NETWORK THEORY

Subject Code : EE304ES
Regulations : R16 - JNTUH
Class : II Year B.Tech EEE I Semester

Department of Electrical and Electronics and Engineering

BHARAT INSTITUTE OF ENGINEERING AND TECHNOLOGY

Ibrahimpatnam - 501 510, Hyderabad

NETWORK THEORY (EE304ES)

COURSE PLANNER

COURSE OVERVIEW

This subject deals with Three -phase circuits, D.C &A.C. Transient analysis, Network functions, Network parameters-I&II, Filters, Fourier analysis of A.C. Circuits, To understand

magnetic circuits network topology and three phase circuits. To design basic filter configurations.

PRE REQUISITES:

The knowledge of following subjects is essential to understand the subject:

1. Concepts of e.m.f, potential difference & current, battery
2. Capacitors, with uniform & composite medium, energy stored in a capacitor, R-C time constant.
3. Fundamentals of Electrical Circuits and equipment, and Basic Engineering Mathematics.

COURSE OBJECTIVE:

1	This course introduces the basic concepts of circuit analysis which is the foundation for all subjects of the Electrical Engineering discipline
2	The emphasis of this course is laid on the basic analysis of circuits which includes three phase circuits, Transient analysis, Network functions, Network parameters, Filters and network topology, Fourier analysis of A.C. Circuits.

COURSE OUTCOMES:

At the end of the course the student will be in a position to

S.No	Description	Bloom's Taxonomy Level
1	Understand the concept of three phase circuits	Knowledge, Understand (Level 1, Level 2)
2	How to analyze the D.C &A.C Transient Analysis by using circuit analysis	Applying (Level 3)
3	Understand the concept of Network Parameters-I & II	Knowledge, Understand (Level 1, Level 2)
4	How to analyze the Filters Analysis by using circuit analysis	Understand, Applying (Level 2, Level 3)
5	Understand the concept of Fourier analysis of A.C. Circuits	Knowledge, Understand (Level 1, Level 2)

HOW PROGRAM OUTCOMES ARE ASSESSED

Program Outcomes		Level	Proficiency assed by
PO1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.	3	Assignments, Mock tests
PO2	**Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	1	Assignments, Mock tests
PO3	**Design/development of solutions:** Design solutions for complex engineering problems and design system	2	Assignments, Mock tests

	components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.		
PO4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.	-	Assignments, Mock tests
PO5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.	1	Assignments, Mock tests
PO6	**The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.	-	Assignments, Mock tests
PO7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	-	-
PO8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.	-	-
PO9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	-	-
PO10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	-	-
PO11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	1	seminars
PO12	**Life-long learning:** Recognize the need for, and have the	2	Industrial visits

	preparation and ability to engage in independent and life-long learning in the broadest context of technological change.		

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) - : None

HOW PROGRAM SPECIFIC OUTCOMES ARE ASSESSED

Program Specific Outcomes		Level	Proficiency assed by
PSO 1	Talented to analyze, design and implement electrical & electronics systems and deal with the rapid pace of industrial innovations and developments	1	Industrial visits, projects
PSO 2	Skillful to use application and control techniques for research and advanced studies in Electrical and Electronics engineering domain	1	Guest lecturers projects

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) - : None

COURSE CONTENT:

JNTUH SYLLABUS

UNIT – I

MAGNETIC CIRCUITS

Faraday's laws of electromagnetic induction, concept of self and mutual induction- dot convention- coefficient of coupling- composite magnetic circuit analysis of series and parallel magnetic circuits

Network Topology

Definitions, graph, tree basic cutest, basic tie-set matrices for planar networks- Loop and nodal methods of analysis of networks with dependent and independent voltage and current sources- Duality and dual networks.

UNIT II

THREE PHASE AC CIRCUITS

Three-Phase AC Circuits: Phase sequence- Star and delta connection Relation between line and phase voltages and currents in balanced systems. Analyses of balanced and unbalanced 3 phase circuits-Measurement of active and reactive power.

UNIT – III

TRANSIENT ANALYSIS

Transient response of R-L, R-C, R-L -C circuits (Series and parallel combination) for DC and AC excitation-Initial conditions. Solution method using differential equation and Laplace transforms. Transient response of the above circuits for different input such as step ramp pulse and impulse by using Laplace transformation method

UNIT – IV

NETWORK PARAMETERS

Network functions driving point and transfer impedance function network- poles and zeros-necessary conditions for driving point function and for transfer function.

Network Parameters: Two port network parameters - Z, Y, ABCD and hybrid parameters and their relations. Two - port network parameters using transformed variables

UNIT – V

FILTERS

Introduction to filters: Low pass, High pass, Band pass, RC, RL filters constant K and M derived filets and composite filter design.

