

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**

- Give the advantages and disadvantages of tie-set matrix.
  - 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.
  - Define quality factor and bandwidth in series resonant circuits and write its expressions.
  - State Substitution theorem and write its merits over other theorems.
  - Give the condition for reciprocity and symmetry in case of h-parameters.
  - Write the procedure to evaluate the initial conditions in electrical circuits.

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

**PART-B**

- Define:
 

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

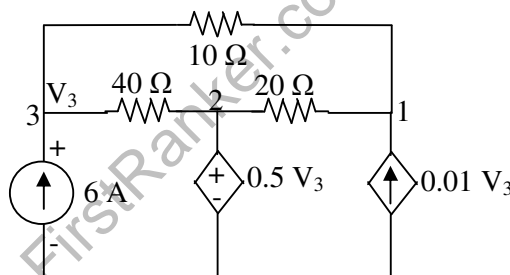


Fig.1

- A 200 V, 50 Hz AC supply is applied to a coil of 0.08 H inductance and  $3.5 \Omega$  resistance connected in series with a  $7.2 \mu\text{F}$  capacitor. Calculate (i) Impedance (ii) Current (iii) Phase angle between current and voltage (iv) power factor (v) power consumed.
  - A current of  $(120-j50)\text{A}$  flows through a circuit when applied voltage is  $(8+j12)\text{V}$ . Determine: (i) impedance (ii) power factor (iii) power consumed and reactive power
- Obtain the expression for frequency at which maximum voltage across the capacitance occurs in a series resonant circuit.
  - 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  $L_1$ ,  $L_2$ .
- State and explain substitution theorem.

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

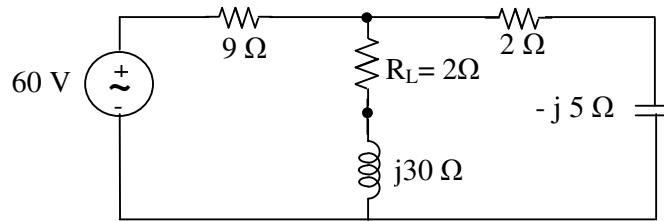


Fig.2

6. (a) The Z-parameters of a two port network are  $Z_{11}=15\ \Omega$ ,  $Z_{22}=24\ \Omega$ ,  $Z_{12}=Z_{21}=6\ \Omega$ . Determine ABCD parameters. [8+8]  
 (b) Find the z-parameters of the two port network shown in fig.3

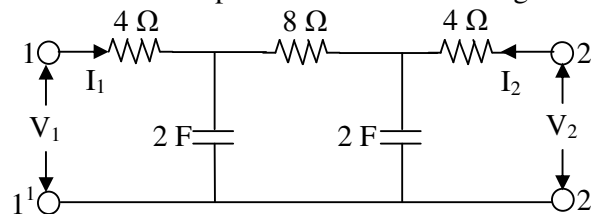


Fig.3

7. A series RL circuit with  $R=200\ \text{ohms}$  and  $L=3\text{H}$  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  $\phi$  must the switch be closed so that the current directly enter steady state. [8+8]

[16]

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