SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203.

QUESTION BANK

III SEMESTER

EE3363 Electric Circuit Analysis
(Common to EEE, ECE, EIE & MDE)

Regulation – 2023

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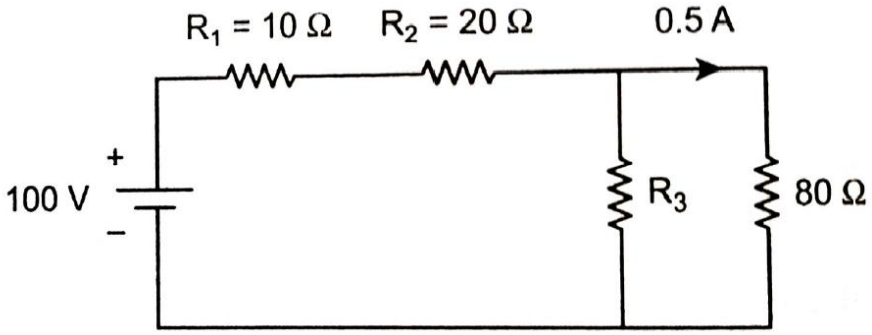
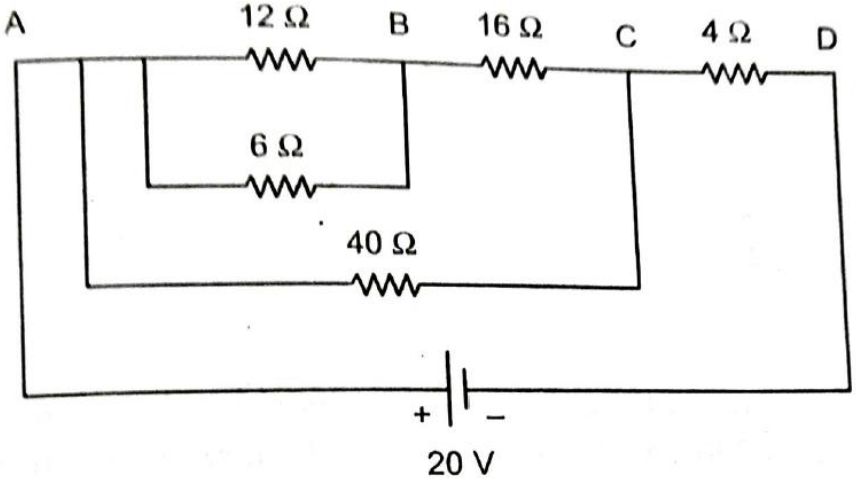
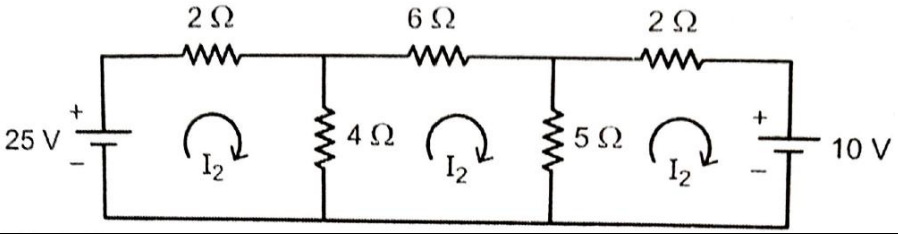
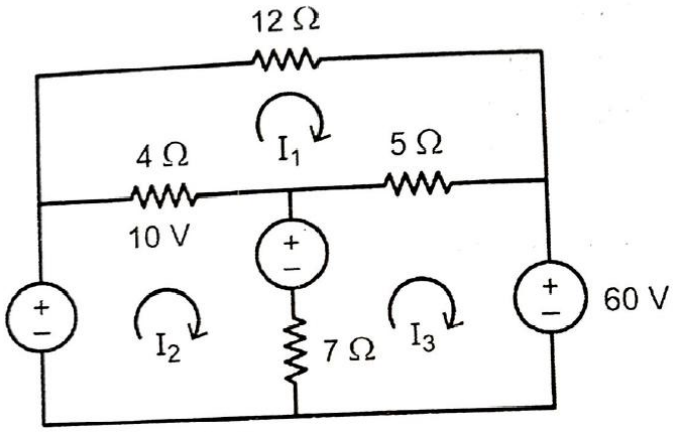
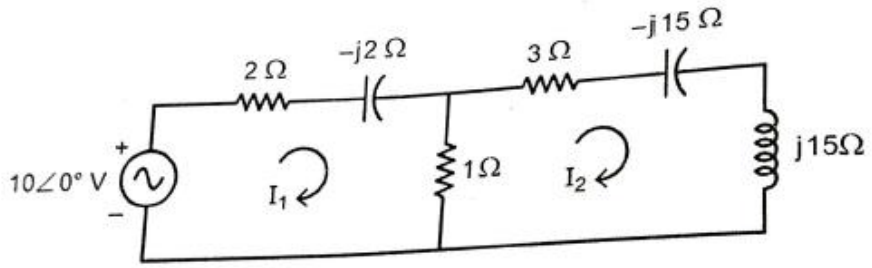
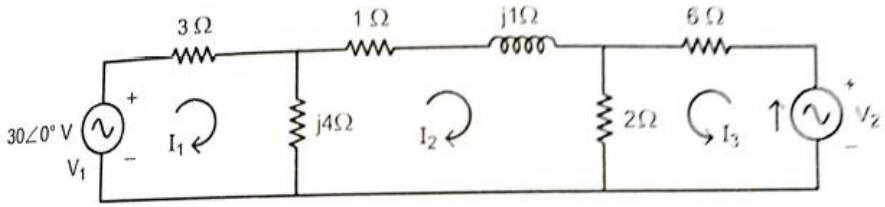
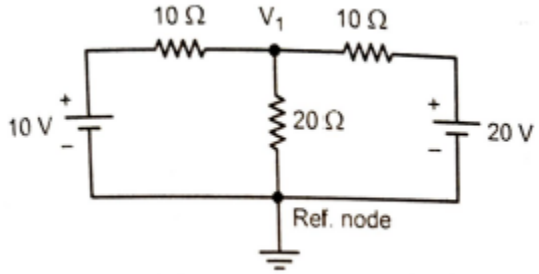
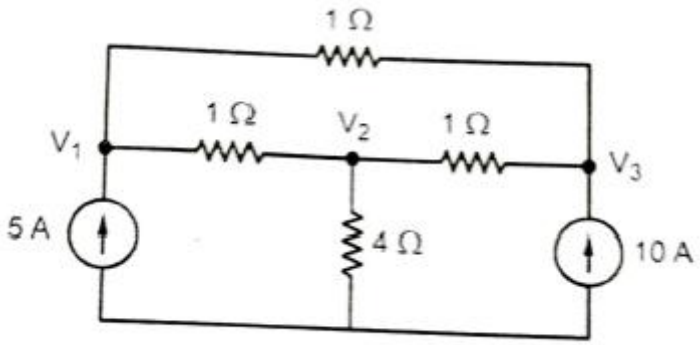
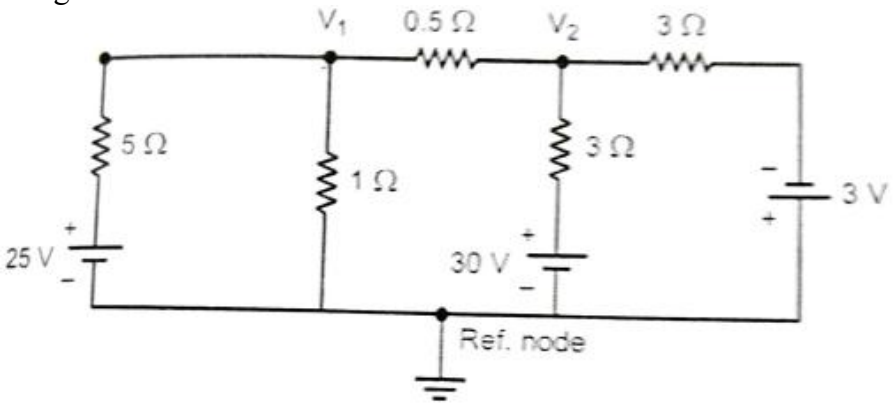
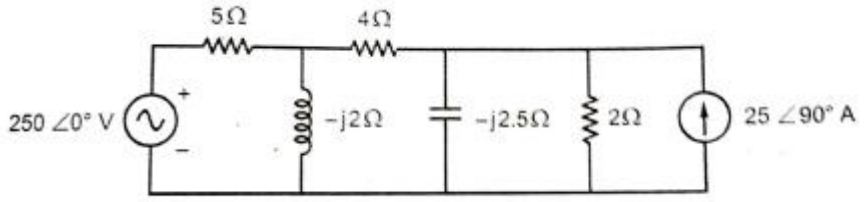
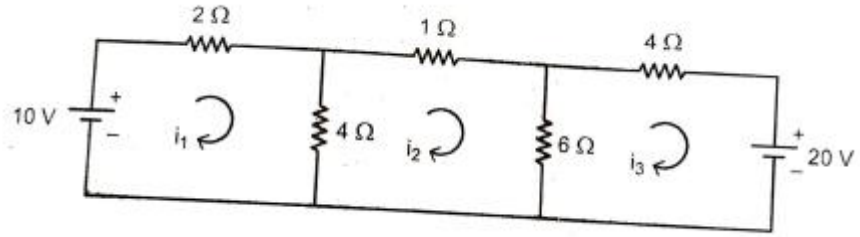
DEPARTMENT OF ELECTRONICS AND INSTRUMENTATION ENGINEERING

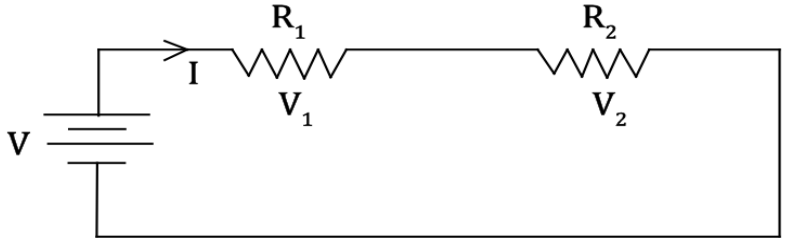
QUESTION BANK

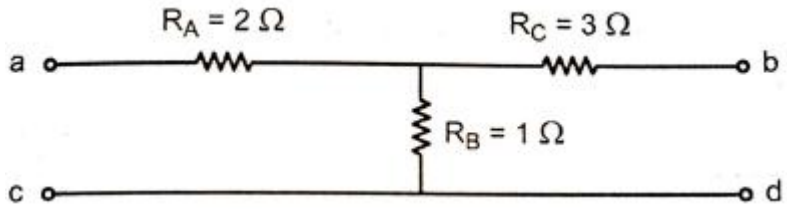
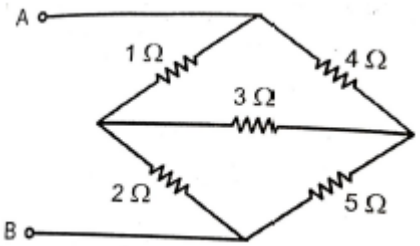
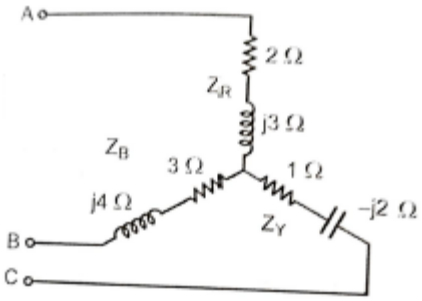
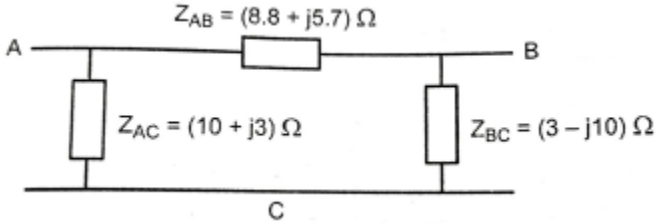
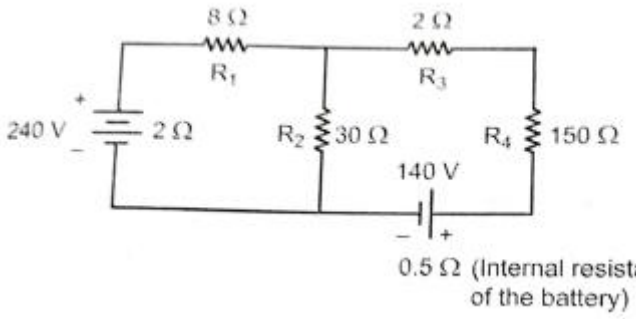
UNIT I - BASIC CIRCUITS ANALYSIS				