GATE SYLLABUS:

1. Basic Network Analysis and Network Topology
2. Initial Conditions; Time Varying Current and Differential Equation; Laplace Transform
3. Two-port Network
4. Network Theorems
5. Sinusoidal Steady State Analysis; Resonance; Power in AC Circuits; Passive Filters
6. Basic Network Analysis and Network Topology
7. Initial Conditions; Time Varying Current and Differential Equation; Laplace Transform
8. Two-port Network
9. Network Theorem
10. Sinusoidal Steady State Analysis; Resonance; Power in AC Circuits; Passive Filters

IES SYLLABUS:

Circuits elements. Kirchoff's Laws. Mesh and nodal analysis. Network Theorems and applications. Natural response and forced response. Transient response and steady state response for arbitrary inputs. Properties of networks in terms of poles and zeros. Transfer function. Resonant circuits. Threephase circuits. Two-port networks. Elements of two-element network synthesis.

TEXT BOOKS:

1. Electric Circuits, A.Chakrabarhty, DhanipatRai& Sons.
2. Network analysis, N.C Jagan and C. Lakhminarayana, BS publications.

REFERENCE BOOKS:

1. Engineering circuit analysis, William Hayt, Jack E. Kemmerly, S M Durbin, McGraw Hill Companies.
2. Electrical Circuits, David A.Bell, Oxford University Press.
3. Electric Circuit Analysis, K.S.Suresh Kumar, Pearson Education.
4. Circuits, A.Bruce Carlson, Cengage Learning.
5. Network Analysis and Circuits, M.Arshad, Infinity Science Press.
6. Electrical Circuits an Introduction, KCA Smith & RE Alley, Cambridge University Press.

LESSON PLAN-COURSE SCHEDULE:

Lecture No.	Week No.	TOPIC	Course Learning outcomes	Reference
UNIT – 1				
1.	1	Faraday's laws of electromagnetic induction	**Understanding** the concept of Faraday's laws	T1,T2 &R1
2.		concept of self and mutual induction	**Understanding** the concept	
3.		coefficient of coupling	**Understanding**	
4.		composite magnetic circuit analysis of series and parallel magnetic circuits	**Compare** and **understanding** the circuits	
5.	2	Definitions, graph, tree basic cutest	**Understanding**	
6.		basic tie-set matrices for planar networks	**Understanding** and **applying the** networks	
7.		Loop and nodal methods	**Applying** the methods	

8.		Review of Unit-I		
9.		***Mock Test – I***		
UNIT – 2				
10.	3	Three-Phase AC Circuits: Phase sequenceStar and delta connection Relation between line and phase voltages and currents in balanced systems	**Compare and understand** the circuits	T1,T2 &R1
11.		Analyses of balanced and unbalanced 3 phase circuits	**Understanding** the circuits	
12.		Measurement of active and reactive power	**Compare and understanding**	
13.		problems	**Applying**	
		Bridge Class # 1		
14.	4	Problems	**Applying** the concepts	
15.		Measurement of active and reactive power	**Understanding and applying**	
16.	4	Problems	**Applying**	
17.		Problems	**Applying**	
		Bridge Class # 2	**Applying** the concept and solving	
18.	5	Problems	**Applying** the concept and solving	
19.		Problems	**Applying** the concept and solving	
20.		Problems	**Applying** the concept and solving	
21.		Problems	**Applying** the concept and solving	
		Bridge Class # 3		
22.	6	Problems	**Applying** the concept and solving	T1,T2 &R1
23.		Problems	**Applying** the concept and solving	
24.		Problems	**Applying** the concept and solving	
25.		Problems	**Applying** the concept and solving	
		Bridge Class # 4		
I Mid Examinations				
UNIT – 3				
26.	7	Transient response of R-L, R-C, R-L -C circuits	**Understanding** the different transient circuits	T1,T2 &R1
27.		Series and parallel combination of Elements	**Knowledge** of series and parallel elements	
28.		Initial conditions	**Understanding**	
29.		Problems	**Applying**	

