Hall Ticket No | | | | | | | | | | | Question Paper Code: AEEB09

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

MODEL QUESTION PAPER

B.Tech III Semester End Examinations, November - 2019

Regulations: R18

NETWORK ANALYSIS

(Common to EEE)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

MODULE – I

1. a) Derive the condition for maximum power transfer with DC excitation and verify with an example. [7M]
   b) In a network consisting of three parallel branches, first is defined as 100V in series with (3 + 4j) ohms, second branch 7 ohms and third branch 50V in series with (2 + 3j) ohms. Apply milliman's theorem to determine current flowing through 7 ohms. [7M]

2. a) State and explain the procedure to draw equivalent series circuit using Thevenin's theorem their by verify theorem with an example for DC excitation. [7M]
   b) Determine voltage across 2+j5 using superposition theorem for circuit shown in figure 1 below? [7M]

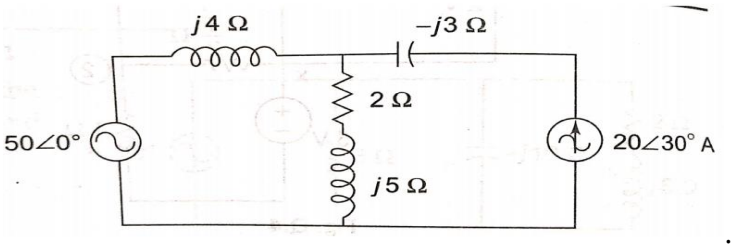

Figure 1

MODULE – II

3. a) Derive the transient response for series RC circuit for AC excitation using differential equation approach. [7M]
   b) A series R C circuit with R = 100 Ω and C = 25 μF has a sinusoidal excitation V(t) = 250 Sin 500t. Find the total current assuming that the capacitor is initially uncharged. Use time domain approach. [7M]

4. a) For the circuit given in Figure 2 steady state conditions are reached for the switch K in position '1'. At t = 0, the switch is changed to position 2. Use the time domain method to determine the current through the inductor for all t≥0. [7M]

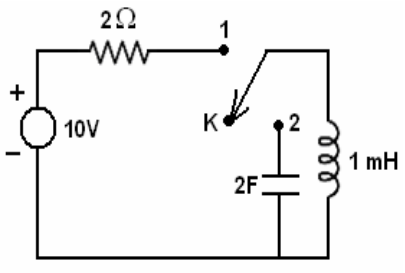

Figure 2

b) Derive the transient response for parallel RL circuit for DC excitation using differential equation approach. [7M]

MODULE – III

5. a) Define locus diagram? Draw the locus diagram of series RL circuit with variable R and constant L. [7M]

b) The transform voltage V(s) of a network is given by V(s) =4s/(s+2)(s2+2s+2) plot its pole-zero diagram and hence obtain v(t). [7M]

6. a) What is a driving point function? Explain the necessary conditions for driving point functions. [7M]

b) For the network shown in figure 3 determine the following transfer functions G21 (s) and Z21 (s). [7M]

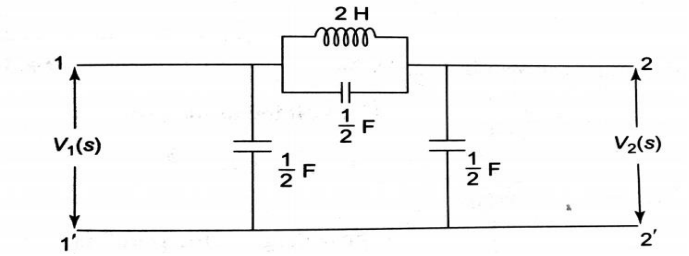

Figure 3

MODULE – IV

7. a) Obtain the expressions for Y parameters of when 2 two -port networks are connected in parallel. [7M]

b) Find the ABCD parameters of the circuit shown in figure 4 below. [7M]

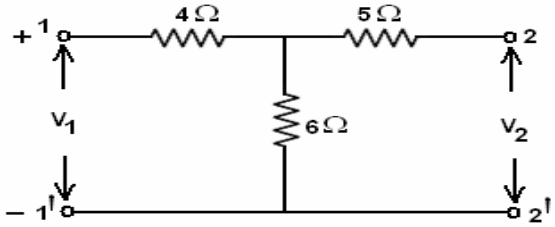

Figure 4

8. a) Give the condition for symmetry for Y parameters .Explain image parameters with necessary expressions. [7M]

b) For the following network shown in figure 5 determine Z parameters [7M]

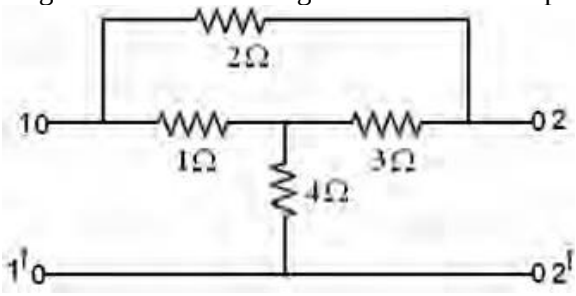

Figure 5

MODULE – V

9. a) Define the term pass band? Explain the design procedure for a constant-k high pass filter and its characteristics. [7M]

b) A constant K low pass filter is designed to cut off at a frequency of 1000Hz and the resistance of the load circuit is 50ohm .Calculate the values of the corresponding components required. [7M]

10. a) What are desirable characteristics of ideal filter? Design m-derived low pass filter and draw its characteristics? [7M]

b) Design a low pass filter (both T and π sections) having a cutoff frequency of 2 KHz to operate with a terminated load resistance of 500Ω [7M]

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COURSE OBJECTIVES:

The course should enable the students to:

I	Apply network theorems to obtain the equivalent circuit of electrical networks.
II	Analyze the transient response of series and parallel RL, RC, RLC circuits for DC and AC excitations.
III	Understand the concept of locus diagram for series and parallel circuits and also network functions for one port and two port networks.
IV	Evaluate the two port network parameters and Discuss their interrelation and interconnection of networks.
V	Design different types of filters and study their characteristics.

