

I B. Tech II Semester Supplementary Examinations, January/February - 2023**NETWORK ANALYSIS**

(Common to ECE, EIE)

Time: 3 hours

Max. Marks: 75

*Answer any FIVE Questions One Question from Each Unit
All Questions Carry Equal Marks*

UNIT-I

1. a) Compare the dependent and independent electrical sources with diagrams? [8M]
b) Analyze the Kirchhoff's current law in topological form by using an example? [7M]

(OR)

2. a) Elaborate the step by step process of mesh analysis of an electrical network? [8M]
b) Derive the expression for the instantaneous power of an inductive circuit having the applied voltage $v = V_m \sin \omega t$? [7M]

UNIT-II

3. a) Draw and analyze the transient response of first order RC series circuit with DC input voltage? [8M]
b) A 17 micro farad capacitor is initially charged to 88V D.C. It is then discharged through a resistance of R ohms for 14 seconds when the potential difference across the capacitor is 44V. Determine the value of resistance R? [7M]

(OR)

4. a) Analyze the transient response of RLC series circuit with DC excitation? [8M]
b) A resistance R and 5.8 micro farads capacitor are connected in series across a 124V DC supply. Find the value of resistor such that the voltage across the capacitor becomes 55V in 5.6sec after the circuit is switched on? [7M]

UNIT-III

5. a) Describe the concept of phase difference of a capacitive circuit with relevant wave forms? [8M]
b) From the following data, find the self and mutual inductances of two windings 1 and 2 of an ideal transformer operating in a linear zone? $N_1 = 540$ turns, $N_2 = 770$ turns, $I_1 = 2.6A$, $\phi_1 = 12\text{mwb}$, $\phi_2 = 8\text{mwb}$? [7M]

(OR)

6. a) Analyze the steady state response of RLC series circuit with relevant equations? [8M]
b) Two coupled coils have $K = 0.76$, $N_1 = 520$ turns, $N_2 = 1100$ turns and the mutual flux being 0.82 wb, find the primary coil flux? If the primary current is 7.4 A, find the primary coil inductance. Also find the secondary inductance? [7M]

UNIT-IV

7. a) Draw the characteristics and explain the variation of current and impedance in a series resonating circuit? [8M]
b) State and prove the compensation theorem with circuit diagram? [7M]

(OR)

8. a) Develop the expression and describe the band width of a series resonating circuit? [8M]
b) A coil with resistance of 20 ohms and inductance of 0.6 H is connected in parallel with a 440 micro farads capacitor. Calculate the frequency at which the circuit will act as a non inductive resistance and find its value? [7M]

UNIT-V

9. a) Describe the cascading of two port networks and derive the equivalent parameters? [8M]
b) Derive the impedance parameters of a two port network with necessary equations? [7M]

(OR)

10. a) Derive the A, B, C, D parameters of a two port network with necessary equations? [8M]
b) The following short circuit currents and voltages are obtained from an experiment on a two port network. [7M]
i) When output is short circuited: $I_1 = 6.2A$, $I_2 = -0.4 mA$, $V_1 = 28V$.
ii) When input is short circuited: $I_1 = -6.2A$, $I_2 = 12 mA$, $V_2 = 32V$.
Determine the admittance parameters?