		Bridge Class # 5		
30	8	Solution method using differential equation	**Understanding and applying** differential equation	
31	8	Problems	**Applying** and solving	T1,T2&R1
32		Problems	**Applying** and solving	
33		Problems	**Applying** and solving	
		Bridge Class # 6		
34	9	Transient response of the above circuits for different input	**Knowledge** of transient response foe different circuits	T1,T2&R3
35		DC and AC excitation-Initial conditions	**Knowledge and understanding**	
36		Transformation method	**Applying**	
37		Problems	**Applying** and solving	
		Bridge Class # 7		
UNIT – 4				
38	10	Network functions driving point and transfer impedance function network	**Understanding** network function	T1,T2&R3
39		poles and zeros- necessary conditions for driving point function and for transfer function.	**Analyzing** poles and zeros	
40		Network Parameters	**Analyzing** the parameters	
41		Two port network parameters - Z, Y	**Analyzing** the parameters	
		Bridge Class # 8		
42	11	Cascaded networks,	**Knowledge** about cascaded networks	
43		Concept of transformed network	**Understanding** the concept	
44		Problems	**Applying**	
45		Problems	**Applying**	
		Bridge Class # 9		
46	12	2-port network parameters	**Understanding** the parameters	
47		Problems	**Applying**	
48		Problems	**Applying**	
49				
50		Problems	**Applying**	
	12	***Mock Test - II***		
UNIT – 5				
51	13	**Network Parameters** : Low pass Filter	**Knowledge** about low pass filter	T1,T2&R3
52		High pass Filter	**Knowledge** about high pass filter	
53		Band pass Filter	**Knowledge** about band pass filter	
54		Problems	**Applying**	

		Bridge Class # 10		
55	14	Band elimination	**Knowledge** of band elimination	
56		RC, RL filters	**Knowledge** of RC,RL filters	
57		Problems	**Applying**	
58		Problems	**Applying**	
		Bridge Class # 11		
59	15	filters constant K	**Knowledge**	
60		M derived filters	**Analyze**	
61		Problems	**Applying**	
62		Problems	**Applying**	
		Bridge Class # 12		
63	16	Problems	**Applying**	
64		Problems	**Applying**	
66		Revision		
66		Revision		
		Topics beyond the syllabus#11		
II Mid Examinations (Week 18)				

IX. MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Outcomes	Program Outcomes (PO)												Program Specific Outcomes (PSO)	
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	-	-	-	1	1	-	-	-	-	-	-	2	1
CO2	2	2	1	1	1	-	-	-	-	-	-	-	2	2
CO3	2	1	1	1	-	1	-	-	-	-	-	-	1	2
CO4	2	1	1	-	1	1	-	-	-	-	-	-	1	2
CO5	2	1	-	1	1	1	-	-	-	-	-	-	1	2
Avg	2.2	1	0.6	0.6	0.8	0.8	-	-	-	-	-	-	1.4	1.8

1: Slight (Low) 2:Moderate (Medium) 3: Substantial (High) - : None

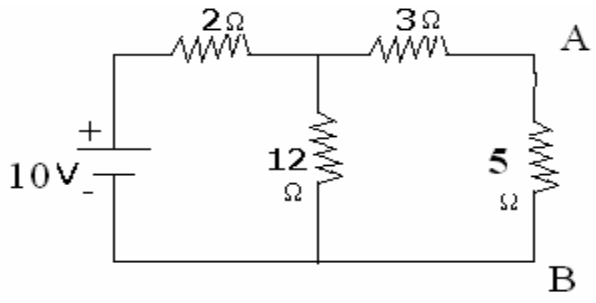
QUESTION BANK: (As Per JNTU, Hyderabad)

DESCRIPTIVE QUESTIONS:

UNIT-I

LONG ANSWER QUESTIONS

S.NO	QUESTION	BLOOMS	COURSE

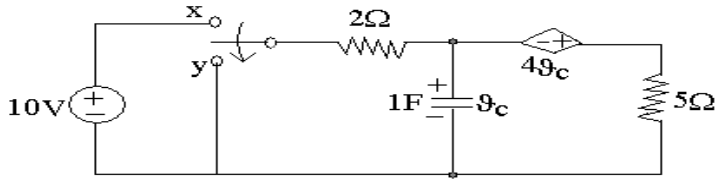
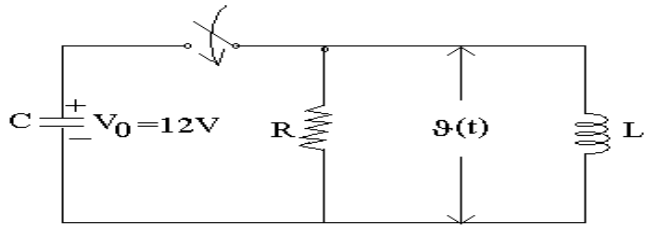
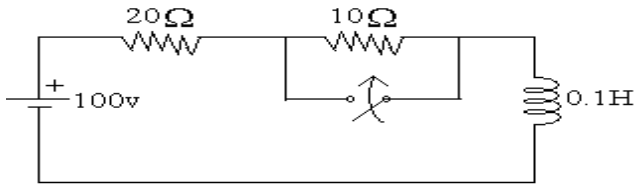
		TAXANOMY LEVEL	OUTCOME
1	Coil 1 of a pair of coupled coils has a continuous current of 5 A, and the corresponding fluxes Φ_{11} and Φ_{12} are 0.2 and 0.4 mWb respectively. If the turns are N_1 = 500 and N_2 = 1500, find L_1, L_2, M and k	Applying	3
2	Two coupled coils of L_1 = 0.8 H and L_2 = 0.2 H have a coupling coefficient k = 0.9. Find the mutual inductance M.	Applying	3
3	Derive the expression for co - efficient of coupling (k)	Understand and applying	2,3
4	4. If the lengthof the coil is 40 cm. Find the number of ampere turns necessary to produce a flux density of $0.7Wb/m^2$ in the gap. Neglect the leakage and fringing	Applying	3
5	Explain self – inductance and mutual – inductance in detail	Knowledge	1
6	What is an electric circuit? What is a magnetic circuit? Make a comparison between electric circuit and magnetic circuit.	Knowledge	1
7	State and explain Faraday's laws of electromagnetic induction	Knowledge	1
8	An iron ring of mean circumference of 1 m is uniformly wound with 400 turns of wire. When a current of 1.2 A is passed through the coil, a flux density of 1.15 Wb/m^2 is produced in the iron. Find the relative permeability of the iron under these circumstances	Applying	3
9	Explain incidence matrix for given network 	Applying	3

