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Note : Remove “Table of Content” before including in CP Book

Each Course Plan shall be printed and made into a book with cover page

Blooms Level in all sections match with A.2, only if you plan to teach / learn at higher levels

18EE32: Electrical Circuit Analysis

A. COURSE INFORMATION

1. Course Overview

Degree:	BE	Program:	EE
Year / Semester :	2/3	Academic Year:	2019-2020
Course Title:	Electrical circuit analysis	Course Code:	18EE32
Credit / L-T-P:	4/L	SEE Duration:	180 Minutes
Total Contact Hours:	50	SEE Marks:	60 Marks
CIA Marks:	40	Assignment	1 / Module
Course Plan Author:	M.Nagaraja	Sign	Dt:
Checked By:	HOD	Sign	Dt:

2. Course Content.

Module	Module Content	Teaching Hours	Module Concepts	Blooms Level
1	Active and passive elements, Concept of ideal and practical sources. Source transformation and Source shifting, Concept Of Super-Mesh and Super node analysis. Analysis of networks by (i) Network reduction method including star - delta transformation, (ii) Mesh and Node voltage methods for ac and dc circuits with independent and dependent sources. Duality.	10	Network simplification	L3,L4
2	**Network Theorems:** Super Position Theorem, Reciprocity theorem, Thevenin’s Theorem, and Norton’s Theorem. Analysis of networks, with and without dependent ac and dc sources.	10	Network theorems	L2,L3,L4
3	**Resonant Circuits:** Analysis of simple series RLC and parallel RLC circuits under resonances. Problems on Resonant frequency, Bandwidth and Quality factor at	10	Resonant circuit	L2,L3

	resonance **Transient Analysis: Transient** analysis of RL and RC circuits under DC and AC excitation: Behavior of circuit elements under switching action, Evaluation of initial conditions.		and Transient Response	
4	**Laplace Transformation:** Laplace transformation (LT), LT of Impulse, Step, Ramp, Sinusoidal signals and shifted functions. Waveform synthesis. Initial and Final value theorems	10	S-Domain Representation	L2,L3
5	**Unbalanced Three phase systems:** Analysis of three phase systems, calculation of real and reactive powers. **Two Port networks:** Definition,Open circuit impedance, Short circuit admittance and Transmission parameters and their evaluation for simple circuits.	10	Three phase system analysis	L2,L3,L4

3. Course Material

Module	Details	Available
	Textbooks:	
1.	Engineering Circuit Analysis ,William H Hayt et al ,Mc Graw Hill 8th Edition,2014	Library
2.	Network Analysis ,M.E. Vanvalkenburg ,Pearson ,3rd Edition,2014	Library
3.	Fundamentals of Electric Circuits ,Charles K Alexander Matthew N O Sadiku Mc Graw Hill, 5th Edition,2013.	Library
	Reference Books :	
1.	Engineering Circuit Analysis ,J David Irwin et al ,Wiley India ,10th Edition,2014	Dept. Library
2.	Electric Circuits ,Mahmood Nahvi , Mc Graw Hill ,5th Edition,2009	Dept. Library
3.	Introduction to Electric Circuits,Richard C Dorf and James A Svoboda ,Wiley ,9th Edition,2015.	Dept. Library
4.	Circuit Analysis; Theory and Practice ,Allan H Robbins Wilhelm C Miller ,Cengage ,5th Edition,2013.	Dept. Library

4. Course Prerequisites

SNo	Course Code	Course Name	Module / Topic / Description	Sem	Remarks	Blooms Level
1	17EE15 /17EE25	Basic Electrical	DC circuits	1st /2nd sem		L2,L3,L4
2	17EC23 /13	Basic electronics	1. Knowledge on Passive and Active elements	1st /2nd sem		L1
3	-	-	2. Knowledge of fundamental of maths	-	Bridge course of maths for students	L1

Note: If prerequisites are not taught earlier, GAP in curriculum needs to be addressed. Include in Remarks and implement in B.5.

B. OBE PARAMETERS

1. Course Outcomes

#	COs	Teach. Hours	Concept	Instr Method	Assessment Method	Blooms' Level
18EE32.1	To analyze behavior of basic circuit elements and to apply concept of mesh and node analysis in circuit theory	5	Electrical circuit behavior	Lecture	Assignment and unit test	L3
18EE32.2	Reduce the complexity of network using source shifting, source transformation and network reduction using transformations.	5	Network reduction	Lecture and tutorial	Assignment	L4
18EE32.3	Apply various network theorems to determine the circuit response / behavior	5	complex electrical network solution	Lecture and tutorial	Assignment	L3
18EE32.4	Solve complex electric circuits using network theorems	5	Network theorems	Lecture and tutorial	Assignment and unit test	L4
18EE32.5	Apply the knowledge of resonance for series and parallel RLC circuit and calculation of various electrical quantities for 3 phase circuits	5	Series and parallel resonance	Lecture	Assignment	L3
18EE32.6	To study necessary conditions for driving point functions , transfer	5	Initial conditions	Lecture and	Assignment and unit test	L4

	function for their application to a given network for analyzing circuit design.			tutorial		
18EE32.7	Evaluate the initial conditions using knowledge of Laplace transformation	5	S domain representation	Lecture and tutorial	Assignement	L4
18EE32.8	Synthesize typical waveforms using Laplace transformation	5	Waveform synthesis	Lecture and tutorial	Assignement and unit test	L4
18EE32.9	Solve unbalanced three phase systems.	5	Unbalanced system	Lecture	Assignement	L3
18EE32.10	Evaluate the performance of two port networks	5	Two port network	Lecture and tutorial	Assignement and unit test	L4
-	**Total**	**50**	-	-	-	-

Note: Identify a max of 2 Concepts per Module. Write 1 CO per concept.

2. Course Applications

SNo	Application Area	CO	Level
1	To build a network.	CO1	L1,L2
2	Network reduction.	CO2	L2,L3
3	audio amplifier driving a speaker as that is an analogous situation.	CO3	L4
4	nonlinear resistive circuits ,	CO4	L4
5	Tuning application, resonator.	CO5	L4
6	Voltage regulator .	CO6	L4
7	Process Controls , Digital Signal Processing.	CO7	L3,L4
8	System Modelling ,Analysis of Electrical Circuits ,Nuclear Physics.	CO8	L3,L4
9	Modeling and control of three phase system	CO9	L4
10	amplification circuits and filters	CO10	L4

Note: Write 1 or 2 applications per CO.

