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< Sri Krishna Institute of Technology, Bengaluru>



COURSE PLAN

Academic Year 2019-2020

Program:	B E – Electrical & Electronics Engineering
Semester :	1 ST
Course Code:	18ELE13
Course Title:	BASIC ELECTRICAL ENGINEERING
Credit / L-T-P:	3/2-2-0
Total Contact Hours:	40
Course Plan Author:	AVINASH S

Academic Evaluation and Monitoring Cell

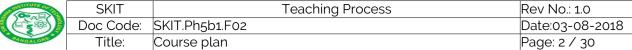
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2. SEE Important Questions	

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

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18ELE13/23 : Basic Electrical Engineering

A. COURSE INFORMATION1. Course Overview

Degree:	BE	Program:	EE
Year / Semester :	1/2	Academic Year:	2018-19
Course Title:	Basic Electrical Engineering	Course Code:	18ELE13/23
Credit / L-T-P:	3/2-2-0	SEE Duration:	180 Minutes
Total Contact Hours:	40	SEE Marks:	60 Marks
CIE Marks:	40	Assignment	1/Module
Course Plan Author:	Avinash S	Sign	Dt:
Checked By:		Sign	Dt:

2. Course Content

Mod	Module Content	Teaching	Module	Blooms
ule		Hours	Concepts	Level
1	D.C.Circuits: Ohm's Law and Kirchhoff's Laws, analysis of series, parallel and series- parallel circuits excited by independent voltage sources. Power and Energy.	(5,5)	1.circuit analysis	L3 Apply
	A.C. Fundamentals: Generation of sinusoidal voltage, frequency of generated voltage, definition and numerical values of average value, root mean square value, form factor and peak factor of sinusoidally varying voltage and current, phasor representation of alternating quantities.		2. AC Fundamentals	L3 Apply
2	Single Phase Circuits: Analysis, with phasor diagram, of circuits with R, L, C, R-L, RC, R-L-C for series and parallel configurations. Real power, reactive power, apparent power and power factor.	(7,5)	1.Single phase System	L3 Apply
	Three Phase circuits:Advantages of 3-phase power, Generation of 3-phase power, Three-phase balanced circuits, voltage and current relations in star and delta connections. Measurement of three phase power using two wattmeter method.		2.Three phase System	L3 Apply
3	Single Phase Transformers: Necessity of transformer, Principle of operation, Types and construction of transformers. emf equation, losses, variation of losses with respect to load, efficiency, Condition for maximum efficiency.	(5,5)	1.Performance of single phase transformer	L3 Apply
	Domestic Wiring: Service mains, meter board and distribution board. Brief discussion on concealed conduit wiring. Two-way and three-way control. Elementary discussion on circuit protective devices: Fuse and Miniature Circuit Breaker (MCB's), electric shock, precautions against shock. Earthing: Pipe and Plate earthing.		2.Electrical wiring System	L2 Underst and
4	DC Generators: Principle of operation, Construction of D.C. Generators. Expression for induced emf, Types of D.C. Generators, Relation between induced emf and terminal voltage. DC motors: Principle of operation, Back emf, Torque equation, Types of dc motors, Characteristics of dc motors (shunt and series motors only) and Applications.		Operation of DC generator Characteristic s of DC motor	L2 Underst and L2 Underst and
5	Three Phase Synchronous Generators: Principle of operation, Constructional details, Synchronous speed, Frequency of generated voltage, emf equation, Concept of winding factor (excluding the derivation and calculation of	(5,8)	1. Operation of three phase synchronous generator	L2 Underst and

STATISTICS OF THE OF TH	SKIT	Teaching Process		Rev No.: 1.0)
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distrik	distribution and pitch factors).				L2

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distribution and pitch factors).		L2
Three Phase Induction Motors: Principle of operation	2. Operation of	Underst
Generation of rotating magnetic field, Construction and	three phase	and
working of three-phase induction motor, Slip and its	s induction	
significance. Necessity of starter, star-delta starter.	motor	

3. Course Material

Mod	Dotails	Available
ule	Details	Available
	Text books	
_	1 Basic Electrical Engineering D C Kulshreshtha Tata McGraw Hill, Revised	In Lib, In dept
	First Edition	III Elb, III dopt
	2 Principles of Electrical Engineering & Electronics	
	V.K. Mehta, Rohit S.ChandPublications	
2	Reference books	
a	1 Fundamentals of Electrical Engineering and Electronics B. L. Theraja	In Lib,In dept
	S. Chand & Company Ltd, Reprint Edition 2013.	
b	2 Electrical Technology E. Hughes International Students 9 th Edition, Pearson,	In Lib
	2005	
	3 Basic Electrical Engineering D. P. Kothari and I. J. Nagrath Tata McGraw Hill,	
	2017.	
	Concept Videos or Simulation for Understanding D.C.Circuits	
CI	https://www.youtube.com/watch?	
	v=Vd2UJiIPbag&list=PL9RcWogXmzaLTYUdnzKhF4bYug3GjGcEc	
	https://www.youtube.com/watch?	
	v=Fja Eo7knF4&list=PL9RcWogXmzaLTYUdnzKhF4bYug3GjGcEc&index	
	=2	
	https://www.youtube.com/watch?v=MJI_eQHNf-	
	A&list=PL9RcWoqXmzaLTYUdnzKhF4bYug3GjGcEc&index=4	
C2	A.C. Fundamentals	
	https://www.youtube.com/watch?v=BFuHXLdL76w	
	https://www.youtube.com/watch?	
	v=3TR_DS_7z2w&list=PLbRMhDVUMngfdEXVcdf_ijj2Eub-UHs_y https://www.youtube.com/watch?v=boz-eSMRHXA	
C3	Single Phase Circuits	
U3	https://www.youtube.com/watch?v=UzrisWhvjV0	
	https://www.youtube.com/watch?v=RihjG6wbQL4	
C4	Three Phase circuits	
04	https://www.youtube.com/watch?v=RihjG6wbQL4	
	https://www.youtube.com/watch?v=CbcU5xS-	
	OS8&list=PL4K9r9dYCOooO5s49HTN7Tavmg5q_Ufqn&index=2	
	https://www.youtube.com/watch?	
	v=NDcCuvc8NLU&list=PL4K9r9dYCOooO5s49HTN7Tavmg5q_Ufq	
	n&index=4	
	https://www.youtube.com/watch? v=WmTqTLv3uvY&list=PL4K9r9dYCOooO5s49HTN7Tavmq5q Uf	
	qn&index=6	
CE	Single Phase Transformers	
_ C5	https://www.youtube.com/watch?	
	v=mx3J9wdbJ30&list=PL4K9r9dYCOopvPWp1qKmuhxLtwGh-	
	8XLN	
	https://www.youtube.com/watch?	
	v=xuIADO0LJfM&list=PL4K9r9dYCOopvPWp1qKmuhxLtwGh-	
	8XLN&index=2	
	https://www.youtube.com/watch?	

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	8XLN&index=4	
	https://www.youtube.com/watch?	
	v=6jvmjYXvCl4&list=PL4K9r9dYCOopvPWp1qKmuhxLtwGh-	
	8XLN&index=6	
	https://www.youtube.com/watch?v=eolT3AqXy6E	
C6	Domestic Wiring	
	https://www.youtube.com/watch?v=Tvh40MFIhCo	
	https://www.youtube.com/watch?v=aITb42 NeFA	
	https://www.youtube.com/watch?v=G6edCysCxeA	
C7	DC Generators	
'	https://www.youtube.com/watch?v=oI-O9FCDqmq	
	https://www.youtube.com/watch?v=6dF3LDzb-tE	
	https://www.youtube.com/watch?v=0gWJ8OqkpHM	
C8	DC motors	
	https://www.youtube.com/watch?	
	v=10fLgpFq6Rc&list=PLLQiBbMXygz5Tc0runVq3wQB4s0TkB8lt	
	https://www.youtube.com/watch?	
	v=D4RFFnzRdkk&list=PLSRCPd4kA2-	
	S2Cu1tYUe5WGmc959y50Xf	
	https://www.youtube.com/watch?v=ASnDSEeWADk	
C9	Three Phase Synchronous Generators	
	https://www.youtube.com/watch?v=b24jORRoxEc	
	https://www.youtube.com/watch?	
	v=Hn3FkCOPuos&list=PLPpCFgQP7QKHog5-n3DFqSxLI_LP-	
	<u>BvXP</u>	
C10	Three Phase Induction Motors	
	https://www.youtube.com/watch?v=dZyO5gcWP-o	
	https://www.youtube.com/watch?v=XzTncl60Vus	
	https://www.youtube.com/watch?v=AhxMrUo806Y	
D	Software Tools for Design	
E	Recent Developments for Research	
	Others (Web, Video, Simulation, Notes etc.)	
1	https://lecturenotes.in/subject/6/basic-electrical-engineering-bee	
2	https://nptel.ac.in/downloads/108105053/	

4. Course Prerequisites

SNo	Course	Course Name	Module / Topic / Description	Sem	Remarks	Blooms
	Code					Level
1						

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				
18ELE13/	Illustrate the series and parallel	5	Circuit	Lecture	Assignment	L3
23.1	circuits using electrical circuit laws.		analysis		and seminar	Apply
					and	
					CIA	
18ELE13/	Explain the fundamentals of AC	5	AC	Lecture	Assignment	L3

