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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:	НОД	Sign	Dt:

2. Course Content.

Mod	Module Content	Teaching	Module	Blooms
ule		Hours	Concepts	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.		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.		Network theorems	L2,L3,L 4
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

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	resonance Transient Analy	sis: Transient		and	
	analysis of RL and RC circuits under DC and		Transient		
	Behavior of circuit elements under switchin	g action,		Response	
	Evaluation of initial conditions.				
4	Laplace Transformation: Laplace transfo	ormation (LT), LT	10	S-Domain	L2,L3
	of Impulse, Step, Ramp, Sinusoidal signals	and shifted		Representation	
	functions. Waveform synthesis. Initial and F	inal value			
	theorems				
5	Unbalanced Three phase systems: A	Analysis of three	10	Three phase	L2,L3,L
	phase systems, calculation of real and reac	tive powers.		system	4
	Two Port networks: Definition, Open ci	rcuit impedance,		analysis	
	Short circuit admittance and Transmissior	parameters and			
	their evaluation for simple circuits.				

3. Course Material

Mod	Details	Available
ule		
	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	Library
	Mc Graw Hill, 5th Edition,2013.	
	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

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4. Course Prerequisites

SNo	Course	Course Name	Module / Topic / Description	Sem	Remarks	Blooms
	Code					Level
1	17EE15	Basic Electrical	DC circuits	$1^{st}/2^{nd}$		L2,L3,L4
	/17EE2			sem		
	5					
2	17EC23	Basic electronics	1. Knowledge on Passive and	$1^{st}\ / 2^{nd}$		L1
	/13		Active elements	sem		
3	_	-	2. Knowledge of fundamental of	-	Bridge course	L1
			maths		of maths for	
					students	

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

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

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.	C07	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)

<u> </u>	· · · · · · · · · · · · · · · · · · ·													
-	Course Outcomes				Р	rogr	am (Dutc	ome	s				
#	COs	PO	PO2	PO	PO	PO	PO6	PO	PO	PO9	PO	PO	PO	Level
		1		3	4	5		7	8		10	11	12	
18EE32.1	To analyze behavior of basic	3	3	-	-	-	-	-	-	-	-	-	-	L2
	circuit elements and to apply													
	concept of mesh and node													
	analysis in circuit theory													
18EE32.2	Reduce the complexity of	3	3	_	-	2	-	-	-	-	-	-	-	L3

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	source tra	ng source shifting, nsformation and reduction using ons.													
18EE32.3	theorems t	arious network o determine the nse / behavior	3	3	-	-	2	-	-	-	-	-	-	_	L4
18EE32.4	Solve compl using netwo	ex electric circuits rk theorems	3	3	_	_	2	-	-	-	-	-	-	_	L4
18EE32.5	resonance parallel R calculation c	knowledge of for series and LC circuit and of various electrical or 3 phase circuits	3	3	_	-	2	_	_	_	-	-	-	_	L3
18EE32.6	To study ne for driving transfer fu application t	cessary conditions point functions , nction for their to a given network g circuit design.	3	3	_	_	2	_	_	_	_		-	-	L3
18EE32.7	Evaluate the	initial conditions ledge of Laplace	3	3	_	_	2	_	_	_	_	_	-	_	L4
18EE32.8	-	typical waveform e transformation	3	3	-	_	2	-	-	-	_	_	-	_	L4
18EE32.9	Solve unbala systems.	anced three phase	3	3	_	_	-	_	-	-	_	-	_	_	L3
18EE32.10	Evaluate the two port net	e performance of works	3	3	-	-	-	-	-	-	-	-	-	_	L4
18EE32	Average												i T	i T	

4. Mapping Justification

Мар	ping	Justification		
CO	PO	-	-	
CO1	PO1	Knowledge of kirchoff's current and voltage law is required to estimate the current through and voltage across circuit elements.		
C01	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	

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CO2	PO2	Analyzing the complexity of the network is required to reduce i in simplified form by suitable transformation method	t 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
C07	PO1	Students will be able to learn and apply all the basic equations of maths, physics and its importance in network analysis	L3
C07	PO2	Students will be able to analyze, evaluate and design solutions to solve complex engineering problems for that , economically feasible and socially acceptable	L4
C07	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

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

Note: Write justification for each CO-PO mapping.

needs of people.

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.