3. Articulation Matrix

(CO – PO MAPPING)

-	Course Outcomes	Program Outcomes												
#	COs	PO 1	PO2	PO 3	PO 4	PO 5	PO6	PO 7	PO 8	PO9	PO 10	PO 11	PO 12	Level
18EE32.1	To analyze behavior of basic circuit elements and to apply concept of mesh and node analysis in circuit theory	3	3	-	-	-	-	-	-	-	-	-	-	L2
18EE32.2	Reduce the complexity of	3	3	-	-	2	-	-	-	-	-	-	-	L3

	network using source shifting, source transformation and network reduction using transformations.													
18EE32.3	Apply various network theorems to determine the circuit response / behavior	3	3	-	-	2	-	-	-	-	-	-	-	L4
18EE32.4	Solve complex electric circuits using network theorems	3	3	-	-	2	-	-	-	-	-	-	-	L4
18EE32.5	Apply the knowledge of resonance for series and parallel RLC circuit and calculation of various electrical quantities for 3 phase circuits	3	3	-	-	2	-	-	-	-	-	-	-	L3
18EE32.6	To study necessary conditions for driving point functions , transfer function for their application to a given network for analyzing circuit design.	3	3	-	-	2	-	-	-	-	-	-	-	L3
18EE32.7	Evaluate the initial conditions using knowledge of Laplace transformation	3	3	-	-	2	-	-	-	-	-	-	-	L4
18EE32.8	Synthesize typical waveform using Laplace transformation	3	3	-	-	2	-	-	-	-	-	-	-	L4
18EE32.9	Solve unbalanced three phase systems.	3	3	-	-	-	-	-	-	-	-	-	-	L3
18EE32.10	Evaluate the performance of two port networks	3	3	-	-	-	-	-	-	-	-	-	-	L4
18EE32	Average													
Note: Mention the mapping strength as 1, 2, or 3														

4. Mapping Justification

Mapping		Justification	Mapping Level
CO	**PO**	**-**	**-**
CO1	PO1	Knowledge of kirchoff's current and voltage law is required to estimate the current through and voltage across circuit elements.	L2
CO1	PO2	Analyzing the complexity in the network requires the knowledge of KVL and KCL	L3
CO2	PO1	Knowledge of network reduction techniques is required to reduce the complex network	L2

CO2	PO2	Analyzing the complexity of the network is required to reduce it in simplified form by suitable transformation method	L3
CO3	PO1	Students will be able to learn and apply all the basic equations of maths, physics and its importance in network analysis	L3
CO3	PO2	Students will be able to analyze, evaluate and design solutions to solve complex engineering problems for that , economically feasible and socially acceptable	L4
CO3	PO5	Offer engineering solutions by usage of modern tools to meet needs of people.	L4
CO4	PO1	Students will be able to learn and apply all the basic equations of maths, physics and its importance in network analysis	L3
CO4	PO2	Students will be able to analyze, evaluate and design solutions to solve complex engineering problems for that , economically feasible and socially acceptable	L4
CO5	PO1	Students will be able to learn and apply all the basic equations of maths, physics and its importance in network analysis	L3
CO5	PO2	Students will be able to analyze, evaluate and design solutions to solve complex engineering problems for that , economically feasible and socially acceptable	L3
CO5	PO5	Offer engineering solutions by usage of modern tools to meet needs of people.	L3
CO6	PO1	Students will be able to learn and apply all the basic equations of maths, physics and its importance in network analysis	L3
CO6	PO2	Students will be able to analyze, evaluate and design solutions to solve complex engineering problems for that , economically feasible and socially acceptable	L4
CO6	PO5	Offer engineering solutions by usage of modern tools to meet needs of people.	L4
CO7	PO1	Students will be able to learn and apply all the basic equations of maths, physics and its importance in network analysis	L3
CO7	PO2	Students will be able to analyze, evaluate and design solutions to solve complex engineering problems for that , economically feasible and socially acceptable	L4
CO7	PO5	Offer engineering solutions by usage of modern tools to meet needs of people.	L4
CO8	PO1	Students should be able to lean and apply the techniques for waveform synthesis	L3
CO8	PO2	Students should be able to analyze and evaluate the basics of physics ,maths in s-domain	L4
CO9	PO1	Students should be able to learn and apply the basic electrical equations of power	L3
CO9	PO2	Students should be able to analyse and evaluate the three	L4

		phase power for various loading condition	
CO10	PO1	Students will be able to learn and apply all the basic equations of maths, physics and its importance in network analysis	L3
CO10	PO2	Students will be able to analyze, evaluate and design solutions to solve complex engineering problems for that , economically feasible and socially acceptable	L4
CO10	PO3	Offer engineering solutions by usage of modern tools to meet needs of people.	L4

Note: Write justification for each CO-PO mapping.

5. Curricular Gap and Content

SNo	Gap Topic	Actions Planned	Schedule Planned	Resources Person	PO Mapping
1					
2					
3					
4					
5					

Note: Write Gap topics from A.4 and add others also.

6. Content Beyond Syllabus

SNo	Gap Topic	Actions Planned	Schedule Planned	Resources Person	PO Mapping
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Note: Anything not covered above is included here.

EE
Prepared by

Checked by Approved

C. COURSE ASSESSMENT

1. Course Coverage

Module #	Title	Teaching Hours	No. of question in Exam						CO	Levels
			CIA-1	CIA-2	CIA-3	Asg	Extra Asg	SEE		
1	Basic Concepts	10	2	-	-	1	0	2	CO1, CO2	L2,L3
2	Network theorems	10	2	-	-	1	0	2	CO3, CO4	L2,L3,L4
3	Resonant Circuits and Transient Analysis	10	-	2	-	1	0	2	CO5, CO6	L3,L4
4	Laplace Transformation	10	-	2	-	1	0	2	CO7, C08	L3,L4
5	Unbalanced Three phase systems and Two Port networks	10	-	-	4	1	0	2	CO9, CO10	L3,L4
-	**Total**	**50**	**4**	**4**	**4**	**5**	**5**	**10**	-	-

Note: Distinct assignment for each student. 1 Assignment per chapter per student. 1 seminar per test per student.

2. Continuous Internal Assessment (CIA)

Evaluation	Weightage in Marks	CO	Levels
CIA Exam – 1	15	CO1, CO2, CO3, CO4	L2, L3
CIA Exam – 2	15	CO5, CO6, CO7, C08	L3, L4
CIA Exam – 3	15	CO9, CO10	L3, L4
Assignment – 1	05	CO1, CO2, CO3, CO4	L2, L3
Assignment – 2	05	CO5, CO6, CO7, CO8	L3, L4
Assignment – 3	05	CO9, CO10	L3, L4
Seminar – 1	-	-	-
Seminar – 2	-	-	-
Seminar – 3	-	-	-
OtherActivities :	-	-	-
Final CIA Marks	**20**		-

Note : Blooms Level in last column shall match with A.2 above.