COURSE OUTCOMES (COs):

CO 1	Apply Thevenin's and Norton theorems to analyze and design for maximum power transfer and the concept of linearity and the associated technique of superposition to circuits and network.
CO 2	Analyze the transient response of series and parallel circuits with DC and AC excitation using differential approach and Laplace transform approach.
CO 3	Understand the locus diagram representation and various functions of network.
CO 4	Understand the features of two port networks and to obtain their equivalent circuits
CO 5	Design low pass, high pass, band pass and band elimination filter networks.

COURSE LEARNING OUTCOMES (CLOs):

AEEB09.01	Verify the law of conservation of energy, superposition principle, reciprocity and maximum power transfer condition for the electrical network with DC excitation and AC Excitation.
AEEB09.02	Summarize the procedure of Thevenin's, Norton's and Milliman's theorems to reduce complex network into simple equivalent network.
AEEB09.03	Estimate the transient response of series and parallel circuits with DC excitation.
AEEB09.04	Analyze the transient response of series and parallel circuits with AC excitation.
AEEB09.05	Evaluate the transient response of first and second order electric circuits using differential equation approach.
AEEB09.06	Determine the transient response of first and second order electric circuits using Laplace transform technique.
AEEB09.07	Explain the concept of locus diagram for series and parallel circuits.
AEEB09.08	Generalize the concept of network functions for one port and two port networks
AEEB09.09	Observe the Time Response From pole - zero plots.
AEEB09.10	Examine the electric networks in time domain and frequency domain.
AEEB09.11	Calculate Z, Y, ABCD, H and image parameters of two port network.
AEEB09.12	Derive the condition for symmetry and reciprocity for different parameters of two port networks.
AEEB09.13	Inter relationships between various two port networks them.
AEEB09.14	Outline the concepts of interconnections of two port networks.
AEEB09.15	Design of low pass, high pass, band pass, band elimination and study their characteristics.
AEEB09.16	Apply the concept of network theorems, switching transient to solve real time world applications.
AEEB09.17	Process the knowledge and skills for employability and to succeed national and international level competitive examinations

MAPPING OF SEMESTER END EXAMINATION - COURSE OUTCOMES

SEE Question No		Course Learning Outcomes		Course Outcomes	Blooms Taxonomy Level
1	a	AEEB09.01	Verify the law of conservation of energy, superposition principle, reciprocity and maximum power transfer condition for the electrical network with DC excitation and AC Excitation.	CO1	Understand
	b	AEEB09.01	Verify the law of conservation of energy, superposition principle, reciprocity and maximum power transfer condition for the electrical network with DC excitation and AC Excitation	CO1	Understand
2	a	AEEB09.02	Summarize the procedure of Thevenin's, Norton's and Milliman's theorems to reduce complex network into simple equivalent network.	CO1	Understand
	b	AEEB09.01	Verify the law of conservation of energy, superposition principle, reciprocity and maximum power transfer condition for the electrical network with DC excitation and AC Excitation	CO1	Understand
3	a	AEEB09.04	Analyze the transient response of series and parallel circuits with AC excitation.	CO2	Understand
	b	AEEB09.05	Evaluate the transient response of first and second order electric circuits using differential equation approach.	CO2	Remember
4	a	AEEB09.03	Analyze the transient response of series and parallel circuits with DC excitation.	CO2	Understand
	b	AEEB09.05	Evaluate the transient response of first and second order electric circuits using differential equation approach.	CO2	Understand
5	a	AEEB09.07	Explain the concept of locus diagram for series and parallel circuits	CO3	Understand
	b	AEEB09.07	Explain the concept of locus diagram for series and parallel circuits.	CO3	Understand
6	a	AEEB09.08	Generalize the concept of network functions for one port and two port networks	CO3	Understand
	b	AEEB09.08	Generalize the concept of network functions for one port and two port networks.	CO3	Understand
7	a	AEEB09.14	Outline the concepts of interconnections of two port networks.	CO4	Understand
	b	AEEB09.11	Calculate Z, Y, ABCD, H and image parameters of two port network.	CO4	Understand
8	a	AEEB09.12	Derive the condition for symmetry and reciprocity for different parameters of two port networks	CO4	Understand
	b	AEEB09.11	Calculate Z, Y, ABCD, H and image parameters of two port network.	CO4	Understand
9	a	AEEB09.15	Design of low pass, high pass, band pass, band elimination and study their characteristics..	CO5	Remember
	b	AEEB09.15	Design of low pass, high pass, band pass, band elimination and study their characteristics.	CO5	Understand
10	a	AEEB09.15	Design of low pass, high pass, band pass, band elimination and study their characteristics..	CO5	Remember
	b	AEEB09.15	Design of low pass, high pass, band pass, band elimination and study their characteristics.	CO5	Understand

Signature of Course Coordinator **HOD, EEE**