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Single phase Lecture Assignment Lamb Apply	Copyright ©2017	. cAAS. All rights reserved.					
23.3 Analytical and Graphical method. 18ELE13/ Illustrate the 3 phase connection using Analytical and Graphical method. 18ELE13/ Determine the efficiency of single phase transformer. 23.6 Performance of single phase transformer. 23.6 Wiring System using hardware module. 18ELE13/ 23.7 Understand the principle of operation of DC generators using constructional diagram. 23.8 PPT and seminar and clA 23.9 PPT and seminar and seminar and clA 23.9 PPT and seminar and clA 23.9 PPT and seminar and seminar and clA 23.10 Understand the principle of operation of Alternator using constructional diagrams. 23.10 Viring and protective devices 23.7 Operation of DC generators using and seminar and clA 23.8 PPT and seminar and clA 23.9 Viring and protective devices 23.9 Viring and protective devices 24. PPT and seminar and clA 25. Characteristi cs of DC generator using constructional diagrams. 26. Characteristi cs of DC motors using hardware module. 27. Operation of Alternator using constructional diagrams. 28. Operation of Alternator using constructional diagrams. 29. Operation of three phase induction motors using hardware module. 29. Operation of three phase induction motors using hardware module. 29. Operation of three phase induction motors 29. Operation of three phase induction motors 20. Operation of three phase induction motors 21. Operation of three phase induction motors 22. Operation of three phase induction motors 23. Operation of three phase induction motors 24. Operation of three phase induction motors 25. Operation of three phase induction motors 26. Operation of three		method.				and	Apply
23.4 using Analytical and Graphical method. System	_		7		Lecture	and seminar and	
phase transformer. Selective	_	using Analytical and Graphical	5		Lecture /	and seminar and	
wiring System using hardware module. Protective devices PPT and seminar and CIA	23.5	phase transformer.		of single phase transformer		and seminar and CIA	Apply
23.7 operation of DC generators using constructional diagram. DC generator Apply and seminar and CIA CIA 18ELE13/ understand the principle of operation of Alternator using constructional diagrams. DC generator DC generator DC generator DC generator CIA CIA DC generator DC generator CIA DC generator DC Generator DC Generator DC GIA DC GIA DC Sof DC motors using and seminar and seminar and clia CIA DC generator CIA DC generator DC generator DC generator CIA Departion of three phase synchronous generator DC generator DC generator DC generator DC GIA Departion of three phase induction motor DC generator DC generator DC generator DC GIA Departion of three phase induction motor DC generator DC generator DC generator DC generator DC GIA Departion of three phase induction motor DC generator Apply and seminar and clia CIA Departion of three phase induction motor DC GIA Departion of three phase induction motor DC GIA Departion of three phase induction motor DC GIA Departion of three phase induction motor DC IA Departion of three phase induction motor DC IA Departion of three phase induction motor DC IA Departion of three phase induction and clia DC IA Departion of three phase induction motor DC IA Departion of three phase induction and clia DC IA Departion of three phase induction motor DC IA Departion of three phase induction and clia DC IA Departion of three phase induction and clia DC IA DEPARTICLE DEPAR	_	wiring System using hardware	5	protective		and seminar and	
23.8 operation of DC motors using hardware module. cs of DC motors construction of Lecture synchronous generator 23.9 understand the principle of constructional diagrams. 23.10 operation of three phase induction motors using hardware module. cs of DC motors construction of three principle of three phase induction motor cs of DC motors cs of DC motors construction of three principle of three phase induction motor construction of three phase induction motor cs of DC motors cs of DC motors construction of three phase induction induction motor cs of DC motors construction of three phase induction induction motor construction of three phase induction motor construction of th	_	operation of DC generators using	6	DC		and seminar and	_
23.9 operation of Alternator using constructional diagrams. three phase synchronous generator 18ELE13/ understand the principle of operation of three phase induction motors using hardware module. three phase synchronous generator Operation of three phase induction motor three phase synchronous generator Operation of three phase induction motor three phase synchronous generator Operation of three phase induction induction motor CIA Understand three phase synchronous generator CIA Understand three phase induction induction motor Operation of three phase induction motor Operation of three phase induction motor		operation of DC motors using	5	cs of DC		and seminar and	
operation of three phase induction motors using hardware module. three phase induction induction motor three phase induction induction induction induction motor induction motor induction induction induction induction motor induction induction induction motor induction ind	_	operation of Alternator using	5	three phase synchronous	& PPT	and seminar and	
- Total 56 - - - -	_	operation of three phase induction motors using hardware module.		three phase induction		and seminar and	
	-	Total	56	-	-	-	-

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

2. Course Applications

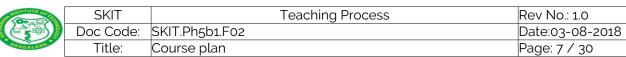
2. 00	2. Course Applications										
SNo	Application Area	CO	Level								
1	To analysis DC circuits	CO1	L3								
2	To understand the AC quantities fundamentals	CO2	L3								
3	To analyses Single phase circuit	CO3	L3								
4	To analyses Three phase circuit analysis	CO4	L3								
5	For stepping up and stepping down power supply	CO5	L3								
	Electrical Wiring is used in Domestic , commercial buildings and protective devices to protect electrical circuits	CO6	L2								
7	DC Power generation for small applications	CO7	L3								
8	Fan, blowers, cranes, elevators traction systems	CO8	L2								
9	To generate electricity	CO9	L2								
10	Irrigation purpose	CO10	L2								

Note: Write 1 or 2 applications per CO.

3. Articulation Matrix

(CO – PO MAPPING)

ΕE



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	-	Course Outcomes							Outc						
	#	COs	PO ₁	PO2	PO3	PO4	PO5		PO7		PO9		1	l	Level
								6		8		0	1	2	
18EL		Analysis of series and paralle		3											L3
	.1	circuits using circuit laws													
		associated with electrica													
		system.													
18EL		Analyze the fundamentals of		3											L3
	.2	AC using phasor													
		representation and wave													
0.51		forms.													
18EL		Analyze the electrica		3											L3
	.3	quantities of RLC and their													
		combinational circuits using													
		phasor diagram and wave													
40FI		forms.	_												
18EL		Analyze the star and delta		3											L3
	.4	connections using phasor													
40EI	F40 /00	diagrams. Determine the efficiency of													1.0
TOEL		single phase transformer.	3	3											L3
40FI	.5 [10/00	Discuss concepts of electrical							4						1.0
18EL	.E13/23 .6	wiring, circuit protecting		3					1						L2
	.0	devices and earthing using													
		hardware module.													
18FI	F12/22	Understand the principle of	2	3											L2
TOLL	.7	operation and construction of		3											
	./	DC generators using	1												
		constructional diagram.													
18FI	F12/22	understand the principle of	2	3											L2
IOLL	.8	operation and construction of		٦											
	.0	DC motors using													
		constructional diagrams and	1												
		hardware module.													
18EL	E13/23	understand the principle of	3	3											L2
	.9	operation and construction of													
	Ü	synchronous generator using													
		constructional diagrams.													
18EL	E13/23	understand the principle of	3	3											L2
	.10	operation and construction of													
		three phase induction motors													
		using constructional diagrams													
		and hardware module.													
Note	: Menti	on the mapping strength as 1, 2,	or 3												

4. Mapping Justification

Мар	ping	Justification	Mapping Level			
СО	CO PO -					
CO1	PO1	Knowledge of series and parallel concepts and electrical laws are required to solve complex Electrical circuits.	L3			
CO1	PO2	Students able to analyze complex Electrical circuits.	L3			
CO2	PO1	Knowledge requires to identify AC component	L3			
CO2	PO2	Students are capable to analyze the AC component.	L3			
CO3	PO1	Knowledge requires to identify the different loads.	L3			
CO3	CO3 PO2 Students are capable to analyze the parameters and behavior of		L3			

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		different loads.					
CO4	PO1	Knowledge requires to identify the different load connection		L3			
CO ₄	PO2	Students are capable to analyze the parameters of different connections.	erent	L3			
CO ₅	CO5 PO1 Students should have basic knowledge towards application of Transformers						
CO5 PO2 Students should identify the classification of transformer and their efficiency							
CO6	PO1	Knowledge requires in domestic wiring		L2			
CO6	CO6 PO2 Students should identify different scheme of wiring installation and safety towards electric shocks.						
CO6	PO7	Analyze the selection of wiring scheme and protective to maintain a good environment.	devices	L2			
CO7	PO1	Students should have knowledge towards application o Generators	f DC	L3			
CO7	PO2	Students should analyze the parameters of different DO generators.		L3			
CO8	PO1	Students should have knowledge towards application o Motors.		L2			
CO8	PO2	Students should analyze the parameters of different DO Motors.		L2			
CO9	PO1	Students should have knowledge towards application o Synchronous Generator	f	L2			
CO9 PO2 Students should analyze the performance of different Synchronous Generator							

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L2

L2

Note: Write justification for each CO-PO mapping.

Induction Motors

Induction Motors.

5. Curricular Gap and Content

PO1

PO2

CO10

CO10

SKIT

SNo	Gap Topic	Actions Planned	Schedule Planned	Resources Person	PO Mapping					
1	1									
2										
Note: Write Gap topics from A.4 and add others also.										
Under	Understanding symbols required in substation installation									

Students should have knowledge towards application of

Students should analyze the performance of different

Analysis of single line diagram of substation

6. Content Beyond Syllabus

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

Note: Anything not covered above is included here.