D1. TEACHING PLAN - 1

Module - 1

Title:	Divide and Conquer	Appr Time:	16 Hrs
a	***Course Outcomes***	-	**Blooms**
-	The student should be able to:	-	**Level**
1	To analyze behavior of basic circuit elements and to apply concept of mesh and node analysis in circuit theory	CO1	L2
2	Reduce the complexity of network using source shifting, source transformation and network reduction using transformations.	CO2	L3
b	***Course Schedule***	-	-
Class No	**Module Content Covered**	**CO**	**Level**
1	Introduction to Active and passive elements	CO1	L1
2	Concept of Concept of ideal and practical sources.	CO1	L2
3	Source transformation and Source shifting	CO1	L2,L3
4	Problems	CO1	L2,L3,L4
5	Concept of Super-Mesh and Super node analysis	CO1	L3,L4
6	Problems	CO1	L3,L4
7	Analysis of networks by (i) Network reduction method including star – delta transformation	CO2	L2,L3
8	Problems	CO2	L2,L3,L4
9	Analysis of networks by ii)Mesh and Node voltage methods for ac and dc circuits with independent and dependent sources	CO2	L2,L3
10	Concept of Duality.	CO2	L2,L3
c	**Application Areas**	**CO**	**Level**
1	To build a network.	CO1	L1,L2
2	Network reduction.	CO2	L2,L3
d	**Review Questions**	-	-
1	Calculate the current in 20Ω resistor in the network shown in fig.1 by sourse transformation method.	CO1	L4
2	Obtain Expressions for a set of Equivalent delta connected impedances to replace a set of star connected impedances.	CO2	L2

3	Reduce the network shown in fig.2a. to a single voltage source in series with a resistance using source shifting and transformation.	CO2	L2
4	Determine the current through 10 Ω resistance in the network shown in fig.2b. by Star-Delta conversion.	CO1	L4
5	For the network shown in fig.3a, find the node voltages.	CO1	L4
6	Solve for Mesh current in the fig. 3b given b	CO1	L4
7	Obtain the delta connected equivalent of the network shown in fig.4a	CO2	L3
8	Find the power delivered by the 6V source in the circuit shown in fig.4b using Mesh analysis	CO1	L4
9	Find the three unknown currents in the circuit shown in Fig.Q.1(a) using mesh analysis. Fig.Q.1(a)		L4
10	Define the following, i)Linear and Non linear elements , ii) Lumped and distributed iii)Active and Passive elements iv) Time varient and time invarient system	CO1	L4
11	Define the following i)Dependent and independent sources ii) deterministic and random elements	CO1	L4
12	Write a a note on i)voltage controlled voltage source ii)current controlled voltage source iii) voltage controlled current source iv) current controlled current source	CO1	L4
e	**Experiences**		
1			
2			
3			
4			
5			

Module – 2

Title:	Divide and Conquer	Appr Time:	10 Hrs
a	***Course Outcomes***	-	**Blooms**
-	The student should be able to:	-	**Level**

1	Apply various network theorems to determine the circuit response / behavior	CO3	L3
2	Solve complex electric circuits using network theorems	CO4	L3,L4
b	***Course Schedule***	-	-
Class No	**Module Content Covered**	**CO**	**Level**
11	Introduction to Network Theorems:Super Position Theorem	CO3	L2
12	Problems	CO3	L3
13	Reciprocity theorem	CO3	L4
14	Problems	CO3	L4
15	Thevenin's Theorem,	CO3	L3
16	Problems	CO4	L4
17	Norton's Theorem	CO4	L4
18	Problems	CO4	L4
19	Analysis of networks, with and without dependent ac and dc sources.	CO4	L4
20	Problems	CO4	L4
c	**Application Areas**	**CO**	**Level**
1	audio amplifier driving a speaker as that is an analogous situation.	CO3	L4
2	nonlinear resistive circuits ,	CO4	L4
d	**Review Questions**	-	-
19	State and explain thevenins theorem.	CO3	L3
20	Obtain the norton's equivalent of the network shown in fig,	CO3	L4
21	State and explain maximum power transfer theorem for AC network	CO4	L3
22	State and explain Nortons theorem.	CO3	L3
23	Calculate the thevenin's equivalent circuit across A,B terminals for the network shown in fig below,	CO3	L4
24	Obtain the condition for an alternating voltage source to transfer in power to the load when the load impedance is the complex conjugate of the source impedance.	CO4	L3
25	Find the current i1, in the circuit show in Fig.Q.3(a) by applying superposition theorem	CO3	L4

	figQ.3(a)		
26	For the network shown in Fig.Q.4(a), obtain the Norton's equivalent as seen from the terminals a - b.	CO4	L4
27	Determine the current I_2 by applying Millman's theorem for the network shown in Fig.Q.4(b). Fig.Q.4(b).	CO4	L4
28	Using Norton's theorem, find RN and IN of the circuit in Figure at terminals a-b.	CO3	L4
29	Use the superposition theorem to find v in the circuit of below Figure	CO3	L4
30	Find the Thevenins equivalent with respect to terminals a-b in the circuit shown in Fig	CO3	L4
31	Find the current through 4Ω resistor in the Figure shown below using superposition theorem.	CO3	L4

32	Obtain Thevenin's equivalent network for the Figure shown below.	CO3	L4
33	For the circuit shown in Figure find the load impedance Z_L that absorbs the maximum average power. Calculate that maximum average power	CO4	L4
34	Find $i0$ in the circuit of Figure using superposition theorem.	CO3	L4
35	State the limitations for Thevenin's theorem.	CO3	L2
e	**Experiences**	-	-
1			
2			
3			
4			
5			

E1. CIA EXAM – 1

a. Model Question Paper - 1

Crs Code:	18EE32	Sem:	3	Marks:	30	Time:	75 minutes
Course:	Electrical circuit Analysis						

-	-	**Note: Answer any 3 questions, each carry equal marks.**	**Marks**	**CO**	**Level**
1	a	Calculate the current in 20Ω resistor in the network shown in fig.1 by sourse transformation method.	5	CO1	L4
	b	Obtain Expressions for a set of Equivalent delta connected impedances to replace a set of star connected impedances.	5	CO2	L3
	c	State and explain thevenins theorem.	5	CO3	L3
2	a	Reduce the network shown in fig.2a. to a single voltage source in series with a resistance using source shifting and transformation.	5	CO1	L4
	b	Determine the current through 10 Ω resistance in the network shown in fig.2b. by Star-Delta conversion.	5	CO2	L4
	c.	Obtain the norton's equivalent of the network shown in fig,	5	CO4	L4
3	a	For the network shown in fig.3a, find the node voltages.	5	CO2	L4
	b	Solve for Mesh current in the fig. 3b given below,	5	CO1	L4
	c.	Calculate the thevenin's equivalent circuit across A,B terminals for the network shown in fig below,	5	CO3	L4

4	a	Obtain the delta connected equivalent of the network shown in fig.4a	5	CO2	L4
	b	Find the power delivered by the 6V source in the circuit shown in fig.4b using Mesh analysis.	5	CO3	L4
	c	State and explain maximum power transfer theorem for AC network	5	CO4	L3

b. Assignment -1

Note: A distinct assignment to be assigned to each student.

Model Assignment Questions							
Crs Code:	18EE32	Sem:	3	Marks:	5 / 10	Time:	90 – 120 minutes
Course:	Electrical circuit Analysis						
Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.							

