INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
Dundigal, Hyderabad - 500 043

ELECTRICAL AND ELECTRONICS ENGINEERING

QUESTION BANK

Course Title	**ELECTRICAL CIRCUITS**				
Course Code	AEEC02				
Program	B.Tech				
Semester	II	EEE, ECE			
Course Type	Fundamental				
Regulation	IARE – UG20				
Course Structure	Theory			Practical	
	Lecture	Tutorials	Credits	Laboratory	Credits
	3	-	3	3	1.5
Course Coordinator	Ms. A. Srikanth, Assistant Professor				

COURSE OBJECTIVES:

The students will try to learn:

I	The network reduction techniques such as source transformation, mesh analysis, nodal analysis and network theorems to solve different networks.
II	The basic concept of AC circuits for optimization of household and industrial circuitry.
III	The various configurations of electromagnetic induction used in magnetic circuits helps in the winding of electrical machines.
IV	The characteristics of two-port networks and network topologies suitable in power system.

COURSE OUTCOMES:

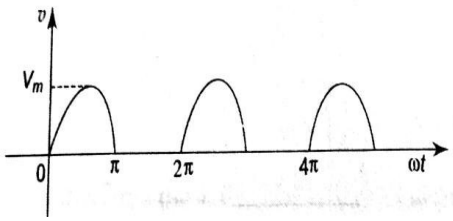
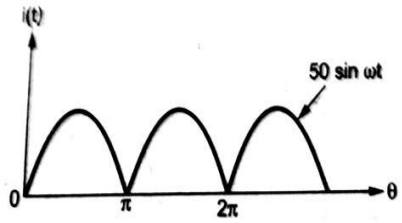
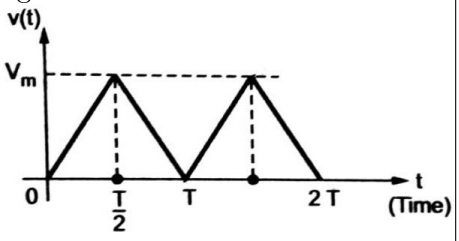
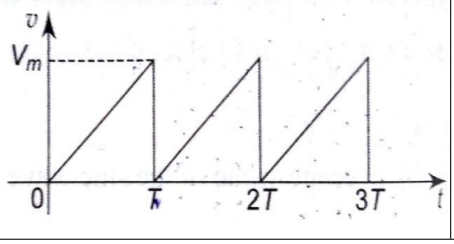
After successful completion of the course, students should be able to:

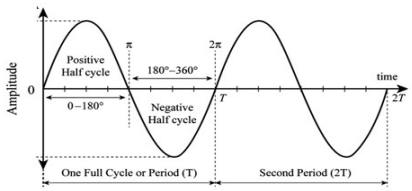
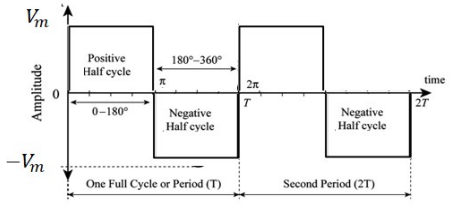
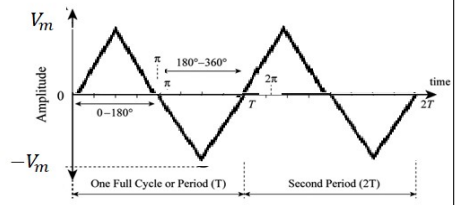
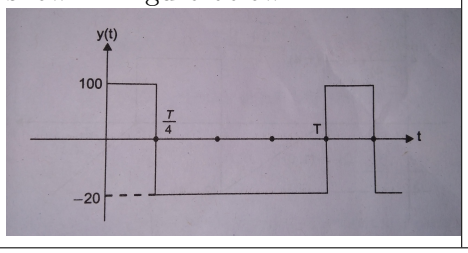
CO 1	**Identify** the basic concepts of electrical quantities such as current, voltage, power, energy of simple DC circuits used in electrical and electronic devices.	Remember
CO 2	**Define** basic terminology of single-phase AC circuits for obtaining mean value, RMS value, form facto, peak facto, impedance, admittance, apparent, real power, reactive power and power factor of electrical circuits.	Understand

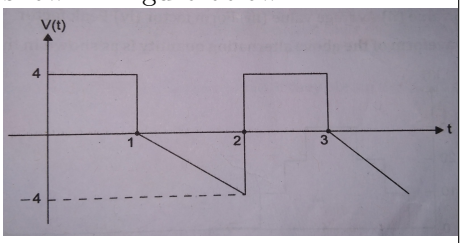
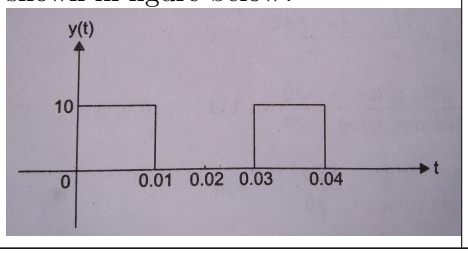
CO 3	**Apply** the different laws, series parallel combination of RLC circuits and indirect quantities associated with electrical circuit for determine voltage and currents in resistive circuits containing voltage and current sources.	Understand
CO 4	**Apply** the several theorems for simplify complex network into equivalent network and verify the current, voltage and power in linear bilateral network with the help of DC and AC excitation.	Understand
CO 5	**Describe** the basic fundamental of Electromagnetism, Faraday's laws of Electromagnetic induction, Lenz's law, types of induced emf, self and mutual inductancefor notice the total magnetomotive force and ampere turns values.	Remember
CO 6	**Understand** the two port parameters, network topology and dual network for digital and graphical representation of complex circuits to be measure easily, without solving for all the internal voltages and currents in the different networks.	Remember

QUESTION BANK:

Q.No	QUESTION	Taxonomy	How does this subsume the level	CO's
MODULE I				
INTRODUCTION TO ELECTRICAL CIRCUITS				
PART A - ANALYTICAL QUESTIONS				
1	Household circuits in the United States commonly run on 120 volts of electricity. Frequently, circuit breakers are installed that open a circuit if it is drawing more than 15 amps of current. What is the minimum amount of resistance that must be present in the circuit to prevent the circuit breaker from activating?	Understand	This would require the learner to recall the memory for different periodic waveforms	CO 3
2	The current in an incandescent lamp is 0.5 Amperes when connected to a 120 Voltage circuit, and 0.2 Amperes when connected to a 10 Voltage source. Does the resistance of the lamp change in these cases?	Understand	This would require the learner to recall the memory for different periodic waveforms	CO 3