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C. COURSE ASSESSMENT

1. Course Coverage

Mod	Title	Teaching		No. of	quest	ion in	Exam		CO	Levels
ule		Hours	CIA-	CIA-	CIA-	Asg	Extra	SEE		
#			1	2	3		Asg			
1	Basic Concepts	10	2	-	-	1	0	2	CO1,	L2,L3
									CO2	
2	Network theorems	10	2	-	-	1	0	2	CO3,	L2,L3,L
									CO4	4
3	Resonant Circuits and Transient	10	-	2	-	1	0	2	CO5,	L3,L4
	Analysis								CO6	
4	Laplace Transformation	10	-	2	-	1	0	2	C07,	L3,L4
									C08	
5	Unbalanced Three phase systems	10	-	-	4	1	0	2	CO9,	L3,L4
	and Two Port networks								CO10	
-	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)

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

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

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D1. TEACHING PLAN - 1

Module – 1

Title:	Divide and Conquer	Appr	16 Hrs		
		Time:			
а	Course Outcomes	-	Blooms		
-	The student should be able to:	-	Level		
1	To analyze behavior of basic circuit elements and to apply concept of	CO1 L2			
	mesh and node analysis in circuit theory				
2	Reduce the complexity of network using source shifting, source	CO2	L3		
	transformation and network reduction using transformations.				
b	Course Schedule	_	-		
Class	Module Content Covered	СО	Level		
No					
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 -	CO2	L2,L3		
	delta transformation				
8	Problems	CO2	L2,L3,L4		
9	Analysis of networks by ii)Mesh and Node voltage methods for ac and	CO2	L2,L3		
	dc circuits with independent and dependent sources				
10	Concept of Duality.	CO2	L2,L3		
c 1	Application Areas To build a network.	CO 1	Level		
2	Network reduction.	C01	L2,L3		
2		02	LZ,LJ		
d	Review Questions	_	-		
1	Calculate the current in 20Ω resistor in the network shown in fig.1 by	CO1	L4		
	sourse transformation method.				
2	Obtain Expressions for a set of Equivalent delta connected	CO2	L2		
	impedances to replace a set of star connected impedances.				

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AMGALOR	Title:	Course Plan	Page: 11 / 44					
Copyright ©20	17. cAAS. All rights reserve	[,] ed. .twork shown in fig.2a. to a single voltage source ir	n CO2	L2				
	series with a resistance using source shifting and transformation.							
4	Determine the current through 10 Ω resistance in the network shown CO1 L4							
	in fig.2b. by Sta							
5	For the networ	k shown in fig.3a, find the node voltages.	C01	L4				
6	Solve for Mesh	current in the fig. 3b given b	CO1	L4				
7	Obtain the delta co	onnected equivalent of the network shown in fig.4a	CO2	L3				
8	Find the power de analysis	elivered by the 6V source in the circuit shown in fig.4b using Mesh	n CO1	L4				
9	using mesh and	unknown currents in the circuit shown in Fig.Q.1(a)		L4				
		Fig.Q.1(a)						
10	Define the follo i)Linear and No iii)Active and F system	CO1	L4					
11	Define the following CO1 i)Dependent and independent sources ii) deterministic and random elements							
12	ii)current cont	on i)voltage controlled voltage source rolled voltage source iii) voltage controlled current rrent controlled current source	CO1	L4				
е	Experiences							
1								
2								
3								
4								
5								

Module - 2

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

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WGALOW		Page: 12 / 44		
Copyright ©20	Apply various network theorems to determine the circuit response /	CO3	L3	
	behavior	203		
2	Solve complex electric circuits using network theorems	CO4	L3,L4	
b	Course Schedule	_	_	
Class	Module Content Covered	СО	Level	
No				
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	
С	Application Areas	СО	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	
	5,			
21	State and explain maximum power transfer theorem for AC network	CO4	L3	
21 22	State and explain maximum power transfer theorem for AC network State and explain Nortons theorem.	CO4 CO3	L3 L3	
		CO3		
22	State and explain Nortons theorem. Calculate the thevenin's equivalent circuit across A,B terminals for the	CO3 CO3 CO4	L3	

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	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).	CO4	L4
28	Fig.Q.4(b). 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 <i>v</i> 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

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32	Ohtain Theven	in's equivalent network for the Figure shown below.	CO3	L4
				LT
		t shown in Figure find the load impedance Z _L that maximum average power. Calculate that maximum		L4
34	Find <i>i</i> 0 in the c	circuit of Figure using superposition theorem.	CO3	L4
35	State the limita	ations for Thevenin's theorem.	CO3	L2
е	Experiences		-	_
1				
2				
3				
4				
5				

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E1. CIA EXAM – 1

a. Model Question Paper - 1

Crs Code	۵.	18EE32	Sem:	3	Marks:	30	Time:	75 min	utes	
Cour		Flectrical	circuit Ana	lycic						
-	-			3 question	s, each ca	arry equa	al marks.	Mai	rk CO	Level
1	a		the curren		stor in the n	etwork shc	own in fig.1 by	5	CO1	L4
	b		-	s for a so ce a set of s	=		delta connec lances.	ted 5	CO2	L3
	с	State and	explain the	evenins theo	orem.			5	CO3	L3
2	a				-	-	voltage source nsformation.	ein 5	C01	L4
	b			nt through I		ance in th	e network sho	own 5	CO2	L4
	C.	Obtain the	e norton's	equivalent o	f the netwo	ork showr	ı in fig,	5	CO4	L4
3	a	For the ne	twork sho	wn in fig.3a,	find the n	ode volta	ges.	5	C02	L4
	b	Solve for I	Mesh curre	nt in the fig.	. 3b given l	pelow,		5	CO1	L4
	C.			nin's equiva n fig below,	lent circuit	across /	A,B terminals	for 5	CO3	L4

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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
	с	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.