SNo	USN	Assignment Description	Marks	CO	Level
1	1KT17EE002	Calculate the current in 20Ω resistor in the network shown in fig.1 by sourse transformation method.	5	CO1	L4
2	1KT17EE003	Obtain Expressions for a set of Equivalent delta connected impedances to replace a set of star connected impedances.	5	CO2	L3
3	1KT17EE004	Reduce the network shown in fig.2a. to a single voltage source in series with a resistance using source shifting and transformation.	5	CO1	L4
4	1KT17EE006	Determine the current through 10 Ω resistance in the network shown in fig.2b. by Star-Delta conversion.	5	CO2	L4

5	1KT17EE007	For the network shown in fig.3a, find the node voltages.	5	CO2	L4
6	1KT17EE008	Solve for Mesh current in the fig. 3b given below,	5	CO1	L4
7	1KT17EE010	Obtain the delta connected equivalent of the network shown in fig.4a	5	CO2	L4
8	1KT17EE011	Find the power delivered by the 6V source in the circuit shown in fig.4b using Mesh analysis.	5	CO3	L4
9	1KT17EE014	Find the three unknown currents in the circuit shown in Fig.Q.1(a) using mesh analysis. Fig.Q.1(a)	5	CO1	L4
10	1KT17EE015	Find V. in the circuit diagram shown in Fig.Q.1(b) using source transformation Fig.Q.1(b)	5	CO2	L4
11	1KT16EE002	Determine the equivalent resistance between the terminals AB for the network shown in Fig.Q.2(a).	5	CO1	L4

12	1KT16EE010	Find the node voltage VI, V2 and V3 in circuit diagram shown in Fig.Q.2(b) using nodal analysis. Fig.Q.2(b)	5	CO2	L4
13	1KT16EE024	Define the following, i)Linear and Non linear elements , ii) Lumped and distributed iii)Active and Passive elements iv) Time variant and time invariant system	5	CO1	L2
14	1KT18EE400	Define the following i)Dependent and independent sources ii) deterministic and random elements	5	CO1	L2
15	1KT18EE401	Write a a note on i)voltage controlled voltage source ii)current controlled voltage source iii) voltage controlled current source iv) current controlled current source	5	CO1	L2
16	1KT17EE002	State and explain thevenins theorem.	5	CO3	L4
17	1KT17EE003	Obtain the norton's equivalent of the network shown in fig,	5	CO3	L4
18	1KT17EE004	State and explain maximum power transfer theorem for AC network.	5	CO4	L4
19	1KT17EE006	State and explain Nortons theorem.	5	CO4	L4
20	1KT17EE007	Calculate the thevenin's equivalent circuit across A,B terminals for the network shown in fig below,	5	CO3	L4
21	1KT17EE008	Obtain the condition for an alternating voltage source to transfer in power to the load when the load impedance is the complex conjugate of the source impedance.	5	CO4	L4
22	1KT17EE010	Find the current i1, in the circuit show in Fig.Q.3(a) by	5	CO4	L4

		applying superposition theorem figQ.3(a)			
23	1KT17EE011	For the network shown in Fig.Q.4(a), obtain the Norton's equivalent as seen from the terminals a - b.	5	CO3	L4
24	1KT17EE014	Determine the current I_2 by applying Millman's theorem for the network shown in Fig.Q.4(b). Fig.Q.4(b).	5	CO3	L4
25	1KT17EE015	Using Norton’s theorem, find RN and IN of the circuit in Figure at terminals a-b.	5	CO3	L4
26	1KT16EE002	Use the superposition theorem to find v in the circuit of below Figure	5	CO4	L4
27	1KT16EE010	Find the Thevenins equivalent with respect to terminals a-b in the circuit shown in Fig	5	CO3	L4
28	1KT16EE024	Find the current through 4Ω resistor in the Figure shown below using superposition theorem.	5	CO4	L4

29	1KT18EE400	Obtain Thevenin's equivalent network for the Figure shown below.	5	CO3	L4
30	1KT18EE401	For the circuit shown in Figure find the load impedance ZL that absorbs the maximum average power. Calculate that maximum average power	5	CO4	L4

D2. TEACHING PLAN - 2

Module - 3

Title:	Divide and Conquer	Appr Time:	16 Hrs
a	***Course Outcomes***	-	**Blooms**
-	The student should be able to:	-	**Level**
1	Apply the knowledge of resonance for series and parallel RLC circuit and calculation of various electrical quantities for 3 phase circuits	CO5	L3
2	To study necessary conditions for driving point functions , transfer function for their application to a given network for analyzing circuit design.	CO6	L4
b	***Course Schedule***		
Class No	**Module Content Covered**	**CO**	**Level**
1	Introduction to Resonant Circuits,	CO5	L2
2	Analysis of simple series RLC and parallel RLC circuits under resonances.	CO5	L4
3	Problems on Resonant frequency	CO5	L3,L4
4	Bandwidth and Quality factor at resonance	CO5	L2
5	Problems	CO5	L3,L4
6	Transient analysis of RL and RC circuits under dc and ac excitations	CO6	L3

7	Problems	CO6	L3,L4
8	Behaviour of circuit elements under switching action	CO6	L4
9	Problems	CO6	L3,L4
10	Evaluation of initial conditions	CO6	L3,L4
c	**Application Areas**	**CO**	**Level**
1	Tuning application, resonator.	CO5	L4
2	Voltage regulator .	CO6	L4
d	**Review Questions**	-	
1.	A Coil with R= 10 Ω and L =0.2 H is in series with a capacitor of 20 micro Farad. Determine the Resonant Frequency, Q-factor and Band width.	CO5	L4
2	An RLC series circuit with a resistance of 10 Ω, inductance of 0.2H and a capacitance of 40 μF is applied with a 100 V supply at variable frequency. Find the following with respect to the series resonant circuit (a) Frequency at which resonance takes place (b) Current (c) Power (d) Power factor (e) Quality factor (f) Half power frequencies.	CO5	L4
3	Determine the current supplied by the source at resonance for the circuit shown in Figure	CO5	L4
4	A series RLC circuit is excited from a constant voltage variable frequency source. The current in the circuit becomes maximum at a frequency of 600/2π Hz and falls half the maximum value at 400/2π Hz. If the resistance in the circuit is 3Ω, find L and C.	CO5	L4
5	Find C which results in resonance in the circuit shown in Figure when ω=5000rad/s.	CO5	L4
6	A series RLC circuit has the values: R=10 Ω, L=0.01H, C=100μF. Calculate resonant frequency, quality factor, bandwidth, and the half-power frequencies.	CO5	L4