Ohm's Law -Kirchhoff 's Laws – DC Circuits – Resistors in series and parallel circuits - A.C Circuits – Average and RMS Value –Complex Impedance – Phasor diagram - Real and Reactive Power, Power Factor, Energy -Mesh current and node voltage methods of analysis D.C and A.C Circuits				
PART – A				
Q.No	**Questions**	**CO**	**BT Level**	**Competence**
1.	What are active elements and passive elements?	CO1	BTL1	**Remember**
2.	State Ohm's Law.	CO1	BTL1	**Remember**
3.	Mention the limitations of Ohm's Law.	CO1	BTL1	**Remember**
4.	Write Kirchoff's Law mathematically.	CO1	BTL1	**Remember**
5.	State two salient points for a series combination of resistors.	CO1	BTL1	**Remember**
6.	State two salient points for parallel combination of resistors.	CO1	BTL1	**Remember**
7.	Write the Kirchoff's Voltage Law	CO1	BTL2	**Understand**
8.	Draw the symbolic representation of the Voltage Source and current Source	CO1	BTL2	**Understand**
9.	Write the expression for Form factor	CO1	BTL2	**Understand**
10.	Define Power factor.	CO1	BTL2	**Understand**
11.	Give the relationship between apparent power, average power & reactive power.	CO1	BTL2	**Understand**
12.	If two resistors of equal resistance R is connected in series, then what is the equivalent resistance?	CO1	BTL3	**Apply**
13.	If two resistors of equal resistance R is connected in parallel, then what is the equivalent resistance?	CO1	BTL3	**Apply**
14.	Two resistors 4 Ω and 6 Ω are connected in parallel. The total current flowing through the resistors is 5A. Find the current flowing through each resistor.	CO1	BTL3	**Apply**
15.	Two capacitance C_1, C_2 of the values 10 μF and 5 μF respectively are connected in series. Evaluate the equivalent capacitance.	CO1	BTL3	**Apply**
16.	Two inductances L_1=3mH and L_2=6mH are connected in parallel. Analyze and calculate L_{eq}	CO1	BTL3	**Apply**
17.	Two resistances when connected in series, the effective value of resistance are 100 Ohms. When connected in parallel the effective value is 24. Determine the value of resistance R1 and R2.	CO1	BTL3	**Apply**