				Mod	del Assignme	nt Question	S			
Crs C	ode:	18EE32	Sem:	3	Marks:	5 / 10	Time:	90 - 120) minu	tes
Cour	se:	Electrica	l circuit A	nalysis						
Note:	Each	student	nt carries equ	al mark.						
SNo	l	USN		As	signment De	scription		Mark	СО	Leve
								S		
1	1КТ1	7EE002			nt in 20Ω resi ransformatior		network shov	vn 5	CO1	L4
2	1KT1	7EE003	Obtain Ex impedance impedance	es to	for a set of I replace a	-	lelta connecte ar connecte		CO2	L3
3	1KT1	7EE004		series w	k shown in f rith a resista	•		-	C01	L4
4	1 KT1	7EE006			rent through ig.2b. by Star			ne 5	CO2	L4

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5	1 KT1 7EE007	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	5	CO3	L4
		shown			
		in fig.4b using Mesh analysis.			
9	1KT17EE014	Find the three unknown currents in the circuit shown in	5	C01	L4
9	IKII7EE014	Fig.Q.1(a) using mesh analysis.	J		L4
		Fig.Q.1(a)			
10	1KT17EE015	Find V. in the circuit diagram shown in Fig.Q.1(b) using source transformation	5	CO2	L4
		Fig.Q.1(b)			
11	1 KT1 6EE002	Determine the equivalent resistance between the terminals AB for the network shown in Fig.Q.2(a).	5	CO1	L4
		1			

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ANG	ALON	Title		Page: 18 / 44		
	ıt ©2017. cA	E010	^{Is reserved.} Find the node voltage VI, V2 and V3 in circuit diagram shown in Fig.Q.2(b) using nodal analysis.	5	CO2	L4
			Fig.Q.2(b)			
13	1KT16E		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		CO1	L2
14	1KT18E		Define the following i)Dependent and independent sources ii) deterministic and random elements	5	CO1	L2
15	1 KT1 8E	E401	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	C01	L2
16	1KT17E	E002	State and explain thevenins theorem.	5	CO3	L4
17	1 KT 1 7 E		Obtain the norton's equivalent of the network shown in fig,	5	CO3	L4
18	1 K T 1 7 E	E004	State and explain maximum power transfer theorem for AC network.	5	CO4	L4
19	1 K T 1 7 E	E006	State and explain Nortons theorem.	5	CO4	L4
20	1 K T 1 7 E		Calculate the thevenin's equivalent circuit across A,B terminals for the network shown in fig below,	5	CO3	L4
21	1KT17E		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	L4
22	1 K T 1 7 E		Find the current i1, in the circuit show in Fig.Q.3(a) by	5	CO4	L4

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				ving superposition theorem			
22	1//71-	755011	F	figQ.3(a)	-	602	
23	IKII			he network shown in Fig.Q.4(a), obtain the Norton's valent as seen from the terminals a – b.	5	CO3	L4
24	1KT17			rmine the current I₂ by applying Millman's theorem ne network shown in Fig.Q.4(b).	5	CO3	L4
				Fig.Q.4(b).	_		
25	1KT17			g Norton's theorem, find RN and IN of the circuit in re at terminals a-b.	5	CO3	L4
26	1KT16			the superposition theorem to find v in the circuit of v Figure	5	CO4	L4
27	1KT16			the Thevenins equivalent with respect to terminals a- the circuit shown in Fig	5	CO3	L4
28	1KT16			the current through 4Ω resistor in the Figure shown w using superposition theorem.	5	CO4	L4

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29		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		CO4	L4

D2. TEACHING PLAN – 2

Module – 3

Title:	Divide and Conquer	Appr	16 Hrs
		Time:	
а	Course Outcomes	-	Blooms
-	The student should be able to:	-	Level
1	Apply the knowledge of resonance for series and parallel RLC circuit	CO5	L3
	and calculation of various electrical quantities for 3 phase circuits		
2	To study necessary conditions for driving point functions , transfer	CO6	L4
	function for their application to a given network for analyzing circuit		
	design.		
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