7	In the network shown in the Figure 7 find the value of C for resonance to take place when ω =500 rad/sec	CO5	L4
8	Write the expression for impedance of R-L-C series circuit. When does it have minimum impedance? Define Q-factor. Find the Q-factor for an inductor and capacitor.	CO5	L4
9	A coil of inductance 0.1H and resistance of 10Ω is connected in series with a capacitor of 0.1μF. Find frequency of resonance of the circuit. Also find quality factor of the circuit at resonance.	CO5	L4
10	An inductance of 0.5 H, a resistance of 5 ohm, and a series across a 220v resonates. Find the current at resonance, b the voltage across capacitance at resonance.	CO5	L4
11	Why the net voltage across L and C in a series R-L-C series circuit under resonance is zero.	CO5	L4
12	An R- L circuit has R= 1 ohms, L=0.00955 H. Calculate the value of series capacitor which converts the circuit to a R-L-C series circuit taking double the value of original current. Assume 50 Hz supply. Supply voltage is kept constant.	CO5	L4
13	A series RLC circuit with R=100W, L = 0.5H, C=40μF has an applied voltage of 100Ð00with variable frequency. Calculate the resonance frequency, current at resonance and voltage across R, L, and C. Also calculate the Q-factor, upper and lower cutoff frequencies.	CO5	L4
14	Two coupled coils with respect to self inductances L1 = 0.6 H, L2 = 0.4 H having a K = 0.4. Coil 2 has 100 turns. The current in coil 1 is I1 =10sin200t Amperes. Determine the voltage at coil 2 and maximum flux set up by coil 1.	CO5	L4
15	With respect to series resonant circuit, prove that bandwidth is inversely proportional to the Q-factor at resonance	CO5	L4
16	Switch k is opened at time t=0 after reaching steady state in the circuit shown in fig, Find V_k, dV_k/dt and d^2V_k/dt^2 at time $t=0^+$	CO6	L4
17	In the circuit shown in fig switch is open at time t=0. Find the values of V,dV/dt and d^2V/dt^2 at $t=0^+$	CO6	L4

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Prepared by

Checked by

Approved

18	A switch is closed at time t=0 in the circuit shown in fig below , Find the values of i_1,i_2, di_1/dt, di_2/dt at the time $t=0^+$	CO6	L4
19	Switch K is opened after the circuit has reached steady state at t=0 in the network shown in figure. Find the expression for V2(t) for time t>0.	CO6	L4
e	**Experiences**		
1			
2			
3			
4			
5			

Module – 4

Title:	Divide and Conquer	Appr Time:	16 Hrs
a	*Course Outcomes*	-	**Blooms**
-	The student should be able to:	-	**Level**
1	Evaluate the initial conditions using knowledge of Laplace transformation	05	L4
2	Synthesize typical waveforms using Laplace transformation	05	L3
b	*Course Schedule*		
Class No	**Module Content Covered**	**CO**	**Level**
1	Introduction to Laplace transformation (LT)	CO7	L1
2	LT of Impulse, Step, Ramp, Sinusoidal signals and shifted functions	CO7	L2,L3
3	Problems	CO7	L3,L4
4	Problems	CO7	L3,L4
5	Waveform synthesis	CO8	L3
6	Problems	CO8	L3,L4

7	Problems	CO8	L3,L4
8	Initial and Final value theorems	CO8	L3
9	Problems	CO8	L3,L4
10	Problems	CO8	L3,L4
c	**Application Areas**	**CO**	**Level**
1	Process Controls , Digital Signal Processing.	CO7	L3,L4
2	System Modelling ,Analysis of Electrical Circuits ,Nuclear Physics.	CO8	L3,L4
d	**Review Questions**	-	-
1	Using Laplce transform obtain an expression for the current i(t) in the network of shown fig, Assume zero critical conditions.	CO7	L1
2	For the critically related network of the fig shown, obtain expression for the current i(t). use laplace transform.	CO7	L3
3	Determine the laplace transform of the periodic sawtooth waveform of given fig.Use gate function.	CO8	L2
4	Find i(t) using Laplace transforms switch is closed at time t = 0 with zero initial conditions	CO7	L4
5	Find Laplace transform of the following fi.111ctions i) sin ωt ii) cos ωt iii)te^{-at}	CO8	L2
6	State and prove initial value theorem.	CO8	L5
7	In the circuit shown in Fig. find the expression for current if switch is closed at t =0. Assume initial charge on capacitance is zero.	CO8	L2

8	Find inverse Laplace transform of the following functions . i) $S^2+5/S(S^2-+4S+4)$ ii)$2S+6/S^2+6S+25$	CO7	L3
9	Using initial and final value theorems, where they apply, find f(O) and $f(\infty)$ for the following functions. i) $S^3+7S^2+5/S(S^3+3S^2+4S+2)$ ii)S(S+ 4) (S + 8)/(S+ l)(S+ 6)	CO7	L4
10	Obtain the Laplace transform of , i)Ramp function t u(t) ii)Exponential function e^{-at} u(t) iii) sinusoidal function sinωt u(t)	CO8	L1
e	**Experiences**	-	-
1			
2			
3			
4			
5			

E2. CIA EXAM – 2

a. Model Question Paper - 2

Crs Code:	18EE32	Sem:	3	Marks:	30	Time:	75 minutes
Course:	Design and Analysis of Algorithms						

-	-	Note: Answer any 2 questions, each carry equal marks.	Marks	CO	Level
1	a	Derive the expression for parallel resonance circuit, containing resistance in both branches. Also show that the circuit will resonate at all frequencies if $R_L=Rc=\sqrt{(L/C)}$.	4	CO5	L3
	b	A series RLC circuit consists of R=100Ω, L=0.02H & C=0.02μF.calculate frequency of resonance.A variable frequency sinusoidal voltage of value 50V is applied to the circuit. Find the frequency at which voltage across L&C is maximum. Also calculate voltage across L& C at frequency of resonance. Find maximum current in the circuit.	3	CO5	L3
	c	Switch k is opened at time t=0 after reaching steady state in the circuit shown in fig, Find V_k, dV_k/dt and d^2V_k/dt^2 at time $t=0^+$	5	CO6	L3

	d	Find inverse Laplace transform of the following functions i)$S^2+5/(s(s^2+4s+4))$ ii) $2S+6/(S^2+6S+25)$	4	CO6	L3
2	a	Derive for a resonant circuit the resonant frequency $fo=\sqrt{f1.f2}$, where f1 & f2 are the 2 half-power frequencies.	3	CO7	L2
	b	Find the value of L for which the circuit given in the fig below resonates at ω=5000rad/sec.	4	CO5	L4
	c	In the circuit shown in fig switch is open at time t=0. Find the values of V,dV/dt and d^2V/dt^2 at $t=0^+$.	4	CO6	L3
	d	using initial and final value theorem , where they apply, find f(0) and f(∞) for the following functions i)$S^3+7S^2+5/(S(S^3+3S^2+4S+2))$ ii) $S(S+4)(S+8)/(S+1)(S+6)$	4	CO7	L3
3	a	In the circuit shown in fig, find the current i(t). The current has reached steady state with switch closed and switch is open at t=0.	5	CO7	L4
	b	Obtain the Laplace transform of , i)Ramp function t u(t) ii)Exponential function e-at u(t) iii) sinusoidal function sinωt u(t)	3	CO8	L4
	c	A switch is closed at time t=0 in the circuit shown in fig below , Find the values of i_1,i_2, di_1/dt, di_2/dt at the time $t=0^+$	4	CO6	L1
	d	Find i(t) using Laplace transforms switch is closed at time t=0 with zero initial conditions	4	CO7	L2

4	a	Switch K is opened after the circuit has reached steady state at t=0 in the network shown in figure. Find the expression for V2(t) for time t>0.	4	CO6	L4
	b	In the circuit shown in fig the relay is adjusted to operate at a current of 5A. Switch is closed at time t=0 and relay is found to operate at t=0.347sec. Find the value of inductance .	4	CO6	L4
	c	Using convolution theorem find the inverse Laplace transform of following functions, i)F(s)=$1/(s-a)^2$ and ii) F(s)= 1/S(S+1)	3	CO7	L3
	d	Obtain the Laplace transform of the triangular wave shown in fig	4	CO8	L3

b. Assignment – 2

Note: A distinct assignment to be assigned to each student.