C. COURSE ASSESSMENT

1. Course Coverage

Mod	Title	Teaching	No. of question in Exam			CO	Levels			
ule		Hours	CIA-1	CIA-2	CIA-3	Asg	Extra	SEE		
#							Asg			
1	D.C.Circuits, A.C. Fundamentals	10	2	-	-	1	1	2	CO1,	L3

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BAN	Title: Course plan									Pag	ge: 9 / 3	0	
Copyrig	Copyright ©2017. cAAS. All rights reserved.												
											CO2,		
2	Single	Phase Circui	ts, Three Phase	12	2	-	-	1	1	2	CO3,	L3	
	circuits										CO4		
3	Single	Phase	Transformers,	10	_	2	_	1	1	2	CO5,	L2,L3	
	Domes	tic Wiring									CO6		
4	DC Ger	erators, DC r	motors	11	-	2	-	1	1	2	CO7,	L2	
											Co8		
5	Three	Phase	Synchronous	13	-	-	4	1	1	2	CO9,	L2	
	Genera	tors, Three I	Phase Induction								CO10		
	Motors												
-		Tota	l	56	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	40	CO1, CO2, CO3, CO4	l4
CIA Exam – 2	15	CO5, CO6, CO7, Co8	L2, L3
CIA Exam – 3	15	CO9, CO10	L3
Assignment - 1	05	CO1, CO2, CO3, CO4	l4
Assignment - 2	05	CO5, CO6, CO7, CO8	L2, L3
Assignment - 3	05	CO9, CO10	L3
Seminar - 1			
Seminar - 2			
Seminar - 3			
Other Activities - define -		CO1 to Co9	L2, L3, L4
Slip test			
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	16 Hrs
		Time:	
a	Course Outcomes	1	Blooms
-	The student should be able to:	-	Level
1	Illustrate the series and parallel circuits using electrical circuit laws.	CO1	L2
2	Explain the fundamentals of AC using Analytical and Graphical method.	CO2	L3, L4
b	Course Schedule	-	-
Class No	Module Content Covered	СО	Level
1	D.C.Circuits: Ohm's Law and Kirchhoff's Laws,	C01	L3
2	analysis of series, parallel and series- parallel	C01	L3
	circuits excited by independent voltage sources.		
3	Power and Energy.	C01	L2
4	A.C. Fundamentals		
5	Generation of sinusoidal voltage	CO2	L2
6	frequency of generated voltage	CO2	L2
7	definition and numerical values of average value	CO2	L3
8	root mean square value	CO2	L3

CO a D	SKIT	Teaching Process	Rev No.: 1.0
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9	form factor and peak factor of sinusoidally varying voltage and current	CO2	L3
10	phasor representation of alternating quantities.	CO2	L4
С	Application Areas	СО	Level
1	To analysis DC circuits	CO1	L3
2	To understand the AC quantities fundamentals	CO2	L3
d	Review Questions	-	-
1	Define magnetic field, magnetic flux mmf.	CO1	L2
2	Define reluctance, permeability, magnertising force	CO1	L2
3	State and explain KCL and KVL as applied to DC circuits.	CO1	L2
4	State and explain ohms law. What are its limitation?	CO1	L2
5	Explain electrical work, power, energy.	CO1	L2
6	Explain series and parallel connection of two resistors.	CO2	L2
7	Explain average value, R.M.S. value, form factor, peak factor of a sinusoidal waveform.	CO2	L2
8	What is meant by phase angle between two alternating quantities?	CO2	L2
е	Experiences	-	
1		CO1	L2

Module – 2

Title:	Divide and Conquer	Appr	10 Hrs
1100	Divide and conquer	Time:	101113
а	Course Outcomes	-	Blooms
-	The student should be able to:	-	Level
1	Illustrate the electrical loads using Analytical and Graphical method.	CO3	L3
2	Illustrate the 3 phase connection using Analytical and Graphical method	CO4	L3
b	Course Schedule		_
	Module Content Covered	СО	Level
1	Single Phase Circuits		Level
2	Analysis with phasor diagram of circuits with R, L, C, R-L, RC, R-L-C for series and parallel configurations.	CO3	L3
3	Real power	CO3	L3
4	reactive power	CO3	L3
5	apparent power and power factor.	CO3	L3
6	Three Phase circuits		
7	Advantages of 3-phase power	CO4	L2
8	Generation of 3-phase power	CO4	L2
9	Three-phase balanced circuits	CO4	L2
10	voltage and current relations in star and delta connections.	CO4	L3
11	Measurement of three phase power using two wattmeter method.	CO4	L3
С	Application Areas	СО	Level
1	To analyses Single phase circuit	CO3	L2
2	To analyses Three phase circuit analysis	CO4	L2
d	Review Questions	_	
1	Show that the average power in an AC circuit is given by P = Vicos •.	CO3	L2
2	What is meant by power factor in AC circuits? What is its significance?	CO3	L2
3	Distinguish between lagging and leading power factors in AC	CO3	L2

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	Titte. Godise ptair	r age. II	, ,,
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	circuits.		
4	Establish the relationship between voltage and current in a R-L-C	CO3	L2
	series circuit. Draw the phasor diagram.		
5	Show that the average power consumed in a pure capacitance is zero.	CO3	L2
6	Show that in a three-phase star-connected system, the line voltage is $\sqrt{3}$	CO3	L2
	times the phase voltage.		
7	When do we say that the system of an ac three-phase voltage is	CO3	L2
	balanced three-phase system?		
8	Derive an expression for power in a three-phase balanced circuit.	CO4	L3
9	List out the advantages of three-phase systems.	CO4	L3
10	With relevant diagrams show that two wattmeters are enough to measure	CO4	L3
	three-phase power.		
е	Experiences	-	-
1		CO1	L2

E1. CIA EXAM – 1

a. Model Question Paper - 1 Crs Code: 18EL F12/2|Sem:

Crs	Code:	18ELE13/2 Sem: 1/2	1	Marks:	15	Time:	75 minutes	6	
		3							
Cou		Basic Electrical Engineering		•			1.4		
-		Note: Answer any 3 questi		n carry equ	ıal marks.		Marks	СО	Level
1		State Ohm's law and its lim					CO1	L2	5
	b	Find the potential differenc	e betwee	en the poin	ts A & B.		CO1	L3	
		10 V 8	Ω Α	6 V {] }12 Ω			5
	С	State and explain the Kirch	hoff's law	/S.			CO1	L2	5
		·		OR					
2	a	Define RMS value of altern				nship betwee	en CO2	L2	
		RMS and maximum value o							5
	b	Find the currents in the var	ious brar	nches of the	e given netw	ork (CO1	L3	5
		0.01 Ω 80 Å 0.01 Ω 120 Å 0.02 Ω	0.03 V150 A	▼80 A 0.02 Ω ▼90 A Ω					
		A sinusoidal alternating cur (I) maximum value (ii) current when t 0.002 se (iii) RMS value of the curren	ec	presented	by i 30sin30	ot, find	CO2	L3	5
3		Obtain the relationship be current in a three balanced	l star con	nected sch	ieme.			L4	7
		List the advantages of 3 ph					CO4	L2	4
		Estimate the power factor wattmeter method of meas				cases of tw	/o CO4	L3	4

AT MOT	NTUTE OF TO	SKIT	Teaching Process	Rev N	lo.: 1.0		
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			eadings are equal				
		(ii) Wattmeter re	eadings are equal and opposite				
		(iii) Wattmeter r	eadings are in the ratio 1:2				
		(iv) one Wattme	eter reads zero.				
			OR				
4	а	Show that in	a three phase, balanced circuit, two wattmeters are	CO4	L4		
		sufficient to me	asure the total three phase power.			7	
	b	Compare Shell	type and Core type transformer.	CO5	L2	4	
			sformer has an efficiency of 92% at full load unity power	CO5	L3	4	
		factor and at ha	alf load 0.9 power factor. Determine its efficiency at 75% of				
		full load, 0.9 po	wer factor.				

b. Assignment -1

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

<u>Note:</u>	A distinct	t assig	nment to be	assigned to	each stude	ent.				
					<u>Assignment</u>					
Crs Co	ode: 18E 23	LE13/	Sem:	1/2	Marks:	5 / 10	Time:	90 – 120 r	minute	S
Cours	se: Bas	sic Ele	ctrical Engin	eering			•			
		dent t	o answer 2-3	assignmen	ts. Each ass	ignment ca	rries equal m	ark.		
SNo	USN				nment Des		,	Marks	СО	Level
1	IKT18E	E001	State and ex	plain Kirchh	noff's laws.	-		5	CO1	L2
2	IKT18E	E001	State ohm's	law. Mentio	n its limitation	ons.		5	CO1	L3
3	IKT18EE	E002	b. State and voltage law.	d explain K	S	CO3	L4			
4	IKT18EE	Ē002	2 a. Define of emf with exa		induced e	mf and sta	tically induce	d 5	CO1	L2
5	IKT18EE	E003	A coil consis gives rise to inductance, a current s re	a magnetic (ii) The emf	flux of 1 m\ induced, (iii)	Wb. Calcula		5 1	CO4	L4
6	IKT18EE	E003	and 300hm the current	respectively through 150 300hm resi	y, connecte ohm resisto stors, (ii) vo	d in series v r is 3.A., fin ltage acros	ance of 200hr with 1500hm. Id (i) current s whole circu l resistors.	lf in	CO1	L2
7	IKT18EE	E004	planes so th A current o current in Y inductance,	at 45% of th of 5 A in X of produces (b) the	ne flux prodices o.075Wb.coupling	uced by co 0.05Wb w Calculate coefficient,	s, lie in paralle il X links coil ' hile the sam (a) the mutu- and (c) th	Y. ie al ie	CO1	L2
8	IKT18EE	004	Two toroida that the may the other. So turns. When the o through eac mutual indu	l solenoids gnetic field olenoid 1 ha current in so h turn of so actance of to	are wound of one pa as 700 turn olenoid 1 is lenoid 2 is 0 the pair of is 2.54 A, v	around the sses throug s and soler 6.52 A, the 0.0320 Wb. solenoids?	e same form some some form some form some some some some some some some som	so 5 of oo ux ee	CO3	L4
9	IKT18EE	E005	A 20V batter to a resisto	ry with an ir or of x ohr across the b	nternal resis ns. If an a pattery, find	dditional 6 the value o	Ω is connected Ω resistor of x so that the same.	is	CO1	L2
10	IKT18EE	E005					10 A in the co lculate: (i) se		CO1	L2

