Hall Ticket No | | | | | | | | | | | Question Paper Code:AEEC05

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal-500043, Hyderabad

B.Tech III SEMESTER END EXAMINATIONS (REGULAR / SUPPLEMENTARY) - FEBRUARY 2023
Regulation:UG20
NETWORK ANALYSIS

Time: 3 Hours (ELECTRICAL AND ELECTRONICS ENGINEERING) Max Marks: 70

Answer ALL questions in Module I and II
Answer ONE out of two questions in Modules III, IV and V
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

MODULE – I

1. (a) Explain the terms reactance and impedance in AC circuits. Predict the voltage, current, reactance and impedance in series RL circuit using sinusoidal excitation. [BL: Understand| CO: 1|Marks: 7]

   (b) A series RLC circuit is supplied at 220V, 50 Hz. At resonance, the voltage across the capacitor is 550V and current I is equal to 1 A. Determine R, L and C parameters of the circuit. [BL: Apply| CO: 1|Marks: 7]

MODULE – II

2. (a) Elucidate the significance of initial conditions in transients. Determine the transient response for series RL circuit for DC excitation using differential equation approach. [BL: Understand| CO: 2|Marks: 7]

   (b) A series RC circuit with R=10Ω and C=0.1 F has a constant voltage of V= 20 V applied at t = 0.Obtain the expression for the transient current using differential equation method. [BL: Apply| CO: 2|Marks: 7]

MODULE – III

3. (a) Discuss the importance of locus diagrams. Draw the locus diagram of series RC circuit when R is varied. [BL: Understand| CO: 3|Marks: 7]

   (b) A 230 volts, 50 Hz source is connected to a series circuit consisting of a resistance of 40 ohms and an inductance which varies between 0.03 H and 0.15 H. Draw the locus diagram of current. [BL: Apply| CO: 3|Marks: 7]

4. (a) Summarize about driving point functions and transfer functions. Obtain the transform impedance of an inductor.Explain the necessary conditions for driving point functions. [BL: Understand| CO: 4|Marks: 7]

   (b) The Laplace transform of a voltage v(t) is V(s)=4(s+1)/(s+2)(s+3). Draw poles and zeros of this function and determine v(t) using pole-zero plot. [BL: Apply| CO: 4|Marks: 7]

MODULE – IV

5. (a) What is phase sequence? Obtain the relationship between line and phase voltage in a 3-phase balanced star connected system. [BL: Understand| CO: 5|Marks: 7]

(b) A balanced star connected load having an impedance of (15 + j20) Ω per phase is connected to a balanced three phase 400 V, 50 Hz supply. Find the line currents and the power absorbed by the load. [BL: Apply| CO: 5|Marks: 7]

6. (a) Write the expression for acive power in case of star and delta systems of three phase circuits. Find the power factor using two wattmeter method for three phase circuits.
[BL: Understand| CO: 5|Marks: 7]

(b) The input power to a three phase load is 10 kW at 0.8 pf. Two wattmeters are connected to measure power, find the individual readings of the wattmeter. [BL: Apply| CO: 5|Marks: 7]

MODULE – V

7. (a) Classify filters based on the frequency characteristics. Explain the design procedure for constant k low pass filter. [BL: Understand| CO: 6|Marks: 7]

(b) Design a low pass filter for T section and π section having a cut-off frequency of 2 kHz to operate with a terminated load resistance of 500Ω . [BL: Apply| CO: 6|Marks: 7]

8. (a) Write the expressions for the characteristic impedance of a T section and π section networks. Explain the design procedure for m-derived high pass filter. [BL: Understand| CO: 6|Marks: 7]

(b) Design band pass filter having a design impedance of 4kΩ and pass band between 1.25 kHz and 2 kHz. [BL: Apply| CO: 6|Marks: 7]

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