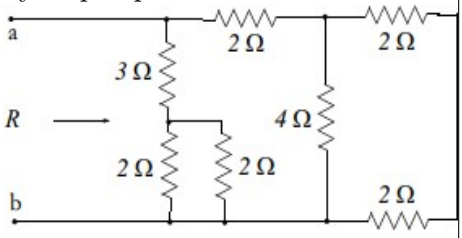
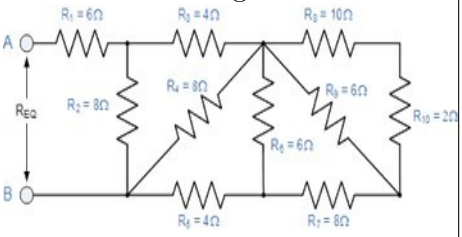
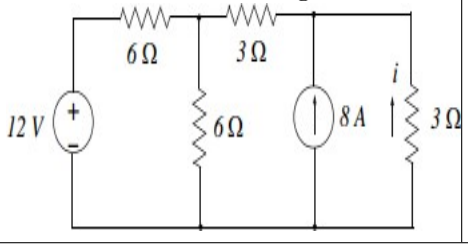
3	Explain your answer using your notes (hint: connect voltage to temperature of the circuit and temperature to resistance of the circuit). Support your answer mathematically.	Understand	This would require the learner to recall the memory for different periodic waveforms	CO 3
4	Obtain average value of sinusoidal waveform shown in figure? 	Understand	This would require the learner to recall the memory for different periodic waveforms	CO 3
5	Find R.M.S value of waveform shown in figure below? 	Understand	This would require the learner to recall the memory for different periodic waveforms	CO 3
6	Find the Form factor for the figure shown below? 	Understand	This would require the learner to recall the memory for different periodic waveforms	CO 3
7	Find the R.M.S value of the waveform shown in figure below? 	Understand	This would require the learner to recall the memory for different periodic waveforms	CO 3

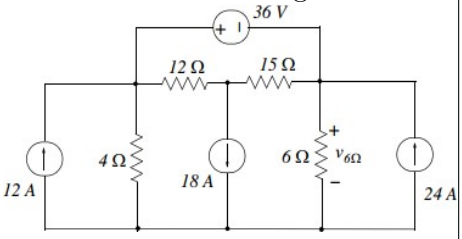
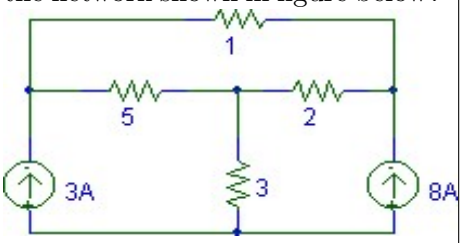
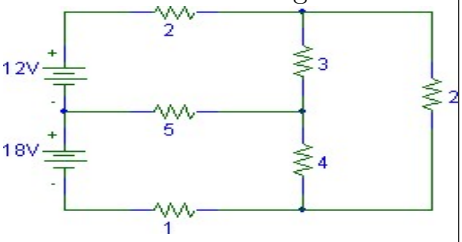
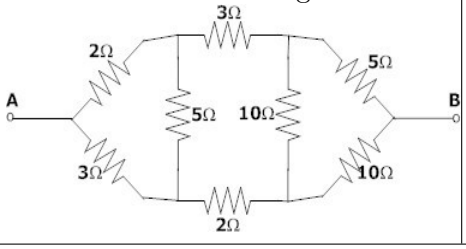
8	Find the Average Value, RMS Value, form Factor and Peak Factor value of the waveform shown in figure below? 	Understand	This would require the learner to recall the memory for different periodic waveforms	CO 3
9	Find the Average Value, RMS Value, form Factor and Peak Factor value of the waveform shown in figure below? 	Understand	This would require the learner to recall the memory for different periodic waveforms	CO 3
10	Find the Average Value, RMS Value, form Factor and Peak Factor value of the waveform shown in figure below? 	Understand	This would require the learner to recall the memory for different periodic waveforms	CO 3
11	Find the Average Value, RMS Value, form Factor and Peak Factor value of the waveform shown in figure below? 	Understand	This would require the learner to recall the memory for different periodic waveforms	CO 3

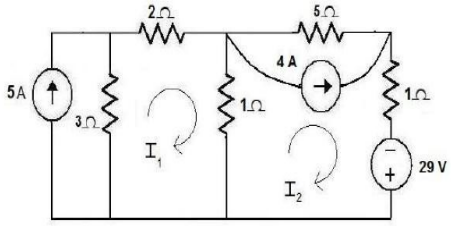
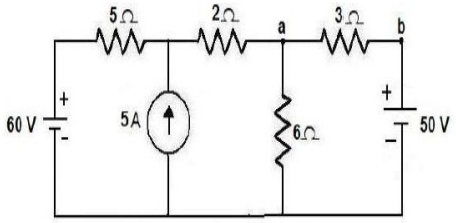
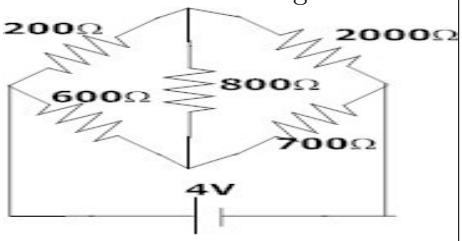
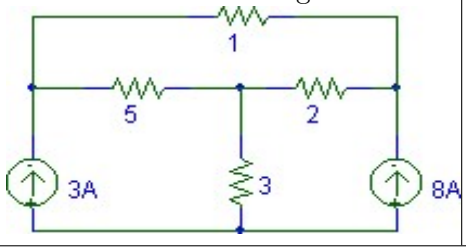
12	Find the Average Value, RMS Value, form Factor and Peak Factor value of the waveform shown in figure below? 	Understand	This would require the learner to recall the memory for different periodic waveforms	CO 3
13	Find the Average Value, RMS Value, form Factor and Peak Factor value of the waveform shown in figure below? 	Understand	This would require the learner to recall the memory for different periodic waveforms	CO 3
PART B- LONG ANSWER QUESTIONS				
1	Differentiate resistor, inductor and capacitor elements using their voltage-current characteristics.	Remember	-	CO 2
2	Derive the necessary condition for source transformation and deduce one type of source from the other.	Remember	-	CO 2
3	Explain the laws used to study behavior of the series and parallel circuits with neat examples.	Remember	-	CO 2
4	Classify types of electric circuit elements depending on their characteristics and explain in detail.	Remember	-	CO 1
5	Distinguish between ideal and practical energy sources.	Remember	-	CO 2
6	State ohm's law and give its applicability and to electrical network. Explain convention current direction and voltage across an element	Remember	-	CO 2
7	Write the conventions to study any electrical circuit.	Remember	-	CO 2