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&ANGALORE	Title:	Page: 21 / 44						
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	Problems	CO6	L3,L4					
		circuit elements under switching action	CO6	L4				
	Problems		CO6	L3,L4				
10	10 Evaluation of initial conditions							
c	Application /	СО	Level					
		ation, resonator.	C05	Level L4				
	Voltage regula		CO6	L4				
	vonage regan							
d	Review Que	stions	_					
1.	A Coil with R=	= 10 Ω and L =0.2 H is in series with a capacitor of 20	CO5	L4				
		Determine the Resonant Frequency, Q-factor and Ban	b					
	width.							
		s circuit with a resistance of 10 Ω , inductance of 0.2H	CO5	L4				
	and a capacita	e						
	frequency. Find the following with respect to the series resonant							
		at which resonance takes place						
	(b) Current							
	(c) Power							
	(d) Power factor (e) Quality factor							
	(f) Half power	-						
		e current supplied by the source at resonance for the	e CO5	L4				
	circuit shown	in Figure						
4	A series RLC	circuit is excited from a constant voltage variable	e CO5	L4				
		urce. The current in the circuit becomes maximum at a						
	• •	500/2π Hz and falls half the maximum value at $400/2π$						
		stance in the circuit is 3Ω , find L and C.						
5	Find C which	results in resonance in the circuit shown in Figure when	1 CO5	L4				
	$\omega = 5000 \text{ rad/s}$	5.						
6	A series RLC	circuit has the values: R=10 Ω , L=0.01H, C=100 μ F	. CO5	L4				
	Calculate reso	onant frequency, quality factor, bandwidth, and the half	_					
	power frequer	ncies.						

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MGALO	Title:	Course Plan		Page: 22	/ 44
7			Figure 7 find the value of C fo =500 rad/sec	r CO5	L4
	does it have n	ninimum impedano	dance of R-L-C series circuit. Wher ce? Define Q-factor. Find the Q-facto		L4
9	A coil of inde series with a o	capacitor of 0.1µF	resistance of 10Ω is connected in \overline{C} . Find frequency of resonance of the final field of the circuit at resonance.		L4
10	An inductance	e of 0.5 H, a resist es. Find the currer	ance of 5 ohm, and a series across ant at resonance, b the voltage across		L4
	Why the net w under resonar	nd C in a series R-L-C series circui	t CO5	L4	
	series capacite taking double	or which converts	L=0.00955 H. Calculate the value o the circuit to a R-L-C series circui jinal current. Assume 50 Hz supply	t	L4
	voltage of 10 frequency, cui	0Đ00with variable rrent at resonance	W, L = 0.5H, C=40µF has an applied e frequency. Calculate the resonance and voltage across R, L, and C. Also d lower cutoff frequencies.	2	L4
	0.4 H having a 11 =10sin200	a K = 0.4. Coil 2 ha	to self inductances L1 = 0.6 H, L2 = as 100 turns. The current in coil 1 is ermine the voltage at coil 2 and		L4
	-		nt circuit, prove that bandwidth is factor at resonance	s CO5	L4
			0 after reaching steady state in the d^2V_k/dt^2 at time t=0 ⁺	CO6	L4
		shown in fig switch d d ² V/dt ² at t=0 ⁺	n is open at time t=0. Find the values	s CO6	L4

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Module – 4

Title:	Divide and Conquer	Appr	16 Hrs
		Time:	
а	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	Module Content Covered	СО	Level
No			
1	Introduction to Laplace transformation (LT)	C07	L1
2	LT of Impulse, Step, Ramp, Sinusoidal signals and shifted functions	C07	L2,L3
3	Problems	C07	L3,L4
4	Problems	C07	L3,L4
5	Waveform synthesis	CO8	L3
6	Problems	CO8	L3,L4

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84NGALOR	Title: Course Plan		Page: 24	/ 44
Copyright ©2	2017. cAAS. All rights reserved. Problems		CO8	L3,L4
8	Initial and Final value theorems		CO8	L3
9	Problems		CO8	L3,L4
10	Problems	CO8	L3,L4	
С	Application Areas		СО	Level
1	Process Controls , Digital Signal Processing.	C07	L3,L4	
2	System Modelling ,Analysis of Electrical Circ	uits ,Nuclear Physics.	CO8	L3,L4
d	Review Questions		-	-
1	Using Laplce transform obtain an expression network of shown fig, Assume zero critical o	CO7	LI	
2	For the critically related network of the fig for the current i(t). use laplace transform.	C07	L3	
3	Determine the laplace transform of the perigiven fig.Use gate function.	CO8	L2	
4	Find i(t) using Laplace transforms switch is zero initial conditions	s closed at time t = 0 with	C07	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 expres closed at $t = 0$. Assume initial charge on cap		CO8	L2

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8	Find inverse Laplace transform of the following functions .	C07	L3
	i) $S^2+5/S(S^2-+4S+4)$ ii) $2S+6/S^2+6S+25$		
9	Using initial and final value theorems, where they apply, find f(O) and $f(\varpi)$ 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)	C07	L4
10	Obtain the Laplace transform of , i)Ramp function t u(t)	CO8	L1
	ii)Exponential function e^{-at} u(t) iii) sinusoidal function sin ω t u(t)		
е	Experiences	-	_
1			
2			
3			
4			
5			

E2. CIA EXAM – 2

a. Model Question Paper - 2

Crs		18EE32	Sem:	3	Marks:	30	Time:	75	i minut	es	
Code	e:										
Coui	rse:	Design ar	nd Analysis	s of Algorit	hms	1	L				
-	-	Note: An	swer any	2 questio	ons, each c	arry equ	ıal marks.		Mark	CO	Level
									S		
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 $R_1 = Rc = \sqrt{(L/C)}$.								CO5	L3
	b	A series RLC circuit consists of $R=100\Omega$, $L=0.02H$ & $C=0.02\mu$ F.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.								CO5	L3
	с		-			-	teady state ir at time t=0 ⁺	ו the	5	CO6	L3