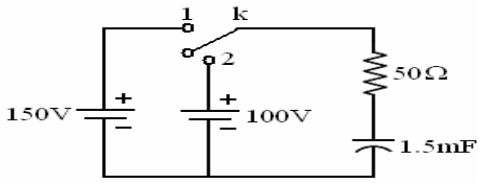
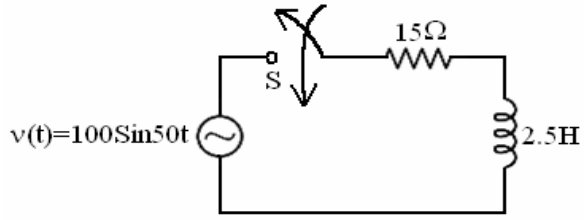
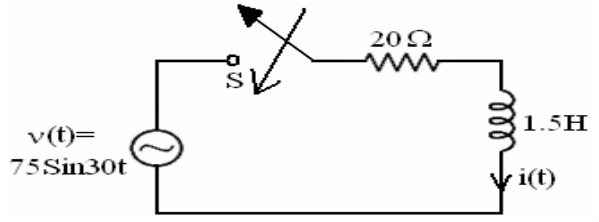
SHORT ANSWER QUESTIONS

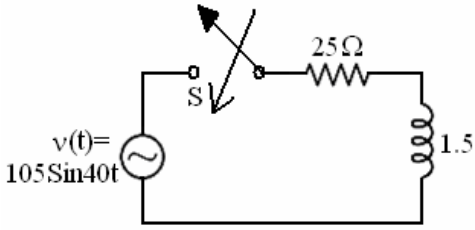
S.No	Question	Blooms Taxanomy Level	Course Outcome
1	Define Faraday's Law of electromagnetic induction	knowledge	1
2	Explain self induction	knowledge	1
3	Explain mutual induction	knowledge	1
4	Discuss dot convention	knowledge	1
5	Define tree and incidence matrix	knowledge	1
6	Define cut set matrix.	knowledge	1
7	Define tie set matrix.	knowledge	1

UNIT-II

LONGANSWER QUESTIONS

S.No	Questions	Blooms Taxanomy Level	Course Outcome
1	Find ϑc (t) at t = 0 + while the switching is done from x to y at t = 0. As shown in figure below 	Applying	3
2	As shown in figure below represents a parallel RLC circuit where R =0.1, L = 0.5H and C is 1F. Capacitor C has an initial voltage of 12V as per the polarity shownin figure. The switch K is closed at time t = 0. Obtain ϑ(t). 	Applying	3
3	a) Derive the expressions for the transient current of RL series circuit when excited by a dc voltage. b) A dc voltage of 100V is applied in the circuit shown in figure below and the switch is kept open. The switch K is closed at t = 0. Find the complete expression for the current. 	Applying	3

4	a) Derive the expression for the transient response in an RLC series circuit excited by a DC source. b) A constant voltage is applied to a series RL circuit at t = 0. The voltage across the inductor at t = 3.46 ms is 20 V and 5 V at t = 25 ms. Obtain R if L = 2H.	Understand and applying	2,3
5	In the circuit given below (shown in Figure) switch 'k' is put in position – 1, for 1 m Sec. and then thrown to position – 2. Find the transient current in both intervals 	Applying	3
6	Derive the transient response of RLC series circuit with sinusoidal input	understanding	2
7	A sinusoidal voltage of 100 Sin50t is applied to a series circuit of R = 15 and L = 2.5H at t=0 (shown in Figure). By Laplace transform method, determine the current i(t) for all t= 0. Assume zero initial conditions 	Applying	3
8	A sinusoidal voltage of 75 Sin30t is applied to a series circuit of R = 20 and L =1.5H at t=0 (shown in Figure). By differential equation method, determine the current i(t) for all t= 0. Assume zero initial conditions 	Applying	3