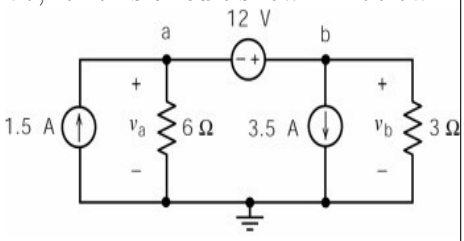
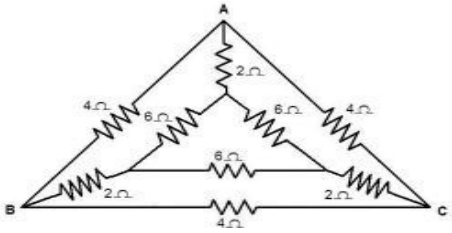
8	Define the terms voltage, current, power, energy, node and degree of the node.	Remember	-	CO 3
9	Define the terms peak, peak to peak, average, RMS values, peak factor and form factor of sine wave.	Remember	-	CO 3
10	Derive the expression for average and RMS values of sine wave.	Remember	-	CO 3
11	Discuss the concept of reactance and impedance offered by R, L, C parameters.	Remember	-	CO 3
12	Explain the concept of susceptance and admittance offered by R, L, C parameters.	Remember	-	CO 3
13	Compute all types of relations between two wave forms and write the relevant expressions.	Remember	-	CO 3
14	Explain the concept of active, reactive, apparent power and draw power triangle.	Remember	-	CO 3
15	Co-relate the impedance triangle with power triangle and explain In detail.	Remember	-	CO 3
16	Explain the terms phase, phase difference and Phasor diagram with neat example.	Remember	-	CO 3
17	Summarize the features of electrical network with DC and AC excitation..	Remember	-	CO 3
18	Explain the nature of power factor in inductive and capacitive circuits.	Remember	-	CO 3
19	Derive the expression for true power in ac circuits.	Remember	-	CO 3
20	Derive the expressions for reactance and impedance of inductor and capacitor.	Remember	-	CO 3
21	Derive the expressions for reactance and impedance of inductor and capacitor.	Remember	-	CO 3

22	An electric heater draws 3.5 A from a 110 V source. The resistance of the heating element is approximately	Remember	-	CO 3
23	A resistor is connected across a 50 V source. What is the current in the resistor if the color code is red, orange, orange, silver?	Remember	-	CO 3
PART C- SHORT ANSWER QUESTIONS				
1	Define the potential difference.	Remember	-	CO 1
2	Define current.	Remember	-	CO 1
3	Write the expression for voltage in terms of C and Q.	Remember	-	CO 1
4	State Ohm's law.	Remember	-	CO 2
5	State Kirchhoff's laws.	Remember	-	CO 2
6	Compare between practical sources and ideal sources.	Remember	-	CO 1
7	Explain with relevant diagrams of dependent sources.	Remember	-	CO 1
8	State two salient points of a series combination of resistors.	Remember	-	CO 1
9	Define an ideal voltage source and current source.	Remember	-	CO 1
10	Write the expression of energy stored in a inductor and capacitor.	Remember	-	CO 1
11	State two salient points of parallel connections of resistors.	Remember	-	CO 2
12	Write the properties of inductor.	Remember	-	CO 2
13	Write the properties of capacitor.	Remember	-	CO 2
14	State limitations of ohm's law?	Remember	-	CO 2
15	Define conductance and state its unit	Remember	-	CO 1
16	Define the alternating quantity.	Remember	-	CO 1
17	Give the difference between periodic and non-periodic wave form.	Remember	-	CO 3
18	Define the peak, peak to peak, average, RMS value also peak and form factor of sine function.	Remember	-	CO 3
19	Represent the alternating current and voltage in terms of sine function.	Remember	-	CO 3

20	Write the expression for reactance offered by inductor and capacitor.	Remember	-	CO 3
21	Give the net impedance offered by commercial inductor and capacitor.	Remember	-	CO 3
22	Define the term admittance of circuit.	Remember	-	CO 3
MODULE II				
ANALYSIS OF ELECTRICAL CIRCUITS				
PART A - ANALYTICAL QUESTIONS				
1	Calculate the equivalent resistance for the given circuit shown in figure below with step by step explanation? 	Understand	This would require the learner to recall the memory for equivalent techniques to find the unknow values	CO 4
2	Calculate equivalent resistance of circuit shown in figure below? 	Understand	This would require the learner to recall the memory for equivalent techniques to find the unknow values	CO 4
3	Apply mesh analysis and calculate the current flowing through 3 Ohms element for the network shown in figure below? 	Understand	This would require the learner to recall the memory for equivalent techniques to find the unknow values	CO 4

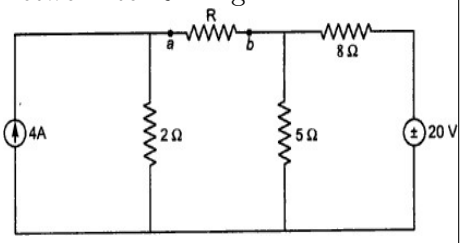
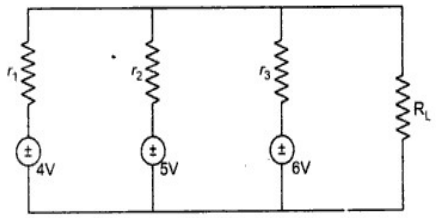
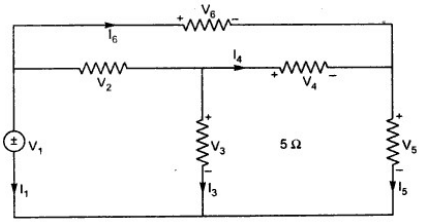
4	Apply nodal analysis and determine the current flowing through each element for the network shown in figure below? 	Understand	This would require the learner to recall the memory for equivalent techniques to find the unknow values	CO 4
5	Determine the node voltages and power absorbed by 5 ohms resistor for the network shown in figure below? 	Understand	This would require the learner to recall the memory for equivalent techniques to find the unknow values	CO 4
6	Using inspection method, compute the current in each mesh and power loss in each element for the network shown in figure below? 	Understand	This would require the learner to recall the memory for equivalent techniques to find the unknow values	CO 4
7	Calculate the voltage to be applied across AB in order to drive current of 5A In the circuit by using star-delta transformation for the network shown in figure below? 	Understand	This would require the learner to recall the memory for equivalent techniques to find the unknow values	CO 4