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				tance, (ii) The emf induced, (iii) The energy stored when rent s reversed in 0.01 sec.				
11	IKT18	EE006	With that t	the help of a circuit diagram and vector diagram, show wo wattmeters are sufficient to measure total power	5	CO1	L2	
10	II/T40	FFOOG		ower factor in a balanced three phase circuit.		CO1		
12	IKITO	EE006	reacta phase	e similar coils each having resistance of 100hm and ance of 80hm are connected in star, across 400 V, 3 e supply. Determine (i) line current, (ii) total power, (iii) ng of each of two wattmeter connected to measure er.	5	COI	L2	
13	IKT18	SEE007	Menti	on the advantages of three phase system over single system.	5	CO1	L2	
14	IKT18	SEE007		,	5	CO4	L4	
15		EE008	section Find current current	cuit has 1000 turns enclosing a magnetic circuit 20cm²in on, with 4A the flux density is 1.0T and with 9A it is 1.4T. the mean value of the inductance between these nt limits and the induced electromotive force if the nt fell uniformly from 9A to 4A in 0.05sec. Also mine the energy stored at the end of 0.05sec.	5	CO1	L2	
16	IKT18	EE008	delta 10 A	ee phase load of three equal impedances connected in across a balanced 400V supply, takes a line current of at a power factor of 0.7 lagging. Calculate: i) the phase nt, ii) the total power, iii) the total reactive volt amperes.	5	CO1	L2	
17	IKT18	EE009	that t	the help of a circuit diagram and vector diagram, show two wattmeters are sufficient to measure total power lower factor in a balanced three phase circuit.	5	CO2	L2	
18	IKT18	EE009	delta 10 A	ee phase load of three equal impedances connected in across a balanced 400V supply, takes a line current of at a power factor of 0.7 lagging. Calculate:i) the phase nt, ii) the total power, iii) the total reactive volt amperes.	5	CO3	L2	
19	IKT18	BEE010	An alt	rernating voltage (80+j60)V is applied to a circuit and the nt flowing is (-4+jl0)A. Find: (i) the impedance of the t, (ii) the phase angle, (iii) power consumed.	5	CO3	L4	
20	IKT18	BEE010	conne	o impedances z_1 =(10 + j15)ohm and Z_2 = (6- j8)ohm are ected in parallel. If the total current supplied is 15A, what wer taken by each branch?	5	CO1	L2	
21	IKT18	3EE011	State	and explain Kirchhoff's laws.	5	CO1	L2	
22	IKT18	BEE011	State	ohm's law. Mention its limitations.	5	CO1	L2	
23		BEE012	voltaç	ate and explain Kirchoff's current law and Kirchoff's ge law.	5	CO1	L2	
24		BEE012	emf w	Define dynamically induced emf and statically induced with examples.	5	CO3	L2	
25		BEE013	gives induc a curr	consists of 600 turns and a current of 10 A in the coil rise to a magnetic flux of 1 mWb. Calculate: (i) self tance, (ii) The emf induced, (iii) The energy stored when rent s reversed in 0.01 sec.	5	CO1	L2	
26		BEE013	and 3 the c 200hr (iii) Th	cuit of two parallel resistors having resistance of 200hm coohm respectively, connected in series with 1500hm. If urrent through 150hm resistor is 3.A., find (i) current in and 300hm resistors, (ii) voltage across whole circuit total power and power consumed in all resistors.	5	CO1	L2	
27	IKT18	BEE014	plane A cur curre induc	coils, X of 12000 turns and Y f 15000 turns, lie in paralleles so that 45% of the flux produced by coil X links coil Y. Trent of 5 A in X produces 0.05Wb while the same nt in Y produces 0.075Wb. Calculate (a) the mutual tance, (b) the coupling coefficient, and (c) the entage of flux produced by coil Y and linking with coil X.	5	CO3	L2	

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28	IKT1	·	that	toroidal solenoids are wound around the same form so the magnetic field of one passes through the turns of other. Solenoid 1 has 700 turns and solenoid 2 has 400	5	CO1	L2
			turns Whe				

28	IKT18EE014	Two toroidal solenoids are wound around the same form so that the magnetic field of one passes through the turns of the other. Solenoid 1 has 700 turns and solenoid 2 has 400 turns. When the current in solenoid 1 is 6.52 A, the average flux through each turn of solenoid 2 is 0.0320 Wb. (a) What is the mutual inductance of the pair of solenoids? (b) When the current in solenoid 2 is 2.54 A, what is the average flux through each turn of solenoid 1.	-	CO1	L2
29	IKT18EE015	A 20V battery with an internal resistance of 5 Ω is connected to a resistor of x ohms. If an additional 6 Ω resistor is connected across the battery, find the value of x so that the external power supplied by the battery remains the same.		CO1	L2
30	IKT18EE015	A coil consists of 600 turns and a current of 10 A in the coil gives rise to a magnetic flux of I mWb. Calculate: (i) self inductance, (ii) The emf induced, (iii) The energy stored when a current s reversed in 0.01 sec.		CO3	L2
31	IKT18EE016	With the help of a circuit diagram and vector diagram, show that two wattmeters are sufficient to measure total power and power factor in a balanced three phase circuit.		CO3	L2
32	IKT18EE016	Three similar coils each having resistance of 10ohm and reactance of 8ohm are connected in star, across 400 V, 3 phase supply. Determine (i) line current, (ii) total power, (iii) reading of each of two wattmeter connected to measure power.		CO3	L2
33	IKT18EE017	Mention the advantages of three phase system over single phase system.	5	CO2	L4
34	IKT18EE017		5	CO1	L2
35	IKT18EE018	A circuit has 1000 turns enclosing a magnetic circuit 20cm²in section, with 4A the flux density is 1.0T and with 9A it is 1.4T. Find the mean value of the inductance between these current limits and the induced electromotive force if the current fell uniformly from 9A to 4A in 0.05sec. Also determine the energy stored at the end of 0.05sec.	5	CO1	L2
36	IKT18EE018	A three phase load of three equal impedances connected in delta across a balanced 400V supply, takes a line current of 10 A at a power factor of 0.7 lagging. Calculate: i) the phase current, ii) the total power, iii) the total reactive volt amperes.		CO3	L2
37	IKT18EE019	With the help of a circuit diagram and vector diagram, show that two wattmeters are sufficient to measure total power and power factor in a balanced three phase circuit.		CO3	L2
38	IKT18EE019	A three phase load of three equal impedances connected in delta across a balanced 400V supply, takes a line current of 10 A at a power factor of 0.7 lagging. Calculate:i) the phase current, ii) the total power, iii) the total reactive volt amperes.		CO1	L2
39	IKT18EE020	An alternating voltage (80+j60)V is applied to a circuit and the current flowing is (-4+jl0)A. Find: (i) the impedance of the circuit, (ii) the phase angle, (iii) power consumed.		CO3	L2
40	IKT18EE020	c. Two impedances z_1 =(10 + j15)ohm and Z_2 = (6- j8)ohm are connected in parallel. If the total current supplied is 15A, what is power taken by each branch?		CO1	L2

D2. TEACHING PLAN - 2

Module - 3

Title:	Divide and Conquer	Appr	16 Hrs
		Time:	

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Copyright ©2017. cAAS. All rights reserved. **Blooms** Course Outcomes The student should be able to: Level Determine the efficiency of single phase transformer. CO5 1 L3 Discuss the concepts of electrical wiring System using hardware CO6 2 L2 module. b Course Schedule Class No Module Content Covered CO Level Single Phase Transformers Necessity of transformer CO5 12 2 Principle of operation CO5 L2 3 Types and construction of transformers. CO5 L2 4 emf equation CO5 L3 5 losses, variation of losses with respect to load 6 CO5 L3 7 efficiency, Condition for maximum efficiency. CO₅ L3 **Domestic Wiring** 8 Service mains, meter board and distribution board. CO6 L2 9 Brief discussion on concealed conduit wiring. CO6 L2 10 Two-way and three-way control. CO6 L2 11 Elementary discussion on circuit protective devices: Fuse and CO6 L2 12 Miniature Circuit Breaker (MCB's) electric shock, precautions against shock. CO6 12 13 Earthing: Pipe and Plate earthing. CO6 L2 14 **Application Areas** СО Level С For stepping up and stepping down power supply CO5 1 L3 Electrical Wiring is used in Domestic, commercial buildings and CO6 2 L3 protective devices to protect electrical circuits d **Review Questions** 1 Explain wit a neat sketch the construction of a core type single phase CO5 L2 transformer. Explain wit a neat sketch the construction of a shell type single phase CO5 L2 2 transformer. Explain why the core of a transformer is laminated? CO5 L2 3 State why silicon steel is selected for the core of a transformer? CO5 L4 4 Explain the principle of operation of a transformer. CO5 5 L4 Derive the EMF equation of a transformer from fundamentals. CO6 6 L4 What is domestic wiring? 7 CO6 L4 8 Give the wiring diagram for the two-way control of a lamp and explain. CO6 L4 What is earthing? Why is it necessary? Explain its performance. CO6 L4 9 What do you understand by electric shock? What are the causes of 10 CO6 L4 electric shock? **Experiences** e 1

