tie-set matrix for the following circuit. Also write down the KVL equations. 5
17. Write short notes on: 10
- a) Superposition Theorem  
 b) Distinguish between various powers used in a.c. circuits.