Subject Code: R13211/R13 **Set No - 1**

I B.Tech II Semester Supplementary Examinations Dec./Jan. – 2015/2016

NETWORK ANALYSIS

(Common to ECE, EIE, E Com E)

Time: 3 hours **Max. Marks: 70**

Question Paper Consists of **Part-A** and **Part-B**
Answering the question in **Part-A** is Compulsory,
Three Questions should be answered from **Part-B**

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PART-A

1. (a) Give the advantages and disadvantages of tie-set matrix.
   (b) A two element series circuit R=10 ohms and X_L=40 ohms has an effective applied voltage of 230 V. Find real power and power factor in the circuit. Draw power triangle.
   (c) Define quality factor and bandwidth in series resonant circuits and write its expressions.
   (d) State Substitution theorem and write its merits over other theorems.
   (e) Give the condition for reciprocity and symmetry in case of h-parameters.
   (f) Write the procedure to evaluate the initial conditions in electrical circuits.

[4+3+4+4+3+4]

PART-B

2. (a) Define: (i) Loop (ii) Planar graph (iii) Oriented graph
   (iv) Loop (v) Path (vi) Connected graph
   (b) Determine voltage at node 2 and the power supplied by the dependent current source in the network shown in fig.1.

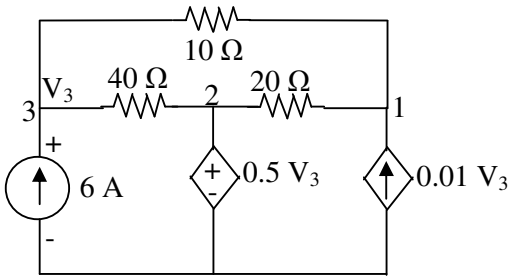

Fig.1

[8+8]

3. (a) A 200 V, 50 Hz AC supply is applied to a coil of 0.08 H inductance and 3.5 Ω resistance connected in series with a 7.2 μF capacitor. Calculate (i) Impedance (ii) Current (iii) Phase angle between current and voltage (iv) power factor (v) power consumed.
   (b) A current of (120-j50)A flows through a circuit when applied voltage is (8+j12)V. Determine: (i) impedance (ii) power factor (iii) power consumed and reactive power

[8+8]

4. (a) Obtain the expression for frequency at which maximum voltage across the capacitance occurs in a series resonant circuit.
   (b) Two magnetically coupled coils have 500 and 1000 turns respectively. A current of 1 A in coil 1 produces a flux of 0.5 mWb links all turns of the coil 1 only and a mutual flux of 0.7 mWb. Find L_1, L_2.

[8+8]

5. (a) State and explain substitution theorem.

5. (b) Find current through R_L using Thevenin's theorem for the circuit shown in fig.2.

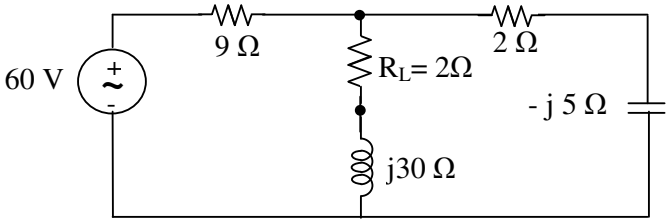

Fig.2

[8+8]

6. (a) The Z-parameters of a two port network are Z_{11}=15 Ω, Z_{22}=24 Ω, Z_{12}=Z_{21}=6 Ω. Determine ABCD parameters.

   (b) Find the z-parameters of the two port network shown in fig.3

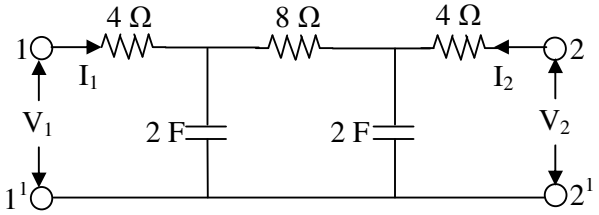

Fig.3

[8+8]

7. A series RL circuit with R=200 ohms and L= 3H has a sinusoidal voltage source $100\sin(600t+\phi)$ applied at time when $\phi = 0$. (i) Find the expression for current (ii) At what value of ϕ must the switch be closed so that the current directly enter steady state.

[16]

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