Module - 4

Title:	Divide and Conquer	Appr	16 Hrs
		Time:	
a	Course Outcomes	-	Blooms
-	The student should be able to:	-	Level
1	Understand the principle of operation of DC generators using	CO7	L2

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	constructiona				
2		ne principle of operation of DC motors using hardware	CO8	L2	
	module.				
b	Course Schedu	ıle			
Class No	Module Conte		СО	Level	
1	DC Generato		CO7	L2	
2	Principle of op	peration,	CO7	L2	
3	Construction	of D.C. Generators.	CO7	L2	
4	Expression fo	r induced emf	CO7	L2	
5	Types of D.C.		CO7	L2	
6	Relation betw	veen induced emf and terminal voltage.	CO7	L2	
7	DC motors:				
8	Principle of or	peration	CO8	L2	
9	Back emf		CO8	L2	
10	Torque equati		CO8	L2	
11	Types of dc m		CO8	L2	
12	Characteristic Applications.	cs of dc motors (shunt and series motors only) and	CO8	L2	
С	Application Ar	roac	СО	Level	
1		eration for small applications	CO8	L3	
2		cranes, elevators traction systems	CO7	L3	
		74.166, 616.146.16.16.16.16.16.16.16.16.16.16.16.16.16			
d	Review Questi		-	-	
1		nciple of operation of DC generators.	CO7	L2	
2		nstruction of DC genrator.	CO7	L2	
3	With usual not generator.	tations derive an expression for the induced EMF of a DC	CO7	L2	
4	What is back e	mf? Explain its significance.	CO8	L3	

What are the various types of DC motors? Give their circuit

Draw and explain torque versus speed characteristics of a DC shunt and

Draw and explain torque versus armature current characteristics of a DC

Derive an expression for the torque developed by a DC motor.

Why is a starter needed for DC motors? Explain in brief.

Explain the principle of operation of DC motors.

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CO8

CO8

CO8

CO8

CO8

CO8

L2

L2

L2

L3

L2

L3

E2. CIA EXAM - 2

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e 1

a. Model Question Paper - 2

Experiences

representations.

DC series motors.

shunt and DC series motors.

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		23								
Cou	rse:	Basic Elec	trical Engine	ering						
-	-	Note: Ansv	ver any 2 qu	estions, eac	h carry equ	al marks.		Marks	CO	Level
1	а	Derive EMF	equation of	transforme	r.			6	CO5	L2
			num efficienc						CO5	L3
			V, 50 Hz trar				iency at (i) 7	5%		
		oad 0.9 pf, (ii) 50% load 0.8 pf, (iii) 25% load 0.6 pf								
		OR								

			T.			
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2	а	With reasoning	for a transformer, show that The transformer can be	5	COE	12

		- AAC AH : 11			
2	<u>ht ©201</u> a	7. cAAS. All rights reserved. With reasoning, for a transformer, show that The transformer can be considered as ideal.	5	CO5	L2
	b	Derive the condition for which the efficiency of a transformer is maximum.	10	CO ₅	L2
	С	Explain two way control of lamps with truth table and connection diagram.		CO6	L2
3	а	Sketch torque versus armature current and speed versus armature current characteristics of a D.C. shunt motor and mention its applications.	3	CO8	L2
	b	A 200V, 4 pole, lap wound DC shunt motor has 800 conductors on its armature. The resistance of the armature winding is 0.5 ohm and that of the shunt field winding is 200 ohm. The motor takes 21A and flux/pole is 30mWb. Find speed and gross torque developed in the motor.		CO8	L3
		OR			
4	а	Derive EMF equation of DC generator.	7	CO7	L2
	b	An 8 pole D.C. generator has 500 armature conductors and has useful flux per pole of 0.065 Wb. What will be emf generated if it is lap connected and runs at 1000 rpm? What must be the speed at which it is to be driven to produce the same emf if it is wave connected?		CO7	L3

b. Assignment – 2

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

1000	Model Assignment Questions											
Crs C	ode:	18ELE13.	/Sem:	1/2	Marks:	10		90 - 120	minute	S		
		23										
Cours			ctrical Engin		1. =			. 1				
			o answer 2-3				carries equal ma					
SNo		USN	Danis - ENAE		nment Desc	ription		Marks	CO	Level		
1			Derive EMF			6 -!		5	CO6	L2		
2			is maximum				y of a transforme		CO6	L3		
3	IKT1		phase, 25 k	XV A, 500/ ne efficiency	1000 V, 50	Hz tra	d Upf of a singl nsformer is 989 of, (ii) 50% load o.	%.	CO6	L4		
4			Explain two connection o		rol of lamp	s with	truth table an	d 5	CO7	L3		
5		18EE003						5	CO6	L2		
6	IKT1	18EE003	Derive EMF	equation of	DC generato	r.		5	CO5	L3		
7	IKT1		has useful generated if	flux per po it is lap co speed at w	ole of 0.065 nnected and which it is to	Wb. W	e conductors an What will be en 1000 rpm? Wha en to produce th	nf at	CO6	L4		
8	IKT1	•	armature cu mention its a	rrent chara pplication	cteristics of	a D.C.	nd speed versu shunt motor an	d	CO6	L3		
9	IKT1		A 200V, 4 pole, lap wound DC shunt motor has 800 conductors on its armature. The resistance of the armature winding is 0.5 ohm and that of the shunt field winding is 200 ohm. The motor takes 21A and flux/pole is 30 mWb. Find speed and gross torque developed in the motor.				e 0	CO5	L2			
10	IKT1	_	Derive EMF					5	CO7	L3		
11	IKT1						of a single phase 8%. Determine th		CO7	L4		

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Conveigh	t ©2017. cAAS. All rights		ray	2: 18 / 3	U
Copyrigh	L ©2017. CAAS. All rights	efficiency at (i) 75% load 0.9 pf, (ii) 50% load 0.8 pf, (iii) 25% load 0.6 pf			
12	IKT18EE006	With reasoning, for a transformer, show that The transformer can be considered as ideal.	5	CO5	L3
13	IKT18EE007	Derive the condition for which the efficiency of a transformer is maximum.	5	CO5	L2
14	IKT18EE007	Explain two way control of lamps with truth table and connection diagram.	5	CO5	L3
15	IKT18EE008	Sketch torque versus armature current and speed versus armature current characteristics of a D.C. shunt motor and mention its applications.		CO6	L4
16	IKT18EE008	A 200V, 4 pole, lap wound DC shunt motor has 800 conductors on its armature. The resistance of the armature winding is 0.5 ohm and that of the shunt field winding is 200 ohm. The motor takes 21A and flux/pole is 30mWb. Find speed and gross torque developed in the motor.	5	CO6	L3
17	IKT18EE009	Derive EMF equation of DC generator.	5	CO6	L2
18	IKT18EE009	An 8 pole D.C. generator has 500 armature conductors and has useful flux per pole of 0.065 Wb. What will be emf generated if it is lap connected and runs at 1000 rpm? What must be the speed at which it is to be driven to produce the same emf if it is wave connected?	5	CO6	L3
19	IKT18EE010	With reasoning, for a transformer, show that The transformer can be considered as ideal.		CO6	L4
20	IKT18EE010	Derive EMF equation of transformer.	5	CO6	L3
21	IKT18EE011	Derive the condition for which the efficiency of a transformer is maximum	5	CO6	L2
22	IKT18EE011	b. The maximum efficiency at full load and Upf of a single phase, 25 kV A, 500/1000 V, 50 Hz transformer is 98%. Determine the efficiency at (i) 75% load 0.9 pf, (ii) 50% load 0.8 pf, (iii) 25% lo_ad 0.6 pf	5	CO7	L3
23	IKT18EE012	Explain two way control of lamps with truth table and connection diagram.		CO7	L4
24	IKT18EE012		5	CO6	L3
25		Derive EMF equation of DC generator.	5	CO5	L2
26	IKT18EE013	An 8 pole D.C. generator has 500 armature conductors and has useful flux per pole of 0.065 Wb. What will be emf generated if it is lap connected and runs at 1000 rpm? What must be the speed at which it is to be driven to produce the same emf if it is wave connected?	5	CO6	L3
27	IKT18EE014	Sketch torque versus armature current and speed versus armature current characteristics of a D.C. shunt motor and mention its application		CO5	L4
28	IKT18EE014	A 200V, 4 pole, lap wound DC shunt motor has 800 conductors on its armature. The resistance of the armature winding is 0.5 ohm and that of the shunt field winding is 200 ohm. The motor takes 21A and flux/pole is 30 mWb. Find speed and gross torque developed in the motor.	5	CO7	L3
29	IKT18EE015	Derive EMF equation of transformer.	5	CO7	L3
30	IKT18EE015	The maximum efficiency at full load and Upf of a single phase, 25 kV A, 500/1000 V, 50 Hz transformer is 98%. Determine the efficiency at (i) 75% load 0.9 pf, (ii) 50% load 0.8 pf, (iii) 25% load 0.6 pf	5	CO7	L2
31	IKT18EE016	With reasoning, for a transformer, show that The transformer can be considered as ideal.		CO7	L3

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32	IKT18EE016		e the condition for which the efficiency of a transformer ximum.	5	CO7	L4
33	IKT18EE017		ain two way control of lamps with truth table and ection diagram.	5	CO7	L3
34	IKT18EE017	arma	ch torque versus armature current and speed versus ture current characteristics of a D.C. shunt motor and ion its applications.	5	CO7	L2
35	IKT18EE018	cond wind ohm.	ooV, 4 pole, lap wound DC shunt motor has 800 uctors on its armature. The resistance of the armature ing is 0.5 ohm and that of the shunt field winding is 200 The motor takes 21A and flux/pole is 30mWb. Find d and gross torque developed in the or.		CO8	L3
36	IKT18EE018	Deriv	e EMF equation of DC generator.	5	CO7	L4
37			5	CO7	L3	
38	IKT18EE019		reasoning, for a transformer, show that The transformer be considered as ideal.	5	CO6	L2
39	IKT18EE020 Derive the condition for which the efficiency of a transformer				CO7	L3

Explain two way control of lamps with truth table and

D3. TEACHING PLAN - 3

IKT18EE020

is maximum.

connection diagram.