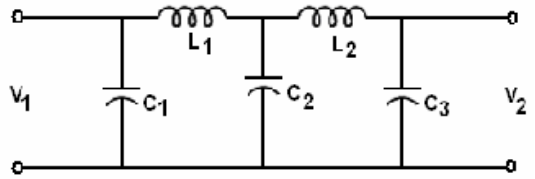
9	A sinusoidal voltage of 105 Sin(40t) is applied to a series circuit of R = 25 and L = 1.5H at t = 0 (shown in Figure), by Laplace transform method. Determine the current i(t) for all t = 0. Assume zero initial conditions 	Applying	3
10	Derive the expression for the response of an RLC series circuit for sinusoidal excitation.	understanding	2

SHORT ANSWER QUESTIONS

S.No	Questions	Blooms Taxanomy Level	Course Outcome
1	Define star and delta networks	knowledge	1
2	Explain the line and phase relation between star and delta networks	knowledge	1
3	Analyze balanced and unbalanced network	understanding	2
4	Describe Measurement of Active power	knowledge	1
5	Describe measurement of reactive power.	knowledge	1

UNIT-III

LONGANSWER QUESTIONS:

S.No	Questions	Blooms Taxanomy Level	Course Outcome
1	1. Find the transfer function 	Applying	3
2	Find Y11(s) for a series capacitive network	Applying	3
3	Explain whether the driving point impedance Z(s) = $\frac{s^2+s+3}{s^4+5s^3+6s^2}$ is suitable for representing a passive one port network.	Applying	3

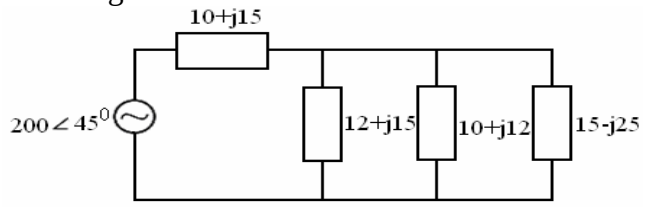
4	A transform voltage is given by- $V(s) = \frac{3s}{(s+1).(s+4)}$. Plot the pole-zero in the s-plane and obtain the time domain response.	Applying	3
5	Explain the restriction on location of poles and zeros in driving point functions.	Understand	2
6	Explain the necessary conditions for transfer functions in a network.	Understand	2
7	Describe about the natural response of a network.	Understand	2
8	How to find the stability of a network function using pole-zero concept.	Understand and Knowledge	2,1
9	Check the stability of the following system expressed of the polynomial $P(s) = s^3 + 2s^2 + 2s + 40$.	Applying	3
10	The transfer function of a network is given by $T(s) = \frac{3s}{(s+2).(s^2+2s+2)}$ .Plot the pole-zero diagram and obtain T(t).	Applying	3

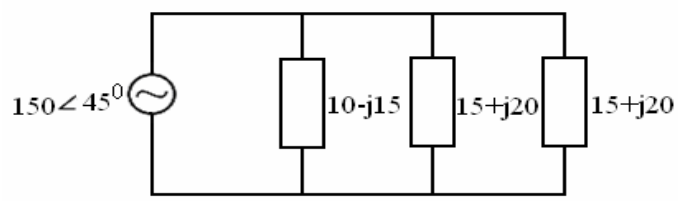
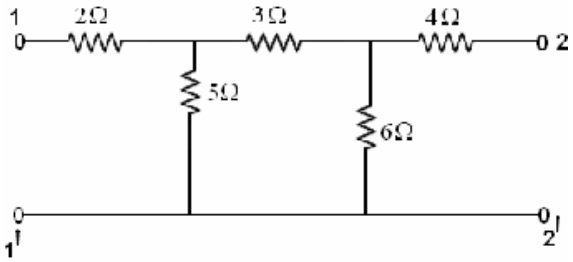
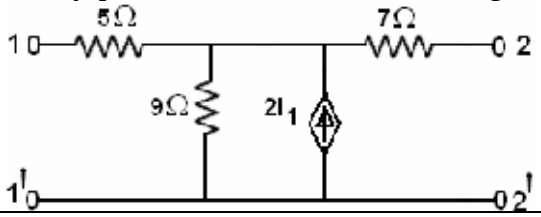
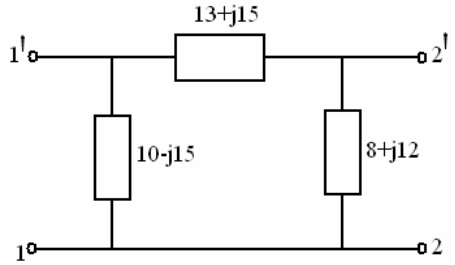
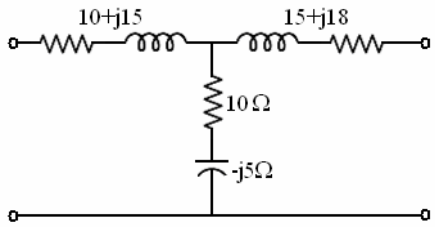
SHORT ANSWER QUESTIONS

