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) State and verify Thevenin's theorem with an example for DC excitation. [7M]
   b) Determine the Norton's equivalent ant between the terminals AB shown in figure1 below? [7M]

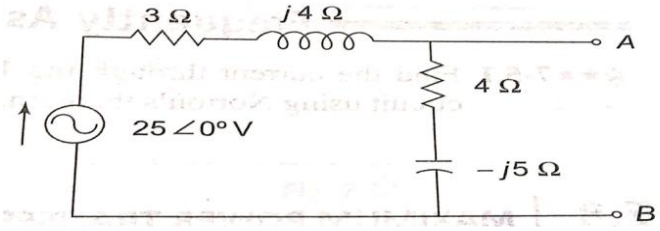

Figure 1

2. a) State and explain compensation theorem with an example for DC excitation. [7M]
   b) Verify Tellegen's theorem provide V_1 =8V, V_2=4V, V_4=2V, I_1 =4A, I_2 = 2A and I_3 =1A for the circuit shown in figure 2 below? [7M]

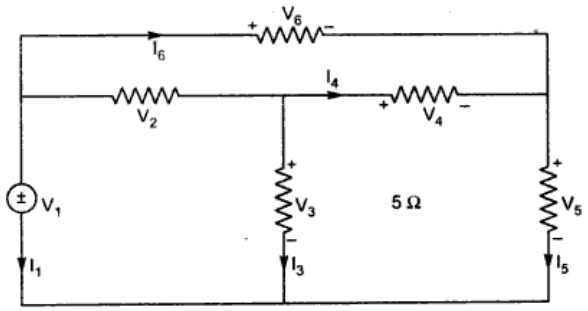

Figure 2

MODULE – II

3. a) Derive the transient response for series RLC circuit for ac excitation using differential equation approach. [7M]

   b) For the circuit given below in Figure.3, the applied voltage is V(t) = 10sin(200t+60°) Find the current through the circuit for $t \geq 0$. Assume zero initial Condition. Use time domain approach. [7M]

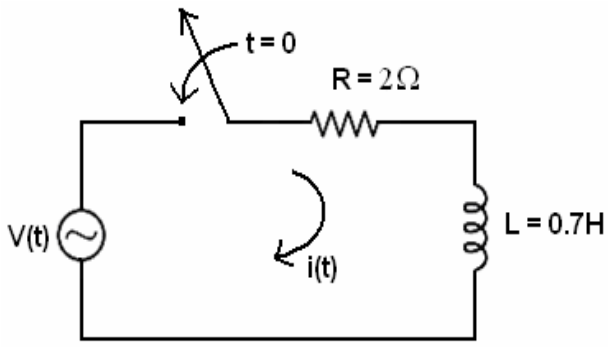

Figure 3

4. a) For the circuit shown in figure 4 determine the currents i_1 and i_2 when the switch is closed at t=0 [7M]

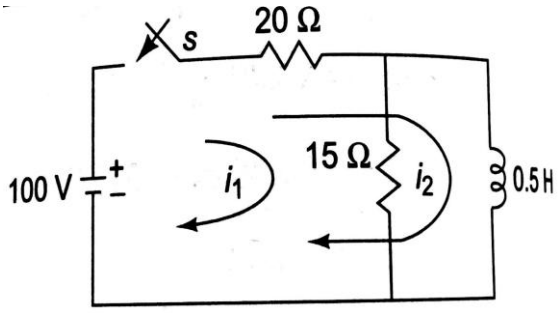

Figure 4

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

MODULE – III

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

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

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

b) For the two port network shown in figure 5 determine driving point impedance function $Z_{11}(s)$,transfer impedance $Z_{21}(s)$,and voltage transfer ratio $G_{21}(s)$ [7M]

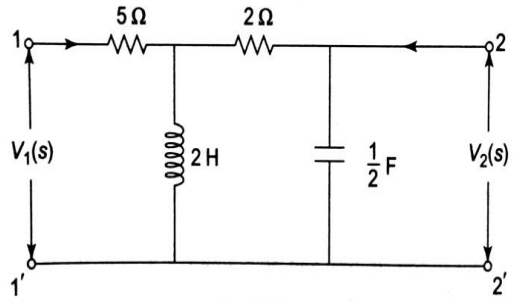

Figure 5

MODULE – IV

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

b) Find the h parameters of the circuit shown in figure 6 below. [7M]