Module - 5

40

Title:	Divide and Conquer	Appr Time:	16 Hrs
a	Course Outcomes	-	Blooms
_	The student should be able to:	-	Level
1	understand the principle of operation of Alternator using constructional diagrams.	CO9	L2
2	understand the principle of operation of three phase induction motors using hardware module.	CO10	L2
b	Course Schedule		
Class No	Module Content Covered	CO	Level
1	Three Phase Synchronous Generators:	CO9	L2
2	Principle of operation	CO9	L2
3	Constructional details	CO9	L2
4	Synchronous speed	CO9	L2
5	Frequency of generated voltage	CO9	L2
6	emf equation	CO9	L2
7	Concept of winding factor (excluding the derivation and calculation of distribution and pitch factors).	CO9	L2
8	Three Phase Induction Motors:	CO10	L2
9	Principle of operation	CO10	L2
10	Generation of rotating magnetic field	CO10	L2
11	Construction and working of three-phase induction motor	CO10	L2
12	Slip and its significance.	CO10	L2
13	Necessity of starter	CO10	L2
14	star-delta starter.	CO10	L2

CO5

L4

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Copyright ©2017. cAAS. All rights reserved. СО Level Application Areas To generate electricity CO9 L2 Irrigation purpose CO10 L2 2 d **Review Questions** Explain the constructional features of a salient pole alternators. CO₉ L2 1 Distinguish between salient and non-salient pole alternators. CO9 L2 Starting from basic principles, develop an expression for the emf induced CO9 L2 3 in an alternator. Explain the constructional features of a non-salient pole alternators. CO₉ L2 4 Explain the construction of squirrel cage induction motor. CO10 L2 Explain the difference in squirrel cage and phase wound induction motor. CO10 L2 6 Explain the principle of operation of an induction motor. CO10 L2 8 Why induction motor require a starter? CO10 L2 What is slip in an induction motor? Explain why slip is never zero in an CO10 L2 9 induction motor? 10 Explain the construction of phase wound induction motor. CO10 L2 е Experiences L2 1

E3. CIA EXAM - 3

a. Model Question Paper - 3

Crs Code		18ELE13/	Sem:	1/2	Marks:	30	Time:	75 minute	es	
Cour	rse'		L trical Engine	⊥ erina						
-	_		wer any 2 qu		ch carry equ	ıal marks.		Marks	СО	Level
1	а		sketches, ex				e alternator.	5	CO9	L2
	b		Derive an e					10	CO10	L3
		'			, ,					
2	а		f a 6 pole induction motor supplied from a three phase 50 Hz supply ha a rotor frequency 2.3 Hz, calculate (i) the percentage slip, (ii) the speed (the motor						CO9	L2
	b	A three phase 6 pole 50 Hz induction motor has a slip of 1 % at no load and 3% at full load. Determine: i) Synchronous speed, (ii) No load speed (iii) Full-load speed, (iv) Frequency of rotor current at stand still, (v. Frequency of rotor current at full-load.					ed,	CO10	L3	
3	а					d by a three	e phase supp	oly 5	CO9	L2
	b	establishes a rotating magnetic field. Show that a three phase winding when excited by a three phase supply establishes a rotating magnetic field. A 2 pole 3 phase alternator running a 3000 rpm has 42 slots with 2 conductors per slot. Calculate the flux pe pole, required to generate a line voltage of 2300 V. Assume Kd = 0.952 and Kp = 0.956. The armature is star connected.					at er	CO10	L3	
					OR					
4	a	With neat	sketches, ex	plain the cor	nstruction of	salient pole	e alternator	7	CO9	L2
	b	phase indu Determine load of the	ıction motor the slip and	The freque speed of th notor, if the	ncy of rotor e motor. Als difference	of inductionso, determin	r to a 4 pole n motor is 2 h le the slip at le synchrono	Hz. no	CO10	L3



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

Note: A distinct assignment to be assigned to each student. Model Assignment Questions										
Crs Co	ode.	18ELE13	/Sam	1/2	Marks:	10	Time:	90 – 120	minuta	
013 0	Jue.	23	Jenn.	17 2	Marks.		Tillie.	90 - 120	i i iii i late.	3
Cours	· O'		octrical F	ngineering						
				r 2-3 assignmer	ts Fach ass	ignment ca	rrios ogual m	ark		
SNo		USN	lo ariswe		nment Desc		mes equal m	Marks	СО	Level
			Chave th			-	ad by a thre			
1	INI	18EE001		at a three pha ipply establishe				ee 5	CO9	L2
2	II/T ₄	10EE001		alternator runs				a 5	CO9	L3
	IIX I I	IOCEUUI		3 phase inducti					COg	L3
				n motor is 2 Hz.						
				ilso, determine						
				the difference						
			l	speed is 10 rpm		o o,				
3	IKT1	.8EE002		at sketches, ex		nstruction	of salient po	le	CO9	L2
			alternato						5	
4	IKT1	8EE002	Define s	slip. Derive an	expression	for frequ	ency of rot	or 5	CO10	L3
			current.			-1-	,			
5	IKT1	.8EE003	If a 6 pol	le induction mo	tor supplied	from a thre	ee phase 50 H	Hz 5	CO9	L2
			supply	has a rotor f	requency 2	2.3 Hz, ca	lculate (i) tł	ne		
				age slip, (ii) the s						
6	IKT1	.8EE003		ohase 6 pole 50					CO9	L2
				and 3% at full lo						
				ad speed, (iii) Fi						
				at stand still, (v) Frequenc	y of rotor	current at fu	ll-		
_	II/Ta	055004	load.	at a tlavaa valaa		المديدة ماميد	م ما ام م		000	Lo
7	IK I 1	.8EE004	l	at a three pha ipply establishe	_		•	ee 5	CO9	L2
8	IKT1	.8EE004		at a three pha				ee 5	CO9	L2
	11/11	.0LL004		upply establish					cog	LE
			ļ .	alternator runni	,	_		I		
				ors per slot. Ca						
				e a line voltage (
			= 0.956. 7	The armature is	star connec	ted.				
9	IKT1	.8EE005	l	at sketches, ex	plain the co	nstruction	of salient po	le 5	CO9	L2
			alternato							
10	IKT1	.8EE005		alternator runs					CO9	L2
				3 phase inducti		•	•	I		
				n motor is 2 Hz.						
				Also, determine the difference						
			l	speed is 10 rpm.		e syncinon	ous speed ai			
11	IKT1	.8EE006		at a three pha		when excit	ed by a thre	e 5	CO10	L3
			l	ipply establishe	_		•			_5
12	IKT1	.8EE006	-	alternator runs				a 5	CO9	L2
			4 pole, 3	3 phase inducti	on motor. T	he frequer	ncy of rotor	of	-	
				n motor is 2 Hz.						
				also, determine						
				the difference		e synchron	ous speed ar	nd		
	117	055		speed is 10 rpm		.1		1	00	
13	IK l 1	.8EE007		3phase alterna					CO9	L2
				conductors pe to generate a						
			0.952 and		ine vollage	01 2300 V	. ASSULTE NU	-		
				a 56. The armatur	e is star con	nected.				
			1 - 1- 0.9.							1