Model Assignment Questions							
Crs Code:	18EE32	Sem:	3	Marks:	5 / 10	Time:	90 – 120 minutes
Course:							
Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.							

SNo	**USN**	**Assignment Description**	**Marks**	**CO**	**Level**
1	1KT17EE002	Using Laplce transform obtain an expression for the current i(t) in the network of shown fig, Assume zero	5	CO	

		critical conditions.			
2	1KT17EE003	For the critically related network of the fig shown, obtain expression for the current i(t). use laplace transform.	5	CO	
3	1KT17EE004	Switch K is opened after the circuit has reached steady state at t=0 in the network shown in figure. Find the expression for V2(t) for time t>0.	5	CO	
4	1KT17EE006	In the circuit shown in fig the relay is adjusted to operate at a current of 5A. Switch is closed at time t=0 and relay is found to operate at t=0.347sec. Find the value of inductance .	5	CO	
5	1KT17EE007	Using convolution theorem find the inverse Laplace transform of following functions, i)$F(s)=1/(s-a)^2$ and ii) $F(s)= 1/S(S+1)$	5	CO	
6	1KT17EE008	Obtain the Laplace transform of the triangular wave shown in fig	5	CO	
7	1KT17EE010	A switch is closed at time t=0 in the circuit shown in fig below , Find the values of i_1,i_2, di_1/dt, di_2/dt at the time $t=0^+$	5	CO	

8	1KT17EE011	Find i(t) using Laplace transforms switch is closed at time t=0 with zero initial conditions	5	CO	
9	1KT17EE014	In the circuit shown in fig, find the current i(t). The current has reached steady state with switch closed and switch is open at t=0.	5	CO	
10	1KT17EE015	Find inverse Laplace transform of the following functions i)$S^2+5/(s(s^2+4s+4))$ ii) $2S+6/(S^2+6S+25)$	5	CO	
11	1KT16EE002	Find the expression for the resultant current i(t) when switch K is closed at t=0 in fig below	5	CO	
12	1KT16EE010	Find the Laplace transform of the given function $f(t)=5+4e^{-2t}$	5	CO	
13	1KT16EE024	Find the LT of the sawtooth waveform shown in fig.	5	CO	
14	1KT18EE400	State and prove initial value and final value theorem	5	CO	
15	1KT18EE401	Obtain the laplace transform of the saw tooth waveform shown in fig.	5	CO	
16	1KT17EE002	Find the laplace transform of i)t ii) δ(t)	5	CO	

17	1KT17EE003	Using Laplce transform obtain an expression for the current i(t) in the network of shown fig, Assume zero critical conditions.	5	CO	
18	1KT17EE004	For the critically related network of the fig shown, obtain expression for the current i(t). use laplace transform.	5	CO	
19	1KT17EE006	Switch K is opened after the circuit has reached steady state at t=0 in the network shown in figure. Find the expression for V2(t) for time t>0.	5	CO	
20	1KT17EE007	In the circuit shown in fig the relay is adjusted to operate at a current of 5A. Switch is closed at time t=0 and relay is found to operate at t=0.347sec. Find the value of inductance .	5	CO	
21	1KT17EE008	Using convolution theorem find the inverse Laplace transform of following functions, i)F(s)=1/(s-a)^2 and ii) F(s)= 1/S(S+1)	5	CO	
22	1KT17EE010	Obtain the Laplace transform of the triangular wave shown in fig	5	CO	
23	1KT17EE011	A switch is closed at time t=0 in the circuit shown in fig	5	CO	

		below , Find the values of i_1,i_2, di_1/dt, di_2/dt at the time $t=0^+$			
24	1KT17EE014	Find i(t) using Laplace transforms switch is closed at time t=0 with zero initial conditions	5	CO	
25	1KT17EE015	In the circuit shown in fig, find the current i(t). The current has reached steady state with switch closed and switch is open at t=0.	5	CO	
26	1KT16EE002	Find inverse Laplace transform of the following functions i)$S^2+5/(s(s^2+4s+4))$ ii) $2S+6/(S^2+6S+25)$	5	CO	
27	1KT16EE010	Find the expression for the resultant current i(t) when switch K is closed at t=0 in fig below	5	CO	
28	1KT16EE024	Find the Laplace transform of the given function $f(t)=5+4e^{-2t}$	5	CO	
29	1KT18EE400	Find the LT of the sawtooth waveform shown in fig.	5	CO	
30	1KT18EE401	State and prove initial value and final value theorem	5	CO	

D3. TEACHING PLAN - 3

Module - 5

Title:	Divide and Conquer	Appr Time:	16 Hrs
a	***Course Outcomes***	-	**Blooms**
-	The student should be able to:	-	**Level**
1	Solve unbalanced three phase systems.	5	L4
2	Evaluate the performance of two port networks	5	L4
b	***Course Schedule***		
Class No	**Module Content Covered**	**CO**	**Level**
1	Analysis of three phase systems	CO9	L2
2	calculation of real and reactive powers.	CO9	L2
3	Problems	CO9	L2
4	Problems	CO9	L4
5	Two Port networks: Definition	CO10	L4
6	Open circuit impedance	CO10	L4
7	Problems	CO10	L4
8	Short circuit admittance	CO10	L3
9	Problems	CO10	L4
10	Transmission parameters and their evaluation for simple circuits.	CO10	L4
c	**Application Areas**	**CO**	**Level**
1	Modeling and control of three phase system	CO9	L4
2	amplification circuits and filters	CO10	L4
d	**Review Questions**	-	-
1	A star connected load with (3+j0) Q (2+j3)n and (2-j)n connected in 3-ph, 4 wires, Y connected system with phase sequence ACB. Find line currents and neural current.	CO9	L2
2	Explain the concept of unbalanced load. State various types of unbalanced loads.	CO9	L2
3	Derive the condition for the symmetrical property in two port networks in case of admittance parameters.	CO9	L2
4	Determine the hybrid parameters for the network shown in the figure below	CO9	L3
5	A three phase delta connected balanced supply 200V is connected to a star connected unbalanced load of impedances(2+3j),(4-6j)and (2-5j)find the	CO9	L3

	line currents.		
6	Explain in detail about the Loop method of solving three phase unbalanced circuits	CO9	L4
7	Derive the condition for the reciprocal property in two port networks in case of ABCD parameters	CO10	L4
8	Determine the impedance parameters for the network shown in the figure below	CO10	L4
9	Derive the condition for the symmetrical property in two port networks in case of hybrid parameters	CO10	L4
10	Determine the transmission parameters for the network shown in the figure below	CO10	L4
e	**Experiences**	-	-
1			
2			
3			
4			
5			

E3. CIA EXAM – 3

a. Model Question Paper - 3

Crs Code:	18EE32	Sem:	3	Marks:	30	Time:	75 minutes
Course:	Electrical circuit analysis						