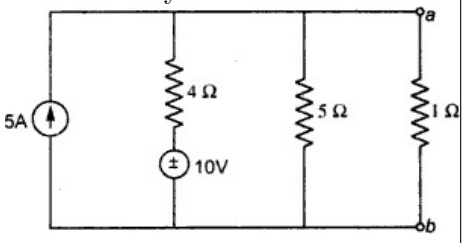
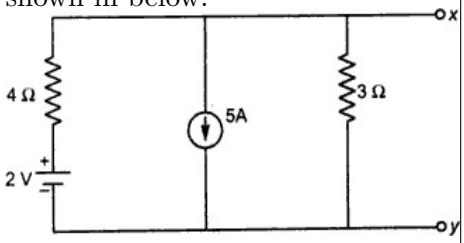
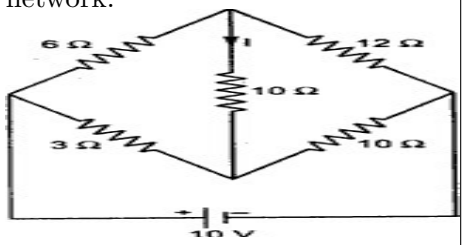
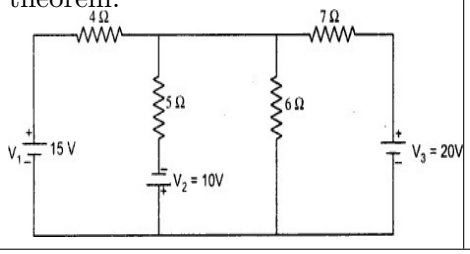
8	Determine the node voltages using nodal analysis for given circuit shown below? 	Understand	This would require the learner to recall the memory for equivalent techniques to find the unknow values	CO 4
9	Determine the current through branch a-b using mesh analysis shown in figure below? 	Understand	This would require the learner to recall the memory for equivalent techniques to find the unknow values	CO 4
10	Determine the current through 800 ohm resistor in the network shown in figure below? 	Understand	This would require the learner to recall the memory for equivalent techniques to find the unknow values	CO 4
11	Determine the node voltages and power absorbed by 5 ohms resistor for the network shown in figure below? 	Understand	This would require the learner to recall the memory for equivalent techniques to find the unknow values	CO 4

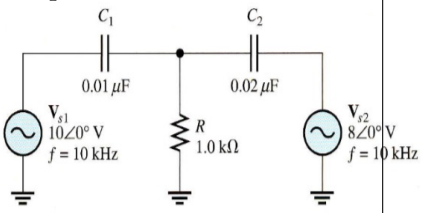
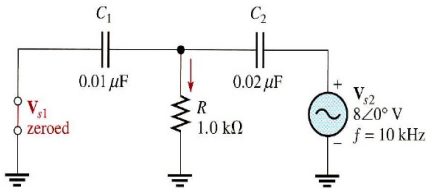
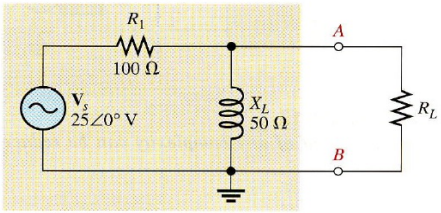
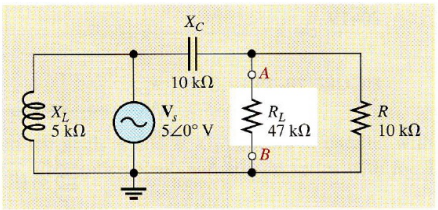
12	Determine the values of the node voltages, va and vb, for this circuit shown in below? 	Understand	This would require the learner to recall the memory for equivalent techniques to find the unknow values	CO 4
13	Determine equivalent resistance between B and C shown in figure below? 	Understand	This would require the learner to recall the memory for equivalent techniques to find the unknow values	CO 4
PART B- LONG ANSWER QUESTIONS				
1	Deduce voltage, current division rules for series, parallel circuits respectively and explain with neat example.	Remember	-	CO 4
2	Predict in detail the equivalent inductance of series and parallel connections of inductor elements.	Remember	-	CO 4
3	Estimate the equivalent capacitance of series and parallel connections of capacitor elements.	Remember	-	CO 4
4	Estimate the equivalent capacitance of series and parallel connections of resistor elements.	Remember	-	CO 4
5	Discuss the method used to determine loop currents for multiple loop network with an neat example.	Remember	-	CO 4
6	Summarize the procedure to calculate node voltages of an electrical network using nodal analysis.	Remember	-	CO 4

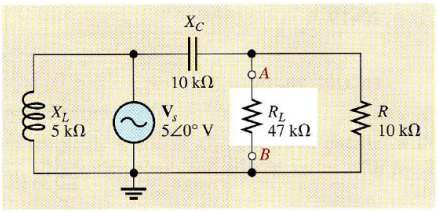
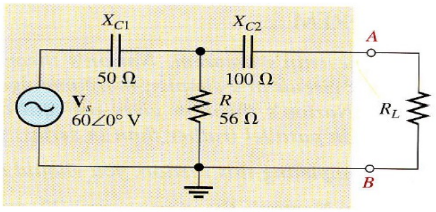
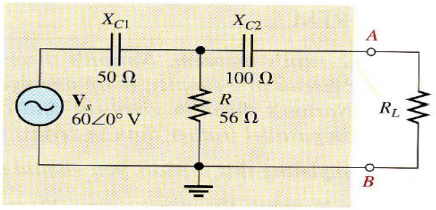
7	Discuss the method used to determine loop currents for multiple loop network with ideal current source between any two meshes.	Remember	-	CO 4
8	Summarize the procedure to calculate node voltages of an electrical network with ideal voltage source between any two nodes.	Remember	-	CO 4
9	Explain the inspection method to write mesh equation for an network.	Remember	-	CO 4
10	Explain the inspection method to write nodal equation for an network.	Remember	-	CO 4
11	Derive the expressions of star-delta transformations to determine the equivalent resistance of complex network.	Remember	-	CO 4
12	If three equal value resistors with R=3ohm are in star , determine their equivalent values in delta connection	Remember	-	CO 4
13	If three capacitors are 10F, 12F and 5F capacitance, Calculate the equivalent capacitance for series and parallel connection.	Remember	-	CO 4
14	Consider an coil allowing an current of i(t) = 4t2 for 1 ms, derive the voltage induced, power absorbed and energy stored by inductor, if its inductance is 5H.	Remember	-	CO 4
15	Consider an capacitor allowing an current of v(t) = 4t2+ 2t + 1, deduce the expression for current flowing, power absorbed and energy stored by capacitor, if its capacitance is 5H.	Remember	-	CO 4
16	If three inductors are connected in parallel having 100mH, 25mH and 35mH inductance respectively, calculate the equivalent inductance.	Remember	-	CO 4

PART C - SHORT ANSWER QUESTIONS				
1	State Kirchhoff's laws.	Remember	-	CO 2
2	Calculate equivalent resistance of the circuit, if applied voltage is 23V and current flowing through circuit is 4A, receiving an power of 92W.	Remember	-	CO 2
3	If the charge developed between two plates is 2C and capacitance is 4.5 F, determine voltage applied to the plates.	Remember	-	CO 2
4	If three capacitors are connected in series which are 2F, 3F and 6F. Calculate equivalent capacitance.	Remember	-	CO 2
5	If three inductors are in parallel with 20mH, 25mH and 50mH, determine the equivalent inductance.	Remember	-	CO 2
6	Deduce current source from voltage source using source transformation.	Remember	-	CO 2
7	Deduce voltage source from current source using source transformation.	Remember	-	CO 2
8	Across AB terminal, a voltage source of 25V is in series with 15 ohms resistor, apply source transformation and redraw the circuit across AB terminals.	Remember	-	CO 2
9	Write the expressions of star to delta transformation.	Remember	-	CO 4
10	Write the expressions of delta to star transformation.	Remember	-	CO 4
11	Define super mesh.	Remember	-	CO 4
12	Give the condition for super node.	Remember	-	CO 4
13	Write the limitations of mesh analysis.	Remember	-	CO 4
14	Write the limitations of nodal analysis.	Remember	-	CO 4
15	If three equal value resistors are in delta, determine their equivalent values in star connection.	Remember	-	CO 4
16	Define reference node.	Remember	-	CO 4