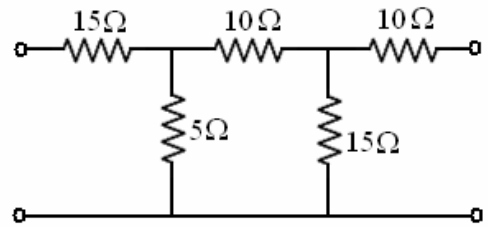
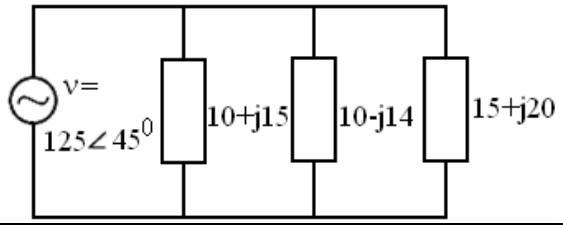
S.No	Questions	Blooms Taxanomy Level	Course Outcome
1	Explain RL network	knowledge	1
2	Explain RC network	knowledge	1
3	Explain RLC network for DC excitation	knowledge	1
4	Explain classical method and laplace method of solutions	knowledge	1
5	Explain transient response for inputs such as step and ramp inputs	knowledge	1

UNIT IV

LONG ANSWER QUESTIONS

S.No	Questions	Blooms Taxanomy Level	Course Outcome
1	For the circuit given below (shown in Figure), determine current supplied by the Source, total active & reactive powers also draw the phasor diagram. 	Applying	3

2	1. For the circuit given below (shown in Figure) determine the current in each branch. Also draw the phasor diagram 	Applying	3
3	Find the ABCD parameters for the circuit shown in fig. 	Applying	3
4	Find y-parameters for the circuit in Figure. 	Applying	3
5	For the two port network given below (Shown in Figure) determine ABCD & hybrid parameters 	Applying	3
6	For the two port network given below (shown in Figure) determine Y and ABCD Parameters. 	Applying	3

7	For the two port network given below (shown in Figure) determine Z and ABCD parameters. 	Applying	3
8	For the circuit given below (shown in Figure) determine current supplied by source & power factor. 	Applying	3
9	(a)Derive expressions for transmission parameters of two two-port networks connected in cascade. (b)Derive expressions for Admittance parameters of two two-port networks connected in parallel	Understanding	3

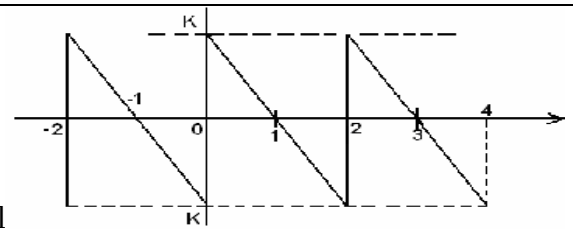
SHORT ANSWER QUESTIONS

S.No	Questions	Blooms Taxanomy Level	Course Outcome
1	What is transform impedance & transform circuit.	knowledge	1
2	Express y-parameters in terms of h-parameters	knowledge	1
3	Express Z-parameters in terms of Y-parameters.	knowledge	1
4	Derive expressions for ABCD parameters of two two-port networks connected in cascade.	knowledge	1
5	Derive expressions for Impedance parameters of two two-port networks connected in series.	knowledge	1