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1	ANGALORE	Title:	Course Plan	Page: 26 / 44			
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	u		(s+4)) ii) $2S+6/(S^2+6S+25)$	4	200	LJ	
		1)3 + 37 (3(3 + 4	(5+4)) II) 23+6/(5+65+23)				
2	a		resonant circuit the resonant frequency fo= $\sqrt{f1.f2}$, are the 2 half-power frequencies.	3	C07	L2	
	b	Find the value	e of L for which the circuit given in the fig below =5000rad/sec.	4	CO5	L4	
	с		hown in fig switch is open at time t=0. Find the values d d^2V/dt^2 at t=0 ⁺ .	4	CO6	L3	
	d	$f(\infty)$ for the fol	In the final value theorem , where they apply, find f(0) and lowing functions $(S^3+3S^2+4S+2))$ ii) $S(S+4)(S+8)/(S+1)(S+6)$	4	C07	L3	
3	a		shown in fig, find the current i(t). The current has state with switch closed and switch is open at t=0.	5	C07	L4	
	b c	i)Ramp functio ii)Exponential f A switch is clo	lace transform of , n t u(t) function e-at u(t) iii) sinusoidal function sinωt u(t) sed at time t=0 in the circuit shown in fig below , Find ,,i ₂ , di ₁ /dt, di ₂ /dt at the time t=0 ⁺	3	CO8 CO6	L4 L1	
	d		Laplace transforms switch is closed at time t=0 with	4	C07	L2	

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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 $t=0.347$ sec. 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	C07	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 /	Assignmer	nt Question	IS				
Crs C	ode:	18EE32	Sem:	3	Marks:	5 / 10	Time:	9	0 – 120 minutes		tes
Cours	se:										
Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.											
						•					
SNo	U	SN		Assign	nment De	-			Mark	CO	Level
SNo	U	SN		Assig		-		-	Mark s	CO	Level
			Using Laplc	-	nment De	scription			S	CO	Level

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-140	SALO	Title		Course Plan	Page:	28 / 4	4		
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2	1KT1			he critically related network of the fig shown, obtain ession for the current i(t). use laplace transform.	5	CO			
3	1KT1		state	h K is opened after the circuit has reached steady at t=0 in the network shown in figure. Find the ession for V2(t) for time t>0.	5	СО			
4	1KT1		at a c founc	e circuit shown in fig the relay is adjusted to operate current of 5A. Switch is closed at time $t=0$ and relay is d to operate at $t=0.347$ sec. Find the value of ctance .	5	CO			
5	1KT1		trans	convolution theorem find the inverse Laplace form of following functions, $=1/(s-a)^2$ and ii) F(s)= 1/S(S+1)	5	CO			
6	1KT1		Obtai in fig	n the Laplace transform of the triangular wave shown	5	CO			
7	1 KT1			itch is closed at time t=0 in the circuit shown in fig v , Find the values of $i_1, i_2, di_1/dt, di_2/dt$ at the time	5	CO			

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8		Find i(t) using Laplace transforms switch is closed at time t=0 with zero initial conditions	5	СО	
9	1 KT1 7EE014	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	СО	
10		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	1 KT1 8EE400	State and prove initial value and final value theorem	5	СО	
		Obtain the laplace transform of the saw tooth waveform shown in fig.	5	CO	
16	1KT17EE002	Find the laplace transform of i)t ii) $\delta(t)$	5	CO	

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	1	7EE003	Using curre	g Laplce transform obtain an expression for the nt i(t) in the network of shown fig, Assume zero al conditions.	5	CO	
18	1KT1			he critically related network of the fig shown, obtain ession for the current i(t). use laplace transform.	5	СО	
19	1KT1		state	h K is opened after the circuit has reached steady at t=0 in the network shown in figure. Find the ession for V2(t) for time t>0.	5	СО	
20	1 K T 1 2		at a c found	e circuit shown in fig the relay is adjusted to operate current of 5A. Switch is closed at time t=0 and relay is d to operate at t=0.347sec. Find the value of ctance .	5	CO	
21	1KT17		trans	g convolution theorem find the inverse Laplace form of following functions, $=1/(s-a)^2$ and ii) F(s)= 1/S(S+1)	5	CO	
22			in fig		5	СО	
23	1KT12	7EE011	A sw	itch is closed at time $t=0$ in the circuit shown in fig	5	CO	