17	Give the difference between nodal analysis and mesh analysis	Remember	-	CO 4
18	If three equal value resistors are in star, calculate their equivalent values in delta connection.	Remember	-	CO 4
19	If three equal value resistors with R= 3ohms are in delta, determine their equivalent values in star connection.	Remember	-	CO 4
MODULE III				
NETWORK THEOREMS (DC AND AC)				
PART A - ANALYTICAL QUESTIONS				
1	Determine the value of resistance R so the maximum power transfer takes place from the rest of the network to R in fig. 	Understand	This would require the learner to recall the memory for equivalent techniques to find the unknow values	CO 5
2	Using Milliman's theorem Determine the current throught RL in the circuit and the voltage drop.(r1 =r2 =r3=2Ω , RL=5Ω) 	Understand	This would require the learner to recall the memory for equivalent techniques to find the unknow values	CO 6
3	Verify Tellegen's theorem provide V1 =8V, V2=4V, V4=2V, I1 =4A, I2 = 2A and I3 =1A. 	Understand	This would require the learner to recall the memory for equivalent techniques to find the unknow values	CO 6

4	Determine power loss in 1Ω resistor by Thevenin's theorem. 	Understand	This would require the learner to recall the memory for equivalent techniques to find the unknow values	CO 6
5	Draw the Norton's equivalent circuit across x-y for the network shown in below. 	Understand	This would require the learner to recall the memory for equivalent techniques to find the unknow values	CO 5
6	Using Thevenin's theorem determine the current I in the network. 	Understand	This would require the learner to recall the memory for equivalent techniques to find the unknow values	CO 5
7	Determine the current through the 6Ω resistor using Thevenin's theorem. 	Understand	This would require the learner to recall the memory for equivalent techniques to find the unknow values	CO 5

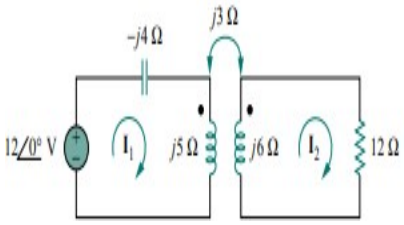
8	Find the current in R of Figure internal source impedances are zero. using the superposition theorem. Assume the internal source impedances are  zero	Understand	This would require the learner to recall the memory for equivalent techniques to find the unknow values	CO 6
9	Find the current in R due to source Vs2 by replacing Vs1, with its internal impedance (zero), as shown in Figure 	Understand	This would require the learner to recall the memory for equivalent techniques to find the unknow values	CO 6
10	Determine Vth, for the circuit external to RL in Figure. The beige area identifies the portion of the circuit to be thevenized. 	Understand	This would require the learner to recall the memory for equivalent techniques to find the unknow values	CO 6
11	For the circuit in Figure, determine the Thevenin voltage as seen by RL. 	Understand	This would require the learner to recall the memory for equivalent techniques to find the unknow values	CO 6

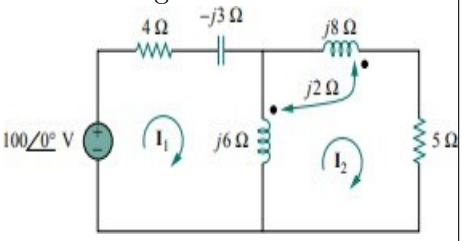
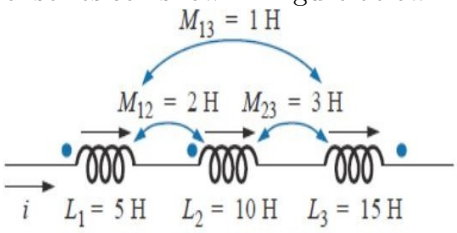
12	For Figure, find Vth for the circuit external to RL. 	Understand	This would require the learner to recall the memory for equivalent techniques to find the unknow values	CO 6
13	In Figure, determiner In, for the circuit as, seen by the load resistor. The beige area identifies the por- tion of the circuit to be nortonized. 	Understand	This would require the learner to recall the memory for equivalent techniques to find the unknow values	CO 6
14	Find Zn, for the circuit in Figure viewed from the open across terminals A and B. 	Understand	This would require the learner to recall the memory for equivalent techniques to find the unknow values	CO 6
PART B- LONG ANSWER QUESTIONS				
1	State and prove Tellegen's theorem with an example for DC excitation.	Remember	-	CO 5
2	State and verify Thevenin's theorem with an example for DC excitation.	Remember	-	CO 6
3	State and verify Nortan's theorem with an example for DC excitation.	Remember	-	CO 6
4	State and prove super-position theorem with an example for DC excitation.	Remember	-	CO 6

5	State and prove reciprocity theorem with an example for DC excitation.	Remember	-	CO 5
6	State and explain compensation theorem with an example for DC excitation.	Remember	-	CO 5
7	State and prove Milliman's theorem theorem with an example for DC excitation.	Remember	-	CO 5
8	Derive the condition for maximum power transfer with DC excitation and verify with an example.	Remember	-	CO 5
9	Explain the Thevenin's equivalent and norton's equivalent circuit with their importance.	Remember	-	CO 6
10	If the Thevenin's equivalent consists of 25v with 10 ohms draw the Nortan's equivalent.	Remember	-	CO 6
11	If 25v, 15v and 10v are connected across AB terminals, Determine voltage measured across AB terminals.	Remember	-	CO 6
12	List the limitations of super-position theorem.	Remember	-	CO 6
13	The Nortan's equivalent circuit consists of 10A in parallel with 8 ohms, determine the load resistance for which maximum power transfer takes place.	Remember	-	CO 6
14	If two branches are in parallel with 15V in series with 5 ohms and 5V in series with 1 ohm across AB terminals , calculate the current and power absorbed by 5 ohms resistor if it is connected across AB terminals.	Remember	-	CO 6
1	State and prove Tellegen's theorem with an example for AC excitation.	Remember	-	CO 5
2	State and verify Thevenin's theorem with an example for AC excitation.	Remember	-	CO 6