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Copyright ©2017. cAAS. All rights reserved. IKT18EE007 With neat sketches, explain the construction of salient pole COq L2 alternator IKT18EE008 Discuss the variation in rotor emf frequency of three phase CO₉ 12 15 induction motor as the load changes. Derive any formula used to substantiate the variation. 16 IKT18EE008 If a 6 pole induction motor supplied from a three phase 50 Hz CO₉ L2 5 supply has a rotor frequency 2.3 Hz, calculate (i) the percentage slip, (ii) the speed of the motor. IKT18EE009 CO10 With neat sketches, explain the construction of salient pole LЗ 17 alternator. IKT18EE009 Define slip. Derive an expression for frequency of rotor CO9 12 18 current. IKT18EE010 If a 6 pole induction motor supplied from a three phase 50 Hz CO10 L3 19 supply has a rotor frequency 2.3 Hz, calculate (i) the percentage slip, (ii) the speed of the motor IKT18EE010 20 A three phase 6 pole 50 Hz induction motor has a slip of 1 % at CO9 12 no load and 3% at full load. Determine: i) Synchronous speed, (ii) No load speed, (iii) Full-load speed, (iv) Frequency of rotor current at stand still, (v) Frequency of rotor current at fullload. IKT18FF011 Show that a three phase winding when excited by a three CO10 L3 21 phase supply establishes a rotating magnetic field. IKT18EE011 A 6 pole alternator runs at 1000 rpm, and supplies power to a COq L2 22 4 pole, 3 phase induction motor. The frequency of rotor of induction motor is 2 Hz. Determine the slip and speed of the motor. Also, determine the slip at no load of the induction motor, if the difference between the synchronous speed and no load speed is 10 rpm. IKT18EE012 With neat sketches, explain the construction of salient pole CO₉ L2 23 alternator. IKT18EE012 Define slip. Derive an expression for frequency of rotor CO9 12 24 current. IKT18EE013 If a 6 pole induction motor supplied from a three phase 50 Hz CO₉ 12 25 supply has a rotor frequency 2.3 Hz, calculate (i) the percentage slip, (ii) the speed of the motor 26 IKT18EE013 A three phase 6 pole 50 Hz induction motor has a slip of 1 % at CO9 12 5 no load and 3% at full load. Determine: i) Synchronous speed, . (ii) No load speed, (iii) Full-load speed, (iv) Frequency of rotor current at stand still, (v) Frequency of rotor current at full-IKT18EE014 Show that a three phase winding when excited by a three 27 CO₉ 12 phase supply establishes a rotating magnetic field. 28 IKT18EE014 Show that a three phase winding when excited by a three COq L2 phase supply establishes a rotating magnetic field.A 2 pole 3phase alternator running at 3000 rpm has 42 slots with 2 conductors per slot. Calculate the flux per pole, required to generate a line voltage of 2300 V. Assume Kd = 0.952 and Kp = 0.956. The armature is star connected. IKT18EE015 With neat sketches, explain the construction of salient pole CO₉ L2 29 alternator IKT18EE015 A 6 pole alternator runs at 1000 rpm, and supplies power to a COq L2 30 4 pole, 3 phase induction motor. The frequency of rotor of induction motor is 2 Hz. Determine the slip and speed of the motor. Also, determine the slip at no load of the induction motor, if the difference between the synchronous speed and no load speed is 10 rpm. IKT18EE016 Show that a three phase winding when excited by a three CO₉ L2 31

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Convrigh	t ©2017. cAAS. All rights				
Сорупап	t @2017. G/V/3.7 (a rights	phase supply establishes a rotating magnetic field.			
32	IKT18EE016	A 6 pole alternator runs at 1000 rpm, and supplies power to a 4 pole, 3 phase induction motor. The frequency of rotor of induction motor is 2 Hz. Determine the slip and speed of the motor. Also, determine the slip at no load of the induction motor, if the difference between the synchronous speed and no load speed is 10 rpm.	5	CO9	L2
33	IKT18EE017	A 2 pole 3phase alternator running at 3000 rpm has 42 slots with 2 conductors per slot. Calculate the flux per pole, required to generate a line voltage of 2300 V. Assume Kd = 0.952 and K p = 0.956. The armature is star connected.	5	CO9	L2
34	IKT18EE017	With neat sketches, explain the construction of salient pole alternator	5	CO9	L2
35	IKT18EE018	Discuss the variation in rotor emf frequency of three phase induction motor as the load changes. Derive any formula used to substantiate the variation.	5	CO9	L2
36	IKT18EE018	If a 6 pole induction motor supplied from a three phase 50 Hz supply has a rotor frequency 2.3 Hz, calculate (i) the percentage slip, (ii) the speed of the motor.	5		L2
37	IKT18EE019	With neat sketches, explain the construction of salient pole alternator.	5	CO9	L2
38	IKT18EE019	Define slip. Derive an expression for frequency of rotor current.	5	CO10	L3
39	IKT18EE020	If a 6 pole induction motor supplied from a three phase 50 Hz supply has a rotor frequency 2.3 Hz, calculate (i) the percentage slip, (ii) the speed of the motor	5	CO9	L2
40	IKT18EE020	A three phase 6 pole 50 Hz induction motor has a slip of 1 % at no load and 3% at full load. Determine: i) Synchronous speed, . (ii) No load speed, (iii) Full-load speed, (iv) Frequency of rotor current at stand still, (v) Frequency of rotor current at full-load.	5	CO9	L2

F. EXAM PREPARATION

1. University Model Question Paper

Cou	ırse:	Basic Electrical Engineering	Month /	'Year	May /	/2018
Crs	Code:	18ELE13/23 Sem: 1/2 Marks: 100	Time:		180 m	ninutes
-	Note	Answer all FIVE full questions. All questions carry equal marks.		Marks	СО	Level
1	a	State Ohm's law and its limitations.		5	CO1	L2
	b	Find the potential difference between the points A & B.		5	CO1	L3
		$\begin{array}{c ccccccccccccccccccccccccccccccccccc$				
		State and explain the Kirchhoff's laws.		5	CO1	L2
		Define RMS value of alternating current. Obtain the relationship between 5			CO2	L2
		RMS and maximum value of alternating current.				
		OR				

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Copyright ©2017. cAAS. All rights reserved. Find the currents in the various branches of the given network CO1 L2 5 100 A 0.01 Ω 0.02Ω 80 Å 0.01Ω **T**150 A CO2 A sinusoidal alternating current is represented by i 30sin30t, find L3 (I) maximum value (ii) current when t 0.002 sec (iii) RMS value of the current In the circuit shown in fig. 2.c, determine CO1 L3 4 (i) the R_{eq} (ii) the total current (iii) The voltage across 6Ω resistor. 5 O зΩ 10 Ω ξ 10 Ω ξ 100 V 6Ω ζ3Ω With neat diagrams explain the generation of single phase voltage. CO2 L2 7 With the help of a circuit diagram and vector diagram, show that two 8 C03 L4 2 wattmeters are sufficient to measure total power and power factor in a balanced three phase circuit. Three similar coils each having resistance of 10ohm and reactance of 5 C03 L3 80hm are connected in star, across 400 V, 3 phase supply. Determine (i) line current, (ii) total power, (iii) reading of each of two wattmeter connected to measure power. OR Mention the advantages of three phase system over single phase CO₃ A three phase load of three equal impedances connected in delta across CO₄ L3 5 a balanced 400V supply, takes a line current of 10 A at a power factor of 0.7 lagging. Calculate: i) the phase current, ii) the total power, iii) the total reactive volt amperes. Derive EMF equation of transformer. CO₅ 3 а b. The maximum efficiency at full load and Upf of a single phase, 25 kV A, 5 L3 500/1000 V, 50 Hz transformer is 98%. Determine the efficiency at (i) 75% load 0.9 pf, (ii) 50% load 0.8 pf, (iii) 25% load 0.6 pf

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	С	With reasoning, for a transformer, show that The transformer can be considered as ideal.	5		
		OR			
-	а	Derive the condition for which the efficiency of a transformer is maximum.	6	CO ₅	
	b	Explain two way control of lamps with truth table and connection diagram.	5		
4	а	Sketch torque versus armature current and speed versus armature current characteristics of a D.C. shunt motor and mention its applications.	7	CO7	
	b	A 200V, 4 pole, lap wound DC shunt motor has 800 conductors on its armature. The resistance of the armature winding is 0.5 ohm and that of the shunt field winding is 200 ohm. The motor takes 21A and flux/pole is 30mWb. Find speed and gross torque developed in the motor.	5		L3
		OR			
-	а	Derive EMF equation of DC generator.	5	CO7	
	b	An 8 pole D.C. generator has 500 armature conductors and has useful flux per pole of 0.065 Wb. What will be emf generated if it is lap connected and runs at 1000 rpm? What must be the speed at which it is to be driven to produce the same emf if it is wave connected?	5	CO8	L3
5	a	Show that a three phase winding when excited by a three phase supply establishes a rotating magnetic field.	8	CO9	
	b	A 6 pole alternator runs at 1000 rpm, and supplies power to a 4 pole, 3 phase induction motor. The frequency of rotor of induction motor is 2 Hz. Determine the slip and speed of the motor. Also, determine the slip at no load of the induction motor, if the difference between the synchronous speed and no load speed is 10 rpm.	5	CO10	L3
	С	A 2 pole 3phase alternator running at 3000 rpm has 42 slots with 2 conductors per slot. Calculate the flux per pole, required to generate a line voltage of 2300 V. Assume Kd = 0.952 and K p = 0.956. The armature is star connected.	5		L3
		OR			
	а	With neat sketches, explain the construction of salient pole alternator	5	CO9	
	b	Discuss the variation in rotor emf frequency of three phase induction motor as the load changes. Derive any formula used to substantiate the variation.	5		
	С	If a 6 pole induction motor supplied from a three phase 50 Hz supply has a rotor frequency 2.3 Hz, calculate (i) the percentage slip, (ii) the speed of the motor.	5		L3

2. SEE Important Questions

Course:		Basic Electrical Engineering Mon					Month	/ Year	AUG /	2018
Crs (Code:	18ELE13/23	Sem:	1/2	Marks:	100	Time:		180 mi	nutes
	Note Answer all FIVE full questions. All questions carry equal marks.					-	-			
Мо	Qno.	no. Important Question						Marks	СО	Year
dul										
е										
1	1	State ohm's law. Mention its limitations.					5	CO1	2017	
	2	b. State and explain Kirchoff s current law and Kirchoff s voltage law.					5	CO1	2017	
	3	2 a. Define dynamically induced emf and statically induced emf with					5	CO2	2017	
		examples.								
		A coil consists of 600 turns and a current of 10 A in the coil gives rise to a			5	CO1	2017			
		magnetic flux	of 1 mWb.	Calculate: (i)	self inductance	e, (ii) The e	mf			