-	-	**Note: Answer any 2 questions, each carry equal marks.**	**Marks**	**CO**	**Level**
1	a	Explain the method of analyzing a 3-Φstar connected load	5	CO9	L3
	b	A delta connected three phase load with impedance is connected acros a 3-ph 230V, 50Hzsymmetrical RYB supply. The impedances are (28 + jO)Q, (25 + j45)Q and (O-j65)Q. Find line and phase currents.	5	CO9	L4
2	a	A star connected load with (3+j0) Q (2+j3) n and (2 - j l) n connected	5	CO9	L4

		in 3-ph, 4 wires, Yconnected system with phase sequence ACB. Find line currents and neural current			
	b	Explain the concept of unbalanced load. State various types of unbalanced loads	5	CO9	L3
3	a	Find z parameters of the circuit shown in Fig,	5	CO10	L4
	b	Find 'T' parameters of the circuit in Fig	5	CO10	L3
4	a	Define h and T parameters of a two port network. Also, derive the expressions for h parameters in terms of T	5	CO10	L3
	b	Find Y and Z parameters for the network shown in fig	5	CO10	L4

b. Assignment – 3

Note: A distinct assignment to be assigned to each student.

Model Assignment Questions							
Crs Code:	18EE32	Sem:	3	Marks:	5 / 10	Time:	90 – 120 minutes
Course:	Electric circuit analysis						
Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.							

SNo	USN	Assignment Description	Marks	CO	Level
1	1KT17EE002	A star connected load with (3+j0) Q (2+j3)n and (2-j)n connected in 3-ph, 4 wires, Y connected system with phase sequence ACB. Find line currents and neural current.	5	CO9	L4
2	1KT17EE003	Explain the concept of unbalanced load. State various types of unbalanced loads.	5	CO9	L3

3	1KT17EE004	Find 'T' parameters of the circuit in Fig.	5	CO10	L4
4	1KT17EE006	Explain the method of analyzing a 3-ph star connected load by using Millman's theorem	5	CO9	L3
5	1KT17EE007	A delta connected three phase load with impedance is connected across a 3-ph 230V, 50Hzsymmetrical RYB supply. The impedances are (28 + jO)Q, (25 + j45)Q and (O-j65)Q. Find line and phase currents.	5	CO10	L4
6	1KT17EE008	Find z parameters of the circuit shown in Fig	5	CO10	L4
7	1KT17EE010	Define Z and Y parameters.	5	CO10	L3
8	1KT17EE011	Find the T parameters for the 2-port network shown in the Fig.9(c).	5	CO10	L4
9	1KT17EE014	An unbalanced 3-phase, 4-wire star connected load, has balanced voltages of 208V with ABC phase sequence. Calculate the line currents and the neutral current. Z_A= 10, Z_B = 15 30^{O} 0, Z_c= 10 -30°	5	CO9	L4
10	1KT17EE015	Find the response i(t) when input signal i) 5δ(t – 2) ii) 5u(t – 2) is given to R-L series Circuit. Assume initial current through the inductor to be zero.	5	CO9	L4
11	1KT16EE002	A series RLC circuit has for its driving point admittance pole-zero diagram as shown in Fig.Find the valves of R – L – C	5	CO9	L4
12	1KT16EE010	Define h and T parameters of a two port network. Also, derive the expressions for h parameters in terms of T	5	CO10	L4
13	1KT16EE024	Find Y and Z parameters for the network shown in fig	5	CO10	L4

14	1KT18EE400	Derive Y-parameters and Transmission parameters of a circuit in terms of its parameters.	5	CO10	L4
15	1KT18EE401	Find the z parameters and h - parameters for the circuit shown in Fig. Q8(b)		CO10	L4
16	1KT17EE002	A star connected load with (3+j0) Q (2+j3)n and (2-j)n connected in 3-ph, 4 wires, Y connected system with phase sequence ACB. Find line currents and neural current	5	CO9	L4
17	1KT17EE003	Explain the concept of unbalanced load. State various types of unbalanced loads.	5	CO9	L4
18	1KT17EE004	Find 'T' parameters of the circuit in Fig.	5	CO10	L4
19	1KT17EE006	Explain the method of analyzing a 3-ph star connected load by using max power transfer theorem	5	CO9	L3
20	1KT17EE007	A delta connected three phase load with impedance is connected across a 3-ph 230V, 50Hzsymmetrical RYB supply. The impedances are (28 + jO)Q, (25 + j45)Q and (O-j65)Q. Find line and phase currents.	5	CO9	L4
21	1KT17EE008	Find z parameters of the circuit shown in Fig	5	CO10	L3
22	1KT17EE010	Define Z and Y parameters.	5	CO10	L3
23	1KT17EE011	Find the T parameters for the 2-port network shown in the Fig.9(c).	5	CO10	L4

24	1KT17EE014	An unbalanced 3-phase, 4-wire star connected load, has balanced voltages of 208V with ABC phase sequence. Calculate the line currents and the neutral current. Z_A= 10, Z_B = 15 30^O 0, Z_c= 10 -30°	5	CO9	L4
25	1KT17EE015	An unbalanced 3-phase, 4-wire star connected load, has balanced voltages of 208V with ABC phase sequence. Calculate the line currents and the neutral current. Z_A= 10, Z_B = 15 30^O 0, Z_c= 10 -30°	5	CO9	L4
26	1KT16EE002	Find the response i(t) when input signal i) 5δ(t – 2) ii) 5u(t – 2) is given to R-L series Circuit. Assume initial current through the inductor to be zero.	5	CO9	L3
27	1KT16EE010	A series RLC circuit has for its driving point admittance pole-zero diagram as shown in Fig.Q.10(a). Find the valves of R - L - C	5	CO9	L4
28	1KT16EE024	Find Y and Z parameters for the network shown in fig	5	CO10	L4
29	1KT18EE400	Derive Y-parameters and Transmission parameters of a circuit in terms of its parameters.	5	CO10	L4
30	1KT18EE401	Find the z parameters and h – parameters for the circuit shown in Fig.	5	CO10	L4