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			1	v , Find the values of $i_1^{}, i_2^{}$, $di_1^{}/dt$, $di_2^{}/dt$ at the time			
24	1KT17			i(t) using Laplace transforms switch is closed at time vith zero initial conditions	5	CO	
25	1KT17		has r	e circuit shown in fig, find the current i(t). The current eached steady state with switch closed and switch is at t=0.	5	CO	
26	1KT16			inverse Laplace transform of the following functions $5/(s(s^2+4s+4))$ ii) $2S+6/(S^2+6S+25)$	5	СО	
			switc	the expression for the resultant current i(t) when h K is closed at t=0 in fig below	5	CO	
28	1KT16			the Laplace transform of the given function 5+4e- ^{2t}	5	СО	
				the LT of the sawtooth waveform shown in fig.	5	CO	
30	1KT18	3EE401	State	and prove initial value and final value theorem	5	CO	

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D3. TEACHING PLAN – 3

Module – 5

Title:	Divide and Conquer	Appr Time:	16 Hrs
а	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
С	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

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6	line currents.	tail about the Loop method of solving three phase	CO9	L4
0	unbalanced circ	uits		L4
7	Derive the conc case of ABCD	dition for the reciprocal property in two port networks in parameters	CO10	L4
8	Determine the i below	mpedance parameters for the network shown in the figure	CO10	L4
9	Derive the cond case of hybrid p	CO10	L4	
10	Determine the figure below	transmission parameters for the network shown in the	CO10	L4
е	Experiences		-	_
1				
2				
3				
4				
5				

E3. CIA EXAM - 3

a. Model Question Paper - 3

Crs		18EE32	Sem:	3	Marks:	30	Time:	75 minut	5 minutes	
Cod	e:									
Cou	rse:	Electrical	circuit ana	lysis						
-	-	Note: Answer any 2 questions, each carry equal marks.				Mark	СО	Level		
								S		
1	a	Explain th	Explain the method of analyzing a 3-Фstar connected load						CO9	L3
	b	acros a 3	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				ces	CO9	L4	
2	a	A star cor	nnected lo	ad with (3	8+j0) Q (2+j3)) n and (2	– j l) n connec	ted 5	CO9	L4

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			es, Yconnected system with phase sequence ACB. Find			
			nd neural current			
		Explain the c unbalanced loa	oncept of unbalanced load. State various types of ads	5	CO9	L3
3	a	Find z parame	ters of the circuit shown in Fig,	5	CO10	L4
	b	Find 'T' parame	eters of the circuit in Fig	5	CO10	L3
4	a	Define h and	T parameters of a two port network. Also, derive the	5	CO10	L3
		expressions fo	r h parameters in terms of T			
	b	Find Y and Z p	arameters 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 C	ode:	18EE32	Sem:	3	Marks:	5 / 10	Time:	90 - 120	minut	tes
Cours	se:	Electric c	ircuit analys	is			·			
Note:	Each	student	to answer 2	-3 assignm	ents. Each a	assignme	nt carries equ	al mark.		
SNo	o USN Assignment Description		Mark	СО	Level					
								S		
1	1KT1	7EE002	A star conn	ected load	with (3+j0)) Q (2+j	3)n and (2-j)	n 5	CO9	L4
			connected i	n 3-ph, 4	wires, Y	connecte	d system wit	:h		
			phase seque	nce ACB. Fi	ind line curr	rents and	neural curren	t.		
2	1KT1	7EE003	Explain the	concept o	of unbaland	ed load.	State variou	ıs 5	CO9	L3
			types of unb	alanced loa	ıds.					

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Carriel	Dyright ©2017. cAAS. All right			Course Plan	Page:	35 / 44	1
3			1	T' parameters of the circuit in Fig.	5	CO10	L4
4	1KT12	7EE006	-	in the method of analyzing a 3-ph star connected by using Millman's theorem	5	CO9	L3
5	1KT17		conne suppl	Ita connected three phase load with impedance is ected across a 3-ph 230V, 50Hzsymmetrical RYB y. The impedances are (28 + jO)Q, (25 + j45)Q and 5)Q. Find line and phase currents.	5	CO10	L4
6	1KT17	7EE008	Find :	z parameters of the circuit shown in Fig	5	CO10	L4
7	1KT17	7EE010	Defin	e Z and Y parameters.	5	CO10	L3
8	1KT12		Find t	the T parameters for the 2-port network shown in the (c).	5	CO10	L4
9	1KT17		balan Calcu	nbalanced 3-phase, 4-wire star connected load, has ced voltages of 208V with ABC phase sequence. late the line currents and the neutral current. $Z_A = 10$, 15 30° 0, $Z_c = 10 - 30°$	5	CO9	L4
10	1KT17		- 2)	the response i(t) when input signal i) 5δ(t – 2) ii) 5u(t is given to R–L series Circuit. Assume initial current gh the inductor to be zero.	5	CO9	L4
11	1KT16			ies RLC circuit has for its driving point admittance zero diagram as shown in Fig.Find the valves of R – L	5	CO9	L4
12	1KT16			e h and T parameters of a two port network. Also, e the expressions for h parameters in terms of T	5	CO10	L4
13	1KT16			Y and Z parameters for the network shown in fig	5	CO10	L4