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Copyright ©2017. cAAS. All rights reserved. induced, (iii) The energy stored when a current s reversed in 0.01 sec. A circuit of two parallel resistors having resistance of 200hm and 300hm CO1 2017 respectively, connected in series with 1500hm. If the current through 150hm resistor is 3.A., find (i) current in 200hm and 300hm resistors, (ii) voltage across whole circuit (iii) The total power and power consumed in all resistors. CO1 2017 With the help of a circuit diagram and vector diagram, show that two CO3 2017 2 7 wattmeters are sufficient to measure total power and power factor in a balanced three phase circuit. A three phase load of three equal impedances connected in delta across 2017 CO₄ a balanced 400V supply, takes a line current of 10 A at a power factor ofo.7 lagging. Calculate:i) the phase current, ii) the total power, iii) the total reactive volt amperes. An alternating voltage (80+j60)V is applied to a circuit and the current CO₃ 2017 flowing is (-4+jlO)A. Find: (i) the impedance of the circuit, (ii) the phase angle, (iii) power consumed. c. Two impedances $z_1 = (10 + j_15)$ ohm and $Z_2 = (6 - j_8)$ ohm are connected in CO3 2017 parallel. If the total current supplied is 15A, what is power taken by each branch? CO₄ 2017 CO₅ 2017 Derive EMF equation of transformer. 3 1 Derive the condition for which the efficiency of a transformer is maximum CO5 2017 2 7 b. The maximum efficiency at full load and Upf of a single phase, 25 kV A, CO₅ 2017 5 500/1000 V, 50 Hz transformer is 98%. Determine the efficiency at (i) 75% load 0.9 pf, (ii) 50% load 0.8 pf, (iii) 25% lo_ad 0.6 pf Explain two way control of lamps with truth table and connection CO6 2017 diagram. 2017 Derive EMF equation of DC generator. CO7 2017 4 An 8 pole D.C. generator has 500 armature conductors and has useful 2017 CO7 flux per pole of 0.065 Wb. What will be emf generated if it is lap connected and runs at 1000 rpm? What must be the speed at which it is to be driven to produce the same emf if it is wave connected? Sketch torque versus armature current and speed versus armature CO8 2017 current characteristics of a D.C. shunt motor and mention its application A 200V, 4 pole, lap wound DC shunt motor has 800 conductors on its CO8 2017 armature. The resistance of the armature winding is 0.5 ohm and that of the shunt field winding is 200 ohm. The motor takes 21A and flux/pole is 30 mWb. Find speed and gross torque developed in the motor. 2017 With neat sketches, explain the construction of salient pole alternator. CO9 2017 5 Define slip. Derive an expression for frequency of rotor current. CO10 2017 5 If a 6 pole induction motor supplied from a three phase 50 Hz supply has CO9 2017 5 a rotor frequency 2.3 Hz, calculate (i) the percentage slip, (ii) the speed of the motor A three phase 6 pole 50 Hz induction motor has a slip of 1 % at no load CO10 2017 and 3% at full load. Determine: i) Synchronous speed, .(ii) No load speed, (iii) Full-load speed, (iv) Frequency of rotor current at stand still, (v)

. Content to Course Outcomes

Frequency of rotor current at full-load.

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1. TLPA Parameters

Table 1: TLPA – Example Course

	,						
Мо	Course Content or Syllabus	Content	Blooms'	Final	Identified	Instructi	Assessment
dul	(Split module content into 2 parts which have	Teachin	Learning	Bloo	Action	on	Methods to
e-	similar concepts)	g Hours	Levels	ms'	Verbs for	Methods	Measure
#			for	Leve	Learning	for	Learning
			Content	l		Learning	
Α	В	С	D	Ε	F	G	Н
	Ohm's Law and Kirchhoff's Laws, analysis		L2	L3	Apply	Lecture	Assignment
-	of series, parallel and series- parallel		L3	_5	, , , , , , , , , , , , , , , , , , , ,		and
	circuits excited by independent voltage		_5				seminar
	sources. Power and Energy.						and
							CIA
1	Generation of sinusoidal voltage,	5	L2	L3	Apply	Lecture	Assignment
-	frequency of generated voltage, definition		L3	_5	, , , , , ,	2000010	and
	and numerical values of average value,						seminar
	root mean square value, form factor and						and
	peak factor of sinusoidally varying						CIA
	voltage and current, phasor						
	representation of alternating quantities.						
2	Analysis, with phasor diagram, of circuits	7	L2	L3	Apply	Lecture	Assignment
-	with R, L, C, R-L, RC, R-L-C for series and		L3	_5	, , , , , ,	2000010	and
	parallel configurations. Real power,		_5				seminar
	reactive power, apparent power and						and
	power factor.						CIA
2	Advantages of 3-phase power, Generation	5	L2	L3	Apply	Lecture	Assignment
-	of 3-phase power, Three-phase balanced		 L3	_5	, , , , , , , , , , , , , , , , , , , ,		and
	circuits, voltage and current relations in		_5				seminar
	star and delta connections. Measurement						and
	of three phase power using two						CIA
	wattmeter method.						
3	Necessity of transformer, Principle of	5	L2	L3	Apply	Lecture	Assignment
	operation, Types and construction of	_	L3		''' '		and
	transformers emf equation, losses,						seminar
	variation of losses with respect to load,						and
	efficiency, Condition for maximum						CIA
	efficiency.						
3	Service mains, meter board and		L2			Lecture	Assignment
	distribution board. Brief discussion on			L2	Understa	&	and
	concealed conduit wiring. Two-way and				nd	PPT	seminar
	three-way control. Elementary discussion						and
	on circuit						CIA
	protective devices: Fuse and Miniature						
	Circuit Breaker (MCB's), electric shock,						
	precautions against shock. Earthing: Pipe						
	and Plate earthing.						
4	Principle of operation, Construction of		L2				Assignment
	D.C. Generators. Expression for induced			L2	Understa		and
	emf,Types of D.C. Generators,Relation				nd	PPT	seminar
	between induced emf and terminal						and
	voltage.					_	CIA
4	Principle of operation, Back emf, Torque		L2				Assignment
	equation, Types of dc motors,			L2	Understa		and
	Characteristics of dc motors (shunt and				nd	PPT	seminar
	series motors only) and Applications.						and
							CIA
5	Principle of operation, Constructional	5	L2			Lecture	Assignment

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		us speed, Frequency of			L2	Understa	&	and	
		ge, emf equation,				nd	PPT	seminar	
	Concept of winding	g factor (excluding the						and	
	derivation and cal	culation of distribution						CIA	
	and pitch factors).								
5		ation, Generation of	8	L2			Lecture	Assignment	
	rotating magnetic	field, Construction and			L2	Understa	&	and	
	working of three-p	hase induction motor,				nd	PPT	seminar	
	Slip and its sign	ificance. Necessity of						and	
	starter, star-delta s	tarter.						CIA	

2. Concepts and Outcomes:

Table 2: Concept to Outcome – Example Course

Mo dul e- #		Concepts		Concept Justification (What all Learning Happened from the study of Content / Syllabus. A short word for learning or outcome)	Methodology, 4.Benchmark)	Student Should be able to
Α	/	J	K	L	M	N N
	KVL and KCL laws. Series and	Electrical Laws. Electrical Circuits.	Circuit Analysis		- Illustrate - series and parallel circuits - electrical circuit laws.	Illustrate the series and parallel circuits using electrical circuit laws.
	voltage.	Numerica l analysis of AC signals AC Fundame ntals	Fundamental	Representation	- Explain - fundamentals of AC - Analytical and Graphical method.	AC using Analytical and
	series and parallel circuits of R,L, C and their combinations.	Single		Function of RLC in electrical circuits.	- Illustrate - electrical loads - Analytical and Graphical method.	Illustrate the electrical loads using Analytical and Graphical method.

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Copyright ©2017. cAAS. All rights reserved. Three phase Generation and its - Illustrate Illustrate the 2 Generation of Three 3 phase phase System connections. 3 phase phase connection voltage. connection usina Analytical System Advantages Analytical and and Graphical Graphical method. method. of 3 phase. Connections in 3 phase circuits. Measurement of 3 phase power. 3 Working Performa Performance Efficiency of Determine Determine the single phase principle of nce of of single Efficiency of efficiency of single single transformer transformer. phase single phase phase Types of phase transformer transformer transformer. transformer. transform Losses and er Efficiency of transformer. 3 Electrical Wiring Wiring and Design Discuss the Electrical protective devices concepts of wirina and concepts of installation. protective wiring electrical wiring electrical wiring System Types of devices Svstem System usina hardware hardware module. wiring. Two wav and Electrical module. three way. wirina Protective System devices. Electrical shocks and their precautions. 4 Construction Operation Understand Operation of Construction and Understand the of DC of DC DC generator working of DC principle of principle of generator. aenerator Generator. operation of DC operation of DC generators generators Working using principle. constructional constructional diagram. Types of DC diagram generators. 4 Construction Operation Characteristic Construction and understand understand the working of DC of DC motor. of DC s of DC principle of principle of of DC Working Motor. motors Motor. operation of DC operation principle. motors motors using Types of DC - hardware module hardware module. Characteri motor. stics of Back EMF DC motor. and their significance. Characteristic 5 Construction. Operation Operation of Construction and understand understand the principle of principle Working of 3 phase three phase working of 3 phase of synchron operation principle. synchronous Alternator. operation of of Alternator Comparison generator Alternator using ous of Rotors. constructional constructional generator Winding diagrams. diagrams

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		factor,					
		Synchronous					
		Speed					
Γ	5	Operation of	Operation	Operation of	Construction and	- understand	understand the
		3 Phase IM.	of three	three phase	working of 3 phase	- principle of	principle of
		Concept of	phase	induction	Induction Motor.	operation of three	operation of three
		RMF.	induction	motor		phase induction	phase induction
		Different	motor.			motors	motors using
		types of rotor.				- hardware module	hardware module.
		Staters.					