F. EXAM PREPARATION

1. University Model Question Paper

Course:	Elecctrical circuit analysis	Month / Year	DEC/2018

Crs Code:	18EE32	Sem:	3	Marks:	60	Time:	180 minutes

-	**Note**	Answer all FIVE full questions. All questions carry equal marks.	**Marks**	**CO**	**Level**
1	a	Find the three unknown currents in the circuit shown in Fig.Q.1(a) using mesh analysis. Fig.Q.1(a)	10	CO1	L4
	b	Find V. in the circuit diagram shown in Fig.Q.1(b) using source transformation Fig.Q.1(b)	10	CO2	L4
		OR			
2	a	Determine the equivalent resistance between the terminals AB for the network shown in Fig.Q.2(a).	4	CO1	L4
	b	Find the node voltage VI, **V2** and **V3** in circuit diagram shown in Fig.Q.2(b) using nodal analysis. Fig.Q.2(b)	10	CO2	L4
	c	A series connected RLC circuit has It = 40, L = 25mH. Calculate the value of C such that _Q = 50. Also find resonant frequency, half power frequencies	6	CO2	L4
3	a	Find the current i1, in the circuit show in Fig.Q.3(a) by applying superposition theorem	6	C03	L4

		figQ.3(a)			
	b	Obtain the condition for an alternating voltage source to transfer in power to the load when the load impedance is the complex conjugate of the source impedance.	4	CO3	L3
	c	Find the voltage 'V_s' and apply reciprocity theorem to the network shown in Fig.Q.3(c).	6	CO4	L4
		OR			
4	a	For the network shown in Fig.Q.4(a), obtain the Norton's equivalent as seen from the terminals a – b.	10	CO3	L4
	b	Determine the current **I_2** by applying Millman's theorem for the network shown in Fig.Q.4(b). Fig.Q.4(b).	10	CO4	L4
5	a	Show the behaviour of R, L, C elements at the time of switching at t = 0 both at t = 0^+ and **t** = infinate	10	CO5	L4
	b	Determine i, di/dt and d^2i/dt^2 at t = 0^+ when the switch K is moved from position 1 to 2 at t = 0 for the network shown in Fig.Q.5(b).	10	CO4	**L4**
6	a	In the network shown in Fig. a steady state is reached with switch 'K' open. At time t = 0, the switch is closed. Find at t = 0^+ , $i_1(t)$,$i_2(t)$ and $di_1(t)/dt$.	10	CO5	L4

	b	In the network shown Fig.Q.6(b) K is closed at t = 0 with zero current in the inductor. Find:i(t), di(t)/dt at t = 0^+ and obtain an expression for i(t) at t >= 0^+ by classical method.	10	CO6	L4
7	a	State and prove shifting theorem	6	CO7	L3
	b	Find the Laplace transform of the waveform shown in Fig.Q.7(b).	4	CO7	L4
	c	Apply the initial and final value theorem respectively to the s-domain equations of $I_1(s)$ and $I_2(s)$ given,	6	C08	L4
		OR			
8	a	Find the Laplace transform of the shifted function given i)10u(t- 2) ii) 10 δ(t-2) iii) 10r(t-2)u(t-2) iv)10sin(t-2) u(t-2). Also sketch these functions.	10	CO7	L4
	b	Find the Laplace transform of the waveform shown in Fig.Q.8(b).	10	CO8	L4
9	a	An unbalanced 3-phase, 4-wire star connected load, has balanced voltages of 208V with ABC phase sequence. Calculate the line currents and the neutral current. Z_A= 10, Z_B = 15 30^O 0, Z_c= 10 -30°	10	CO9	L4
	b	Define Z and Y parameters.	4	CO10	L4

	c	Find the T parameters for the 2-port network shown in the Fig.9(c).	6	CO10	L4
		OR			
10	a	A series RLC circuit has for its driving point admittance pole-zero diagram as shown in Fig.Q.10(a). Find the valves of R - L - C.	10	CO9	L4
	b	Find the response i(t) when input signal i) 5δ(t - 2) ii) 5u(t - 2) is given to R-L series Circuit. Assume initial current through the inductor to be zero.	10	CO10	L4

2. SEE Important Questions

Course:	Electrical circuit analysis					Month / Year	May /2018
Crs Code:	18EE32	Sem:	3	Marks:	60	Time:	180 minutes

	Note	Answer all FIVE full questions. All questions carry equal marks.	-	-	
Module	Qno.	Important Question	**Marks**	**CO**	**Year**
1	1	Transform the network given in Fig Ql(a) in to a single voltage source using source transformation technique.	6	CO1	2017
	2	Find the currents i_1, i_2 and i_3 in the network given Fig Ql(b)using mesh analysis	7	CO1	2017
	3	Find current through 0.5Q resistance in the Fig Ql(c) using node	8	CO2	2017

		analysis			
	4	Find the three unknown currents in the circuit shown in Fig. using mesh analysis	6	CO2	2016
	5	Find V. in the circuit diagram shown in Fig.Q.1(b) using source transformation.	7	CO2	2016
2	1	State and illustrate superposition theorem.	16 / 20	CO	2017
	2	b. Obtain the current Ix in the circuit shown in Fig Q3(b) using Thevenin's theorem	6	CO3	2017
	3	Find the Norton's equivalent circuit at the terminals A and B in the network given in Fig	7	CO3	2017
	4	State and explain Maximum power transfer theorem.	8	CO4	2016
	5	Verify Reciprocity theorem for the network given in Fig	7	CO4	2016
3	1	It is required that a series RLC circuit should resonate at 500KHz. Determine the values of R, L and C if the Bandwidth of the circuit is 10KHz and its impedance is 100Ω at resonance. Also find the voltages across L and C at resonance if the applied voltage is 75 volts.	8	CO5	2006
	2	Derive an expression for the resonant frequency of a parallel resonant circuit. Also shown that the circuit is resonant at all frequencies if $R_L = R_C\sqrt{L/C}$ where R_L. = Resistance in the indicator branch,	7	CO5	2006

		Rc = Resistance in the capacitor branch.			
	3	In the circuit shown in Fig , the switch K is changed from position A to B at t=0 , steady state have been reached before switching calculate i(t),di(t)/dt, $d^2i(t)/dt^2$ at $t=0^+$	8	CO6	2007
	4	Determine i, di/dt and d^2i/dt^2 at $t = 0^+$ when the switch K is moved from position 1 to 2 at t = 0 for the network shown in Fig	8	CO6	2004
	5	In the network shown Fig. K is closed at t = 0 with zero current in the inductor. Find:i(t), di(t)/dt at $t = 0^+$ and obtain an expression for i(t) at $t >= 0^+$ by classical method.	8	CO6	2004
4	1	For the critically related network of the fig shown, obtain expression for the current i(t). use laplace transform.	7	CO7	2004
	2	Determine the laplace transform of the periodic sawtooth waveform of given fig.Use gate function.	8	CO7	2004
	3	Find Laplace transform of the following fig 1 i) sin ωt ii) cos ωt iii)te^{-at}	7	CO7	2006
	4	State and prove initial value theorem.	7	CO8	2004
	5	Using initial and final value theorems, where they apply, find f(O) and f(æ) for the following functions. i) $S^3+7S^2+5/S(S^3+3S^2+4S+2)$ ii)S(S+ 4) (S + 8)/(S+ l)(S+ 6)	8	CO8	2007
5	1	Explain the concept of unbalanced load. State various types of unbalanced loads	7	CO9	2009
	2	Find z parameters of the circuit shown in Fig,	8	CO10	2007

	3	Find 'T' parameters of the circuit in Fig	8	CO10	2007
	4	An unbalanced 3-phase, 4-wire star connected load, has balanced voltages of 208V with ABC phase sequence. Calculate the line currents and the neutral current. Z_A= 10, Z_B = 15 ∟30^O 0, Z_c= 10∟ -30°	7	CO9	2004
	5	Find the response i(t) when input signal i) 5δ(t - 2) ii) 5u(t - 2) is given to R-L series Circuit. Assume initial current through the inductor to be zero.	6	CO9	2005

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