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					,
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	1 KT1 7EE002	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	1 KT1 7EE003	Explain the concept of unbalanced load. State various types of unbalanced loads.	5	CO9	L4
18	1 KT1 7EE004	Find 'T' parameters of the circuit in Fig.	5	CO10	L4
19	1 KT1 7EE006	Explain the method of analyzing a 3-ph star connected load by using max power transfer theorem	5	CO9	L3
20	1 KT1 7EE007	A delta connected three phase load with impedance is connected across a 3-ph 230V, 50Hzsymmetrical RYB supply. The impedances are (28 + j0)Q, (25 + j45)Q and (O-j65)Q. Find line and phase currents.	5	CO9	L4
21	1 KT1 7EE008	Find z parameters of the circuit shown in Fig	5	CO10	L3
22	1KT17EE010	Define Z and Y parameters.	5	CO10	L3
23	1 KT1 7EE01 1	Find the T parameters for the 2-port network shown in the Fig.9(c).	5	CO10	L4

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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. $Z_A = 10$, $Z_B = 15 30^{\circ}$ 0, $Z_c = 10 - 30^{\circ}$	5	CO9	L4
25		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. $Z_A = 10$, $Z_B = 15 30^\circ 0$, $Z_c = 10 - 30^\circ$	5	CO9	L4
26	1KT16EE002	Find the response i(t) when input signal i) $5\delta(t - 2)$ ii) $5u(t - 2)$ is given to R–L series Circuit. Assume initial current through the inductor to be zero.		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	DEC/2018
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	GALON	Title:	Course Plan					Page: 3	8 / 44	ŀ
	^{ght ©2017} Code:	. cAAS. All rights reser	Sem:	3	Marks:	60	Time:		180 m	ninutes
-	1	Answer all FI						Mark	CO	Level
<u> </u>								S	<u> </u>	
1		Find the thre using mesh a		currents i	n the circuit	shown ir	n Fig.Q.1(a) 10	CO1	L4
				Fig	.Q.1(a)					
		Find V. in t transformatic				Q.1(b) us	ing source	e 10	CO2	L4
						J.Q.1(b)				
				OR						
2		Determine th network shov			between the			e 4	CO1	L4
		Find the nod Fig.Q.2(b) usi	-		V3 in circui	t diagrar	n shown iı	n 10	CO2	L4
					Fig.Q.2(b))				
		A series conr value of C s power freque	uch that _Q		t = 40, L =	25mH. C			CO2	L4
3		Find the cur superpositior		he circuit	show in Fig	g.Q.3(a) k	by applying	9 6	C03	L4

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	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
С	Find the voltage 'V _s ' and apply reciprocity theorem to the network shown in Fig.Q.3(c).	6	CO4	L4
	OR			
а	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 I2 by applying Millman's theorem for the network shown in Fig.Q.4(b).	10	CO4	L4
	Fig.Q.4(b).			
а	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
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
	c a b	 power to the load when the load impedance is the complex conjugate of the source impedance. c Find the voltage 'V_s' and apply reciprocity theorem to the network shown in Fig.Q.3(c). OR a For the network shown in Fig.Q.4(a), obtain the Norton's equivalent as seen from the terminals a – b. b Determine the current I₂ by applying Millman's theorem for the network shown in Fig.Q.4(b). a Show the behaviour of R, L, C elements at the time of switching at t = 0 both at t = 0⁺ and t = infinate b Determine i, di/dt and d²i/dt² 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). 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⁺, i₁(t),i₂(t) and 	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 c Find the voltage 'V's' and apply reciprocity theorem to the network 6 6 shown in Fig.Q.3(c). 6 a For the network shown in Fig.Q.4(a), obtain the Norton's equivalent as seen from the terminals a – b. 10 b Determine the current I₂ by applying Millman's theorem for the network shown in Fig.Q.4(b). 10 a Fig.Q.4(b). 10 b Determine the current I₂ by applying Millman's theorem for the network shown in Fig.Q.4(b). 10 c Fig.Q.4(b). 10 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 b Determine i, di/dt and d²i/dt² 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 a In the network shown in Fig. a steady state is reached with switch 'K' 10 10 a In the network shown in Fig. a steady state is reached with switch 'K' 10 10	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. CO3 c Find the voltage 'V's' and apply reciprocity theorem to the network for the network of the source impedance. CO4 c Find the voltage 'V's' and apply reciprocity theorem to the network for the network of the network shown in Fig.Q.4(a), obtain the Norton's equivalent as seen from the terminals a – b. 10 CO3 b Determine the current I2 by applying Millman's theorem for the network shown in Fig.Q.4(b). 10 CO4 a For the behaviour of R, L, C elements at the time of switching at t = 0 both at t = 0 ⁺ and t = infinate 10 CO5 b Determine i, id/dt and d ² /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 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,(t),i,(t), and 10 CO5

