Code No. 6015

# FACULTY OF ENGINEERING

**B.E. 2/4 (ECE) I – Semester (Main) Examination, November 2013**

**Subject : Basic Circuits 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. State and explain superposition theorem. 3
2. What are the properties of incidence matrix? 2
3. Find the value of 'R' in fig shown in (A) in such a way that maximum power is transferred to it. 3

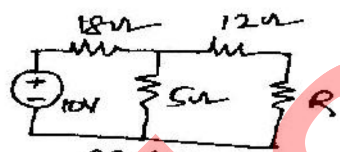


fig (A).

4. Write the difference between transient and steady state responses. 3
5. State and explain the time constant of an R-L circuits. 2
6. Define apparent and average powers. 2
7. Define and explain ABCD parameters of a network. 3
8. What is the condition of reciprocity for hybrid parameters and also the condition of symmetry? 2
9. Define : Incidence matrix and Tie set. 2
10. Define : Complex frequency, poles and zeros of a transfer function. 3

## PART – B (50 Marks)

11.a) For the circuit shown in fig (B), find the node voltages using nodal analysis. 8

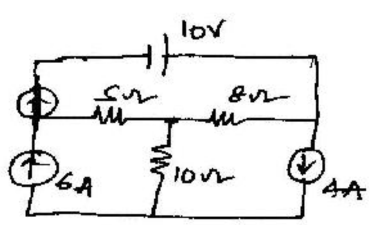


fig (B).

b) Define and classify energy sources. 2

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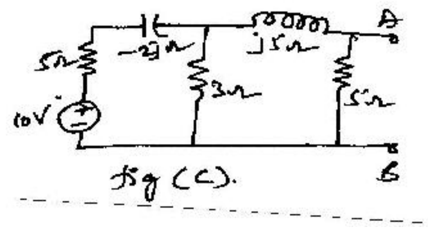
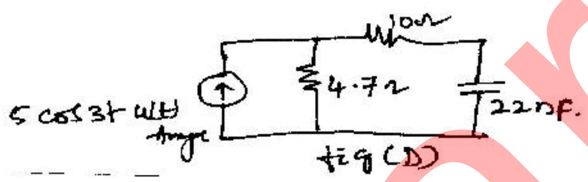
12.a) Determine the impedance connected across the terminal A & B in fig (C), for the maximum power transfer. Also find value of max. power transferred. 8



b) Define self and mutual inductances. 2

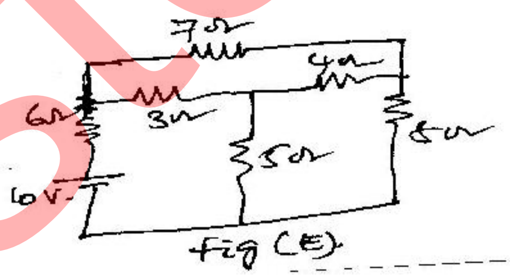
13. Find the response v(t) in the circuit of fid.(D). Also plot it with neat sketches. 10



14.a) Show that, "when networks are interconnected in series-parallel manner, then the overall h-parameters are the summation of individual h-parameters of networks interconnected". 8

b) Define reciprocity theorem and explain. 2

15. For the network shown in fig(E), write a cut-set schedule. Obtain the values of branch voltages and branch currents. 10



16.a) What the restrictions on the location of pole-zeros of a transfer function, explain? 5

b) The Laplace transform of current I(s) in a network is given by

$$I(s) = \frac{3s}{(s+2)(s+3)}$$

Plot poles and zeros in the s-plane and hence obtain the time-domain response. 5

17. Write short notes on : 10

a) Series and parallel resonances
b) Principle of Duality
c) Zero input response and zero state responses.

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