

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**

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.

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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.

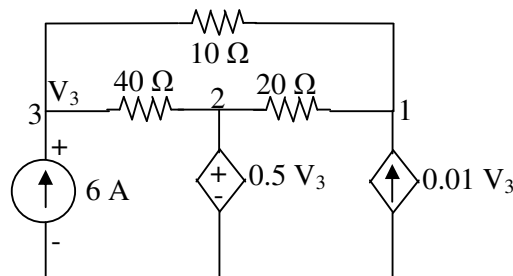


Fig.1

- A 200 V, 50 Hz AC supply is applied to a coil of 0.08 H inductance and 3.5 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.
 - 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
- 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.

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

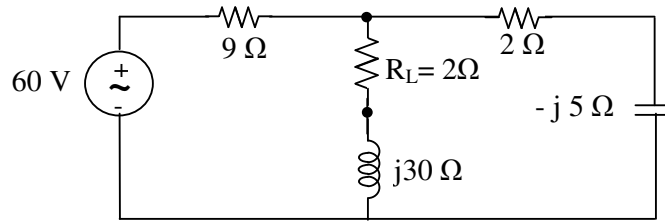


Fig.2

[8+8]

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

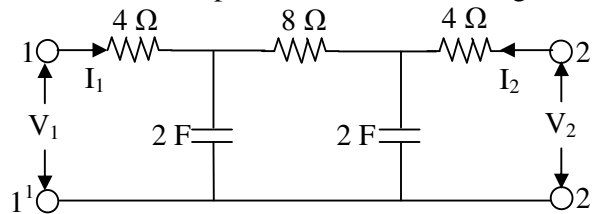


Fig.3

[8+8]

7. A series RL circuit with $R=200\ \text{ohms}$ 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 ϕ must the switch be closed so that the current directly enter steady state.

[16]