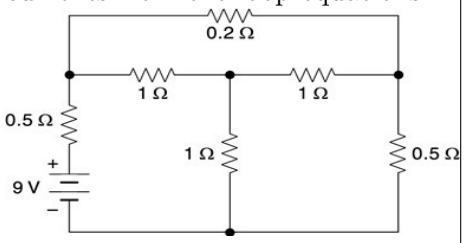
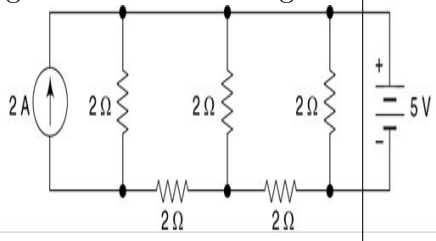
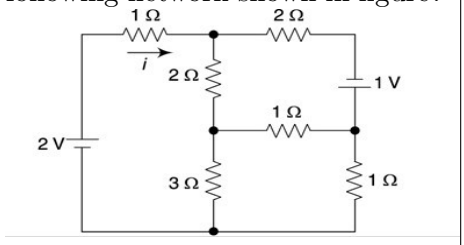
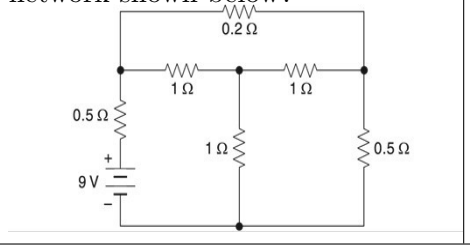
3	State and verify Nortan's theorem with an example for AC excitation.	Remember	-	CO 6
4	State and prove super-position theorem with an example for AC excitation.	Remember	-	CO 6
5	State and prove reciprocity theorem with an example for AC excitation.	Remember	-	CO 5
6	State and explain compensation theorem with an example for AC excitation.	Remember	-	CO 5
7	State and prove Milliman's theorem theorem with an example for AC excitation.	Remember	-	CO 5
8	Derive the condition for maximum power transfer with AC excitation and verify with an example.	Remember	-	CO 5
9	Explain the Thevenin's equivalent and norton's equivalent circuit with their importance.	Remember	-	CO 6
10	If the Thevenin's equivalent consists of 25v with 10 ohms draw the Nortan's equivalent.	Remember	-	CO 6
11	If 25v, 15v and 10v are connected across AB terminals, Determine voltage measured across AB terminals.	Remember	-	CO 6
12	List the limitations of super-position theorem.	Remember	-	CO 6
13	The Nortan's equivalent circuit consists of 10A in parallel with 8 ohms, determine the load resistance for which maximum power transfer takes place.	Remember	-	CO 6
14	If two branches are in parallel with 15V in series with 5 ohms and 5V in series with 1 ohm across AB terminals , calculate the current and power absorbed by 5 ohms resistor if it is connected across AB terminals.	Remember	-	CO 6
PART C- SHORT ANSWER QUESTIONS				
1	State Tellegen's theorem.	Remember	-	CO 5

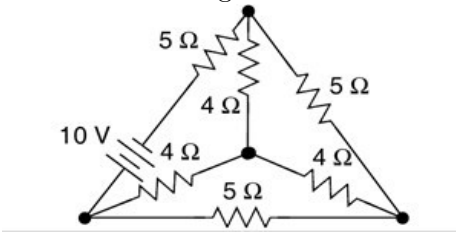
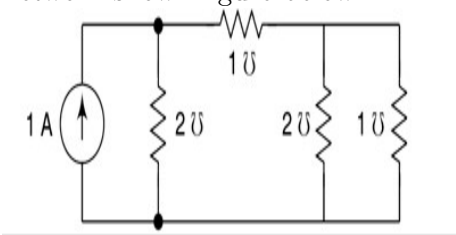
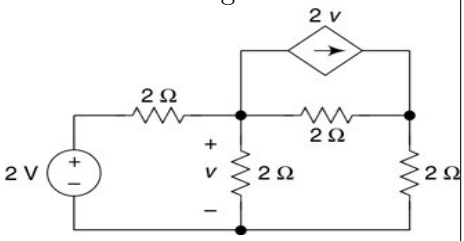
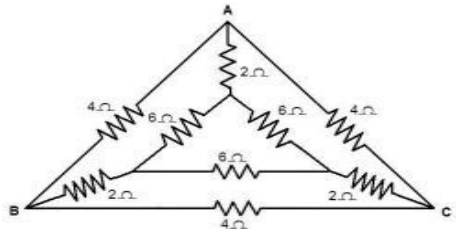
2	State Theveninn's theorem.	Remember	-	CO 6
3	State Norton's theorem.	Remember	-	CO 6
4	State super-position theorem.	Remember	-	CO 6
5	State reciprocity theorem.	Remember	-	CO 5
6	State compensation theorem.	Remember	-	CO 5
7	State Milliman's theorem.	Remember	-	CO 5
8	State maximum power transfer theorem	Remember	-	CO 5
9	Give the application of maximum power transfer theorem	Remember	-	CO 5
10	Application for Tellegen's theorem.	Remember	-	CO 5
11	Application for Theveninn's theorem.	Remember	-	CO 6
12	Application for Norton's theorem.	Remember	-	CO 6
13	Application for super-position theorem.	Remember	-	CO 6
14	Application for reciprocity theorem.	Remember	-	CO 6
15	Application for compensation theorem.	Remember	-	CO 6
16	Application for Milliman's theorem.	Remember	-	CO 6
17	Application for maximum power transfer theorem	Remember	-	CO 6
MODULE IV				
MAGNETIC CIRCUITS				
PART A - ANALYTICAL QUESTIONS				
1	Two coils with a coefficient of coupling of 0.5 between them are in series so as to magnetize the a)in the same direction(series aiding) b)in the opposite direction(series opposition).the corresponding values of equivalent inductance for a)1.9H b)0.7H.find the self inductance of each coil, mutual inductance of each coil, mutual inductance between the coil	Understand	This would require the learner to recall the memory for Faraday's laws	CO 7