18.	How much current flows through a conductor of resistance 20 Ohm when it is supplied with a potential difference of 200 V?	CO1	BTL4	**Analyze**
19.	A resistor of 3.6Ω is connected in series with another resistor of 4.56 Ω. What resistance should be connected across 3.6Ω resistor so that the total resistance of the circuit shall be 6Ω?	CO1	BTL4	**Analyze**
20.	How the series circuit is distinguished with parallel circuits?	CO1	BTL4	**Analyze**
21.	Point out the difference between DC Current with AC Current.	CO1	BTL4	**Analyze**
22.	Estimate the resultant resistance produced by the parallel connection of two resistors of 10Ω and 30Ω.	CO1	BTL4	**Analyze**
23.	For a purely resistive circuit excited by sinusoidal varying voltage, what are the phase angel and power factor?	CO1	BTL4	**Analyze**
24.	Generalize the expressions for mesh current equations in matrix Form.	CO1	BTL2	**Understand**
PART – B				
1.	Two resistors are connected in parallel and a voltage of 200 Volts is	CO1	BTL1	**Remember**

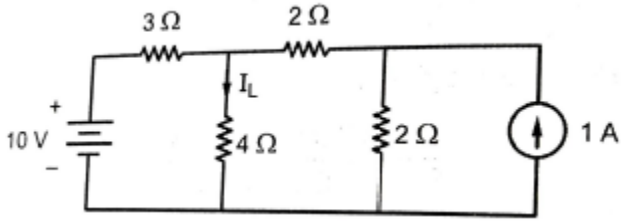
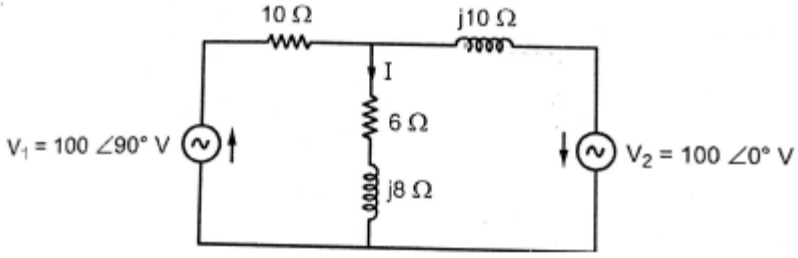
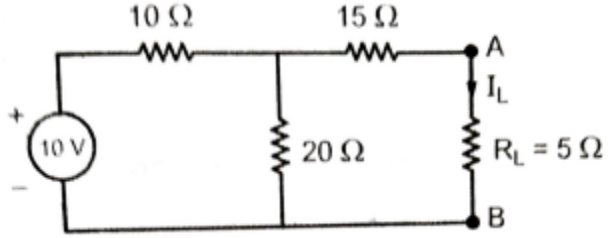
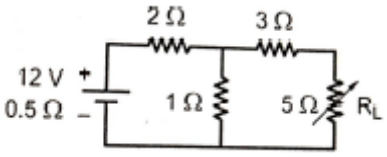
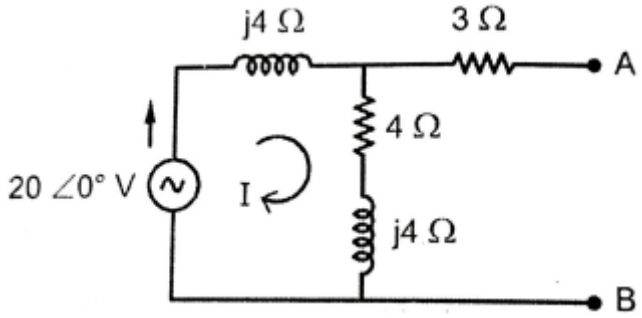
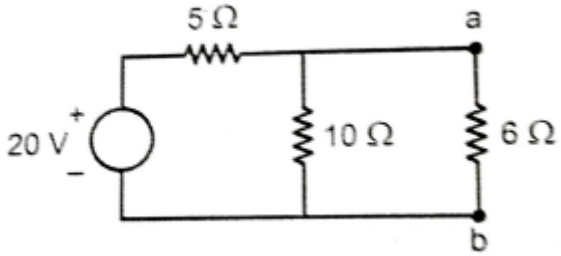
	applied to the terminals. The total current taken is 25A and the power dissipated in one of the resistor is 1500W. What is the resistance of each element?			
2.	Three resistors of 6Ω, 9Ω and 15Ω are connected in parallel to an 18V supply. Calculate (a)the current in each branch of the network, and supply current (b)total resistance of the network	CO1	BTL1	**Remember**
3.	Find the voltages across R1 and R2. Also Find the value of R3 	CO1	BTL1	**Remember**
4.	Calculate the equivalent resistance of the following combination of resistors and also the source current 	CO1	BTL1	**Remember**
5.	Solve the mesh currents shown in Circuit below 	CO1	BTL2	**Understand**
6.	Analyze the circuit using Mesh current method and determine the current in 12Ω resistor. 	CO1	BTL2	**Understand**