UNIT V

LONG ANSWER QUESTIONS

S.No	Questions	Blooms Taxanomy Level	Course Outcome
1	Design a symmetrical T attenuator to give 2 dB attenuation to have a characteristic impedance of 150 ohm	Understanding	2
2	Explain the design procedure of the Band pass filter in detail	Understanding	2
3	Explain the design procedure of the High pass filter in	Understanding and applying	2,3

	 detail		
4	Write short notes on a) Properties of Fourier transform b) Laplace transforms method of solving transient circuits. c) Low pass filter.	knowledge	1
5	Write short notes on a)Phase angle spectra b) Fourier transform properties	knowledge	1
6	Write short notes on a) Line and phase angle spectra b)Fourier b) integrals	knowledge	1
7	Write short notes on a) Fourier transform theorems b)Exponential form of Fourier series c) Transform impedance & Transform circuits.	knowledge	1
8	Write short notes on a) Composite filters b) Necessary conditions for transfer functions c) Properties of Fourier transform.	knowledge	1
9	a)Give the analysis for the design of constant K band elimination filter and explain its characteristics b) Design a constant K band elimination filter with cut off frequency 1750 Hz to 4250 Hz and a characteristic impedance of 250	Understanding and Knowledge	2,1

SHORT ANSWER QUESTIONS

S.NO	QUESTIONS	BLOOMS TAXANOMY LEVEL	COURSE OUTCOME
1	Draw the circuit diagram of a Band pass filter.	knowledge	1
2	Draw the circuit diagram of a High pass filter	knowledge	1
3	Explain constant K-type low pass filter	knowledge	1
4	Write the propagation constant for T-section filter	knowledge	1
5	Explain and write the properties of a filter	knowledge	1

OBJECTIVE QUESTIONS: As Per JNTU, Hyderabad

UNIT-1

1. In the star connected network choose the correct among the following:
   (a) $V_L = V_P$ (b) $V_L = \sqrt{3}V_P$ (c) $V_P = \sqrt{3}V_L$ (d) $V_L = 3V_P$
2. In the delta connected network choose the correct among the following:
   (a) $V_L = V_P$ (b) $V_L = \sqrt{3}V_P$ (c) $V_P = \sqrt{3}V_L$ (d) $V_L = 3V_P$
3. In the star connected network choose the correct among the following:
   (a) $I_L = I_P$ (b) $I_L = \sqrt{3}I_P$ (c) $I_P = \sqrt{3}I_L$ (d) $I_L = 3I_P$
4. In the delta connected network choose the correct among the following:
   (a) $I_L = I_P$ (b) $I_L = \sqrt{3}I_P$ (c) $I_P = \sqrt{3}I_L$ (d) $I_L = 3I_P$
5. Choose the correct statement for the balanced three phase network:
   a) All the phase voltages are same
   b) All the line voltages are same
   c) All the phase currents are same
   d) All of the above

UNIT-2

1. Time constant for R-C series network is:
   (a) R/C (b) R^2C (c) RC (d) RC^2
2. Time constant for R-L series network is:
   (a) L/R (b) R/L (c) RL (d) RL^2
3. If R=100Ω , C=10 μF, the time constant for R-C parallel network is:
   (a) 2ms (b) 1ms (c) 5ms (d) 4ms
4. If R=10KΩ , L=10H, the time constant for R-C parallel network is:
   (a) 2ms (b) 1ms (c) 5ms (d) 4ms
5. For RLC series network, the system will oscillate if:
   (a) Damping ratio greater than 1 (b) Damping ratio less than 1
   (c) Damping ratio equal to 1 (d) Does not depends on damping ratio
6. Under steady state condition the capacitor act as _____.

UNIT-3

1. Choose the correct representation of impedance network function:
   (a) $Z_{12}(s)$ (b) $Z_{22}(s)$ (c) $Z_{11}(s)$ (d) $Z_{21}(s)$
2. Choose the correct representation of admittance network function:
   (a) $Y_{12}(s)$ (b) $Y_{22}(s)$ (c) $Y_{11}(s)$ (d) $Y_{21}(s)$
3. The transfer function is given by:
   (a) V_1/V_2 (b) V_2/V_1 (c) I_2/I_1 (d) I_1/I_2
4. System is stable if poles are:
   (a) Located on the LHS of s-plane (b) Located on the RHS of s-plane
   (c) Always stable (d) Cannot be predicted
5. Poles are:
   (a) Roots of the Numerator of Transfer Function
   (b) Roots of the Denominator of Transfer Function
   (c) Roots of both (d) Roots of driving point function
6. The pair of terminals is customarily connected to the energy source which is driving force of the network so that pair of terminal is known as _____ of network.
7. Because of the similarity of impedance and admittance the two quantities are assigned one name as _____.