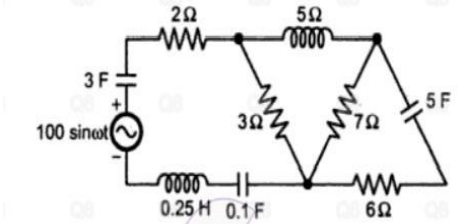
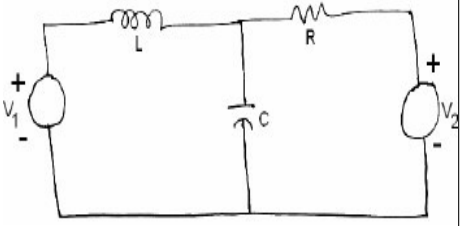
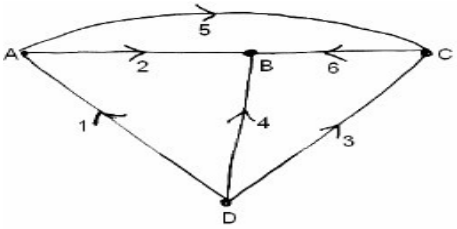
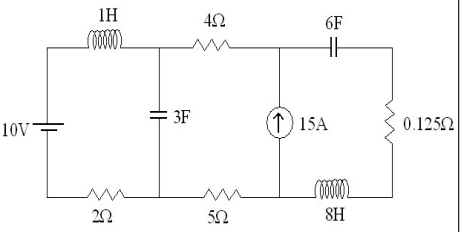
2	An iron ring of mean length 100cm and cross sectional area of 10cm 2 has an air gap of 1mm cut in it. it is wound with a coli of 100 turns. Assume relative permeability of iron is 500.calculate inductance of coil.	Understand	This would require the learner to recall the memory for Faraday's laws	CO 7
3	An ring shaped electromagnet has an air gap of 6mm and of cross sectional area 12 cm2.the mean length of the core being 60cm and cross sectional area area 12 cm2.calculate the mmf required to produce a flux density of 0.4 wb/m2 in the gap. Assume the relative permeability of material as 600.	Understand	This would require the learner to recall the memory for Faraday's laws	CO 7
4	Two coupled coils with L1 =0.02H,L2=0.01H,k=0.5 are connected in four different ways: series aiding, series opposing and parallel with both arrangements of the winding sense. what area the four equivalent inductances?	Understand	This would require the learner to recall the memory for Faraday's laws	CO 7
5	An iron ring of mean length 200cm and cross sectional area of 20cm 2 has an air gap of 1mm cut in it. it is wound with a coli of 100 turns. Assume relative permeability of iron is 500.calculate inductance of coil.	Understand	This would require the learner to recall the memory for Faraday's laws	CO 8
6	Calculate the phasor currents I1 and I2 in the circuit of figure below? 	Understand	This would require the learner to recall the memory for Faraday's laws	CO 8

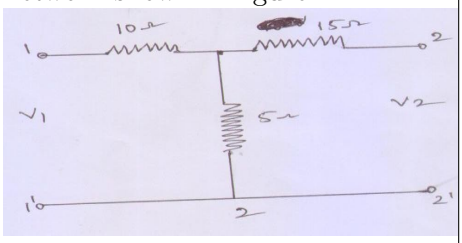
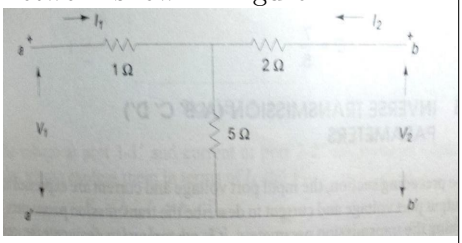
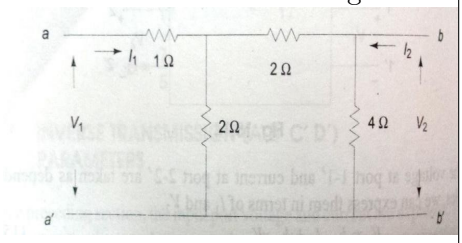
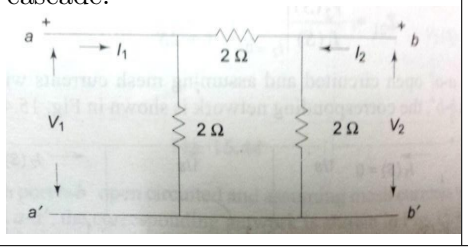
7	Calculate the mesh currents in the circuit of Figure below? 	Understand	This would require the learner to recall the memory for Faraday's laws	CO 8
8	Find the total inductance of series coil shown in figure below? 	Understand	This would require the learner to recall the memory for Faraday's laws	CO 8
	PART B- LONG ANSWER QUESTIONS			
1	Explain the concept of DOT convention and state right hand thumb rule for coupled coils.	Remember	-	CO 7
2	Derive the expression for co-efficient of coupling helps in identifying how strongly two coils are coupled.	Remember	-	CO 7
3	Predict the amount of magnetic flux developed in the composite magnetic circuit.	Remember	-	CO 7
4	Explain the concept of more than two coils coupled in series and derive the expressions for voltage induced, equivalent inductance.	Remember	-	CO 7
5	What is the differences between dynamically induced e.m.f and statically induced e.m.f?	Remember	-	CO 7
6	Explain the clear difference between self inductance and mutual inductance and write various expressions for self and mutual inductance?	Remember	-	CO 7
7	Explain the the procedure to analyze the series magnetic circuit with suitable example?	Remember	-	CO 8

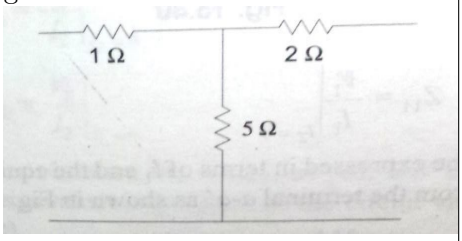
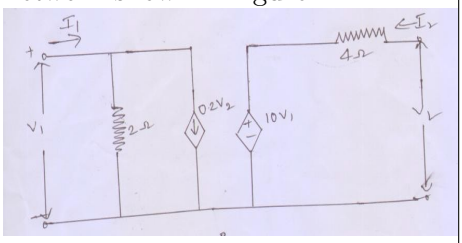
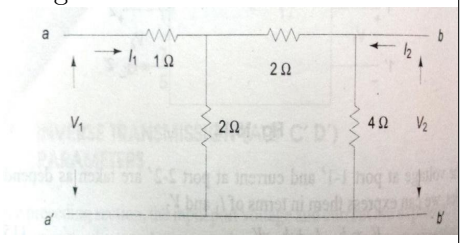
8	Explain the the procedure to analyze the series magnetic circuit with airgap with suitable example?	Remember	-	CO 8
9	Explain the the procedure to analyze the parallel magnetic circuit with suitable example?	Remember	-	CO 8
PART C- SHORT ANSWER QUESTIONS				
1	Define term magnetic flux and write its units?	Remember	-	CO 7
2	Define terms self inductance, mutual inductance?	Remember	-	CO 7
3	Write expression for equivalent inductance when two coils are coupled in series aiding connection?	Remember	-	CO 7
4	Write expression for equivalent inductance when two coils are coupled in parallel aiding connection?	Remember	-	CO 7
5	Define reluctance.	Remember	-	CO 7
6	State faraday's law of electro-magnetic induction.	Remember	-	CO 7
7	Write the expression for co-efficient of coupling and Define perfect coupling.	Remember	-	CO 8
8	Define reluctance and write the expression their suggest Core to be chosen for magnetic circuit.	Remember	-	CO 8
9	Write the condition from dot convention to form voltage equation.	Remember	-	CO 8
10	Two coils of are connected in series , when they are aiding with each other total inductance is 25H and when they are opposing each other is 15H, Determine the mutual inductance.	Remember	-	CO 8
11	Two coils of are connected in parallel , when they are aiding with each other if self inductance of each coil is 10H and mutual inductance is 1H, compute equivalent inductance.	Remember	-	CO 8