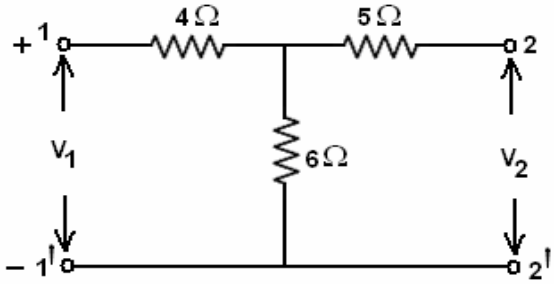

Figure 6

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

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

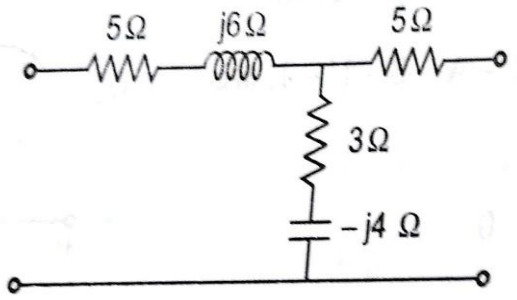

Figure 7

MODULE – V

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

   b) Determine the cut-off frequency for the given π-section of low pass filter as shown in figure 8 below? [7M]

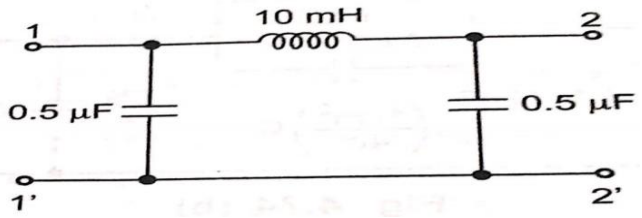

Figure 8

10. a) Explain the design procedure for band stop filter and draw its characteristics. [7M]

    b) Design a proto type section of band pass filter having cutoff frequencies of 1KHz and, 5KHz and a design impedance of 600ohm [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, Tellegen's, 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, compensation 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	AEEB09.02	Summarize the procedure of Thevenin's, Norton's and Milliman's, compensation theorems to reduce complex network into simple equivalent network.	CO 1	Understand
	b	AEEB09.02	Summarize the procedure of Thevenin's, Norton's and Milliman's, compensation theorems to reduce complex network into simple equivalent network	CO 1	Understand
2	a	AEEB09.02	Summarize the procedure of Thevenin's, Norton's and Milliman's, compensation theorems to reduce complex network into simple equivalent network	CO 1	Understand
	b	AEEB09.01	Verify the law of conservation of energy, Tellegen's, superposition principle, reciprocity and maximum power transfer condition for the electrical network with DC excitation and AC Excitation.	CO 1	Understand
3	a	AEEB09.04	Analyze the transient response of series and parallel circuits with AC excitation.	CO 2	Understand
	b	AEEB09.05	Evaluate the transient response of first and second order electric circuits using differential equation approach.	CO 2	Remember
4	a	AEEB09.03	Analyze the transient response of series and parallel circuits with DC excitation.	CO 2	Understand
	b	AEEB09.05	Evaluate the transient response of first and second order electric circuits using differential equation approach.	CO 2	Understand
5	a	AEEB09.07	Explain the concept of locus diagram for series and parallel circuits	CO 3	Understand
	b	AEEB09.07	Explain the concept of locus diagram for series and parallel circuits.	CO 3	Understand
6	a	AEEB09.08	Generalize the concept of network functions for one port and two port networks	CO 3	Understand
	b	AEEB09.08	Generalize the concept of network functions for one port and two port networks.	CO 3	Understand
7	a	AEEB09.14	Outline the concepts of interconnections of two port networks.	CO 4	Understand
	b	AEEB09.11	Calculate Z, Y, ABCD, H and image parameters of two port network.	CO 4	Understand
8	a	AEEB09.12	Derive the condition for symmetry and reciprocity for different parameters of two port networks	CO 4	Understand
	b	AEEB09.11	Calculate Z, Y, ABCD, H and image parameters of two port network.	CO 4	Understand
9	a	AEEB09.15	Design of low pass, high pass, band pass, band elimination and study their characteristics..	CO 5	Remember
	b	AEEB09.15	Design of low pass, high pass, band pass, band elimination and study their characteristics.	CO 5	Understand
10	a	AEEB09.15	Design of low pass, high pass, band pass, band elimination and study their characteristics..	CO 5	Remember
	b	AEEB09.15	Design of low pass, high pass, band pass, band elimination and study their characteristics.	CO 5	Understand

Signature of Course Coordinator **HOD, EEE**