UNIT -4

1. In two port networks, the total number of terminals is:
   (a) 1 (b) 2 (c) 3 (d) 4

2. Transmission parameter is also known as:
   (a) Z-parameter (b) Y-parameter (c)ABCD parameter (d) h-parameter
3. For Z parameter, condition for symmetry is given as:
   (a) $Z_{12}= Z_{21}$ (b) $Z_{22}= Z_{11}$ (c) $Z_{12}= Z_{22}$ (d) $Z_{11}= Z_{21}$
4. For Z parameter, condition for reciprocity is given as:
   (a) $Z_{12}= Z_{21}$ (b) $Z_{22}= Z_{11}$ (c) $Z_{12}= Z_{22}$ (d) $Z_{11}= Z_{21}$
5. For Y parameter, condition for symmetry is given as:
   (a) $Y_{12}= Y_{21}$ (b) $Y_{22}= Y_{11}$ (c) $Y_{12}= Y_{22}$ (d) $Y_{11}= Y_{21}$

UNIT-5

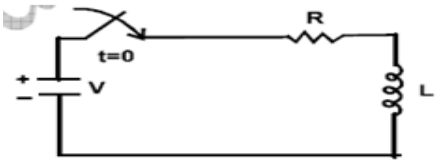
1. Choose the correct for Band Pass filter:
   (a) Has only one cut-off frequency (b) Has two cut-off frequencies
   (c) Have more than two cut-off frequencies (d) None of the above
2. Choose the correct for High Pass filter:
   (a) Has only one cut-off frequency (b) Has two cut-off frequencies
   (c) Have more than two cut-off frequencies (d) None of the above
3. Choose the correct for band stop filter:
   (a) Has only one cut-off frequency (b) Has two cut-off frequencies
   (c) Have more than two cut-off frequencies (d) None of the above
4. Fourier series is applicable to:
   (a) All the waveforms (b) Only non-periodic waveforms
   (c) Only periodic waveforms (d) Only sinusoidal waveforms
5. For anti-symmetric periodic signal, Fourier series has:
   (a) Only even harmonics (b) All the harmonics
   (c) No harmonics (d) Only odd harmonics
6. When r poles or zeros have the same value, the pole or zero is said to be of _____.
7. When the variable s has the value such the network function vanishes, that complex

GATE:

1. In the circuit shown in figure, assuming initial voltage and capacitors and currents through the inductors to be zero at the time of switching ($t = 0$), then at any time $t > 0$:

a). Current increases monotonically with time
b). Current decreases monotonically with time
c). Current remains constant at V/R d). Current first increases then decreases

2. In figure the switch was closed for a long time before opening at t=0. The voltage V_x at t= 0^+ is:
   a)25V b)50V c)-50V d)0V



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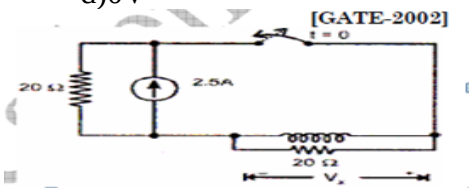

3. In g-parameters, choose the correct one
   a)V_1& V_2interms of I_1& I_2 b) I_1& I_2interms of V_1& V_2
   c) V_2& I_1interms of V_1& I_2 d) V_1& I_1interms of V_2& I_2
4. In Z-parameters, choose the correct one

a)V_1& V_2interms of I_1& I_2 b) V_1& I_1interms of V_2&

In ABCD-parameters, choose the correct one

a)V_1& V_2interms of I_1& I_2 b) I_1& I_2interms of V_1& V_2

c) V_1& I_2interms of V_2& I_1 d) V_1& I_1interms of V_2& I_2

WEBSITE ADDRESSES:

1. www.jntuworld.com
2. http://en.wikipedia.org
3. http://nptel.iitm.ac.in/
4. www.youtube.com/user/nptelhrd

IIT WEBSITES:

1. http://*www.***iit***kgp.ernet.in/*
2. http://*www.****iit****k.ac.in/*
3. http://*www.****iit****b.ac.in/*
4. http://*www.****iit****d.ac.in/*
5. http://*www.****iit****m.ac.in/*

PREVIOUS GATE QUESTION PAPERS WEBSITES:

1. http://www.engineersinstitute.com/Gate_2012_2013-2014_previous_year_paper_solution.php
2. www.aceenggacademy.com
3. www.madeeasy.in

ENGINEERING SERVICES WEBSITES:

1. www.upsc.gov.in
2. www.aceenggacademy.com
3. www.madeeasy.in

JOURNALS (NATIONAL & INTERNATIONAL):

1. www.ieee.org
2. www.worldscientific.com
3. www.springer.com
4. www.sciencedirect.com

LIST OF TOPICS FOR STUDENT SEMINARS:

1. Types of elements and source transformation techniques
2. Kirchhoff's laws, current division, voltage division
3. Mesh and super mesh analysis, nodal and super nodal analysis

Steady state analysis of pa

WEBSITES:

1. Illumination engineering and electric utility services.
   URL: http://nptel.ac.in/courses/1008105060/
2. Centre for Railways Research at IIT Kharagpur.
3. Nptel.ac.in/courses/108105058/