12	Write flux density in terms of field intensity.	Remember	-	CO 8
MODULE V				
TWO PORT NETWORK AND GRAPH THEORY				
PART A - ANALYTICAL QUESTIONS				
1	For the network shown in figure below draw the graph and write tie- set schedule, obtain all branch currents from the loop equations? 	Understand	This would require the learner to recall the memory for network parameters	CO 10
2	Write the tie-set matrix for the following network shown in figure  below?	Understand	This would require the learner to recall the memory for network parameters	CO 10
3	Draw the oriented graph and obtain the tie-set matrix for the following network shown in figure? 	Understand	This would require the learner to recall the memory for network parameters	CO 10
4	Write the tie-set matrix for the network shown below? 	Understand	This would require the learner to recall the memory for network parameters	CO 10

5	Write the cut- set matrix for the network shown figure below? 	Understand	This would require the learner to recall the memory for network parameters	CO 10
6	Write the tie -set matrix for the network shown figure below? 	Understand	This would require the learner to recall the memory for network parameters	CO 11
7	Write the cut -set matrix for the network shown figure below? 	Understand	This would require the learner to recall the memory for network parameters	CO 10
8	Determine equivalent resistance between B and C shown in figure below? 	Understand	This would require the learner to recall the memory for network parameters	CO 10
9	Draw the graph from incident matrix and write tie-set matrix 1 0 0 0 -1 -1 -1 -1 0 0 0 0 0 1 -1 0 0 1 0 1 1	Understand	This would require the learner to recall the memory for network parameters	CO 10
10	Draw the graph from incident matrix and write cut-set matrix 1 0 0 0 -1 -1 -1 -1 0 0 0 0 0 1 -1 0 0 1 0 1 1	Understand	This would require the learner to recall the memory for network parameters	CO 10

11	Draw the following Graph Tree Dual network of figure shown below 	Understand	This would require the learner to recall the memory for network parameters	CO 11
12	Explain the principal of duality and draw the dual net- work for the network shown below? 	Understand	This would require the learner to recall the memory for network parameters	CO 11
13	Determine the brach voltages using cut-set marix for the graph shown below? 	Understand	This would require the learner to recall the memory for network parameters	CO 10
14	Develop the fundamental tie-set ma- trix for the circuit shown in below? 	Understand	This would require the learner to recall the memory for network parameters	CO 10
15	The parameters of two port network are Z11=20ohms,Z22 =30 ohms,Z12=Z21=10ohm find Y and ABCD parameters of the net work	Understand	This would require the learner to recall the memory for network parameters	CO 9

16	Find the z-parameters for the network shown in figure 	Understand	This would require the learner to recall the memory for network parameters	CO 9
17	Using definitions, find y-parameters of the two port network shown in figure 	Understand	This would require the learner to recall the memory for network parameters	CO 9
18	Find the transmission parameters for the network shown in figure. 	Understand	This would require the learner to recall the memory for network parameters	CO 9
19	Two networks have been shown in fig. Obtain the transmission parameters of the resulting circuit when both the circuits are in cascade. 	Understand	This would require the learner to recall the memory for network parameters	CO 9

20	Find Image parameters of the given network 	Understand	This would require the learner to recall the memory for network parameters	CO 9
21	Using definitions, find y-parameters of the two port network shown in figure 	Understand	This would require the learner to recall the memory for network parameters	CO 9
22	Find transmission parameters and then obtain image parameters for the given Network 	Understand	This would require the learner to recall the memory for network parameters	CO 9
23	Compute the parameters if 2 Two-port networks are connected in series and parallel	Understand	This would require the learner to recall the memory for network parameters	CO 9
24	Compute the parameters if 2 Two-port networks are connected in Cascade	Understand	This would require the learner to recall the memory for network parameters	CO 9
PART B- LONG ANSWER QUESTIONS				
1	Define terms graph, oriented and non-oriented graph, planar and non- planar graph, tree and co-tree, branches and links, nodes and degree of the node.	Remember	-	CO 10
2	Explain the formation of incidence matrix with an example.	Remember	-	CO 10

3	Demonstrate the formation of matrix using tie-sets for the determination of relation between link currents and branch currents.	Remember	-	CO 10
4	Describe the method for the formation of matrix used to give relation between branch and twig voltages.	Remember	-	CO 10
5	Explain the dual elements and dual network with neat example.	Remember	-	CO 11
6	Determine the branch currents in terms of link currents using tie-set matrix with an example.	Remember	-	CO 10
7	Determine the branch voltages in terms of twig voltages using cut-set matrix with an example.	Remember	-	CO 10
8	Take any graph and draw all possible trees, basic tie-sets and basic cut-sets.	Remember	-	CO 10
9	Define z parameters and draw equivalent circuit	Remember	-	CO 9
10	Obtain z parameters in terms y parameters	Remember	-	CO 9
11	Derive the relationship between Y parameters and z parameters	Remember	-	CO 9
12	Obtain h parameters in terms y parameters	Remember	-	CO 9
13	Define y parameters and draw equivalent circuit	Remember	-	CO 9
14	Obtain ABCD parameters in terms z parameters	Remember	-	CO 9
15	Define h parameters and draw equivalent circuit	Remember	-	CO 9
16	Derive condition of symmetry for Z parameters	Remember	-	CO 9
17	Define ABCD parameters and write applications	Remember	-	CO 9
18	Show that for series connected two port network, the overall z parameters is equal to the addition of individual z parameters of two port network	Remember	-	CO 9

19	Show that for parallel connected two port network, the overall y parameters is equal to the addition of individual y parameters of two port network	Remember	-	CO 11
20	Derive image parameters in terms of open circuit and short circuit impedance	Remember	-	CO 9
21	Explain what is the effect on overall Transmission(ABCD) parameters when two or more two port networks connected in cascade	Remember	-	CO 9
PART C- SHORT ANSWER QUESTIONS				
1	Define tree and co-tree.	Remember	-	CO 10
2	Write the expression for number of links.	Remember	-	CO 10
3	Give the importance and properties of incidence matrix.	Remember	-	CO 10
4	For 8 element 5 node graph, determine number of links.	Remember	-	CO 10
5	Define basic tie-set and give the condition to form basic tie-set.	Remember	-	CO 10
6	Define basic tie-set and give the condition to form basic cut-set.	Remember	-	CO 10
7	Define the duality and the dual elements.	Remember	-	CO 11
8	Give the importance of tie-set matrix with electrical networks.	Remember	-	CO 11
9	Define two port networks?	Remember	-	CO 10
10	Define z parameters.	Remember	-	CO 9
11	Why Z parameters are called open circuit impedance parameters	Remember	-	CO 9
12	Define ABCD parameters	Remember	-	CO 9
13	Define Y parameters	Remember	-	CO 9
14	Define H parameters	Remember	-	CO 9
15	What are symmetrical networks?	Remember	-	CO 9
16	What is condition of symmetry for Z parameters?	Remember	-	CO 9
17	What is condition of symmetry for Y parameters?	Remember	-	CO 9
18	What is condition of symmetry for ABCD parameters?	Remember	-	CO 9

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