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	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 $t \ge 0^+$ by classical method.	10	CO6	L4
7	a	State and prove shifting theorem	6	C07	L3
	b	Find the Laplace transform of the waveform shown in Fig.Q.7(b).	4	CO7	L4
	с	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	C07	L4
	b	Find the Laplace transform of the waveform shown in Fig.Q.8(b).	10	CO8	L4
9	а	An unbalanced 3-phase, 4-wire star connected load, has balanced voltages of 208V with ABC phase sequence. Calculate the line	10	CO9	L4
		currents and the neutral current. Z_A = 10, Z_B = 15 30° 0, Z_c = 10 -30°			
	b	Define Z and Y parameters.	4	CO10	L4

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	с	Find the T pa	rameters for the 2–port network shown in the Fig.9(c).	6	C010	L4
10		A corios PLC	OR circuit has for its driving point admittance pole zer	0 10	CO9	
10			circuit has for its driving point admittance pole-zero nown in Fig.Q.10(a). Find the valves of R – L – C.	o 10	09	L4
			oonse i(t) when input signal i) 5δ(t – 2) ii) 5u(t – 2) i L series Circuit. Assume initial current through the e zero.		C010	L4

2. SEE Important Questions

Cou	rse:	Electrical circu	uit analysis				Month	/ Year	May /	2018
Crs Code:		18EE32	Sem:	3	Marks:	60	Time:			es
	Note	Answer all FIV	/E full quest	ions. All	questions carry	equal mai	rks.	_	_	
Mo dul	Qno.	Important Que	estion					Mark s	CO	Year
e 1	1	Transform the	-		ig Ql(a) in to a s nique.	ingle volta	ge source	6	CO1	2017
	2	Find the curre analysis	ents i ₁ , i ₂ and	d i₃ in th	e network giver	ı Fig Ql(b)u	sing mesh	7	CO1	2017
	3	Find current	through 0.	5Q resis	stance in the F	ig Ql(c) u	sing node	8	CO2	2017

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		analysis					
		Find the thre mesh analysis	e unknown currents in the circuit shown in Fig. using	9 6	CO2	2016	
		Find V. in t transformatio	he circuit diagram shown in Fig.Q.1(b) using source m.	2 7	CO2	2016	
2	1	State and illu	strate superposition theorem.	16 / 20	СО	2017	
-			e current Ix in the circuit shown in Fig Q3(b) using		CO3		
		Thevenin's th					
		Find the Nor network given	ton's equivalent circuit at the terminals A and B in the	e 7	CO3	2017	
	4	State and evol	ain Maximum power transfer theorem.	8	CO4	2016	
	5	-	beity theorem for the network given in Fig	7		2016	
3		Determine the 10KHz and its	I that a series RLC circuit should resonate at 500KHz e values of R, L and C if the Bandwidth of the circuit is s impedance is 100Ω at resonance. Also find the voltages C at resonance if the applied voltage is 75 volts.	5	CO5	2006	
		circuit. Also sh	ression for the resonant frequency of a parallel resonant nown that the circuit is resonant at all frequencies if here R_L = Resistance in the indicator branch,	7	CO5	2006	

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		Title:		Page: 4	13 / 44	ŀ
Copyrig	,	3	ce in the capacitor branch.			
	3	In the circuit s at t=0 , stea	shown in Fig , the switch K is changed from position A to E ady state have been reached before switching calculate $i(t)/dt^2$ at t=0 ⁺		CO6	2007
	4	Determine i,	di/dt and d^2i/dt^2 at $t = 0^+$ when the switch K is moved 1 to 2 at $t = 0$ for the network shown in Fig	8 t	CO6	2004
		inductor. Finc	k shown Fig. K is closed at $t = 0$ with zero current in the d:i(t), di(t)/dt at $t = 0^+$ and obtain an expression for i(t classical method.		CO6	2004
4			ally related network of the fig shown, obtain expression It i(t). use laplace transform.	n 7	C07	2004
			e laplace transform of the periodic sawtooth waveforn se gate function.	n 8	C07	2004
	3	Find Laplace t iii)te ^{-at}	transform of the following fig 1 i) sin ωt ii) cos ωt	7	C07	2006
	4	State and pro	ve initial value theorem.	7	C08	2004
		f(æ) for the fo	and final value theorems, where they apply, find f(O) and following functions. $(S^3 + 3S^2 + 4S + 2)$ ii)S(S+ 4) (S + 8)/(S+ 1)(S+ 6)	8 b	CO8	2007
5		Explain the unbalanced lo	concept of unbalanced load. State various types o bads	f 7	CO9	2009
	2	Find z parame	eters of the circuit shown in Fig,	8	CO10	2007

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	3	Find 'T' paran	neters of the circuit in Fig	8	CO10	2007
		voltages of	ed 3-phase, 4-wire star connected load, has balanced 208V with ABC phase sequence. Calculate the line the neutral current. $Z_A = 10$, $Z_B = 15 \perp 30^{\circ}$ 0, $Z_c = 101$	e	CO9	2004
		-	oonse i(t) when input signal i) 5δ(t – 2) ii) 5u(t – 2) is L series Circuit. Assume initial current through the e zero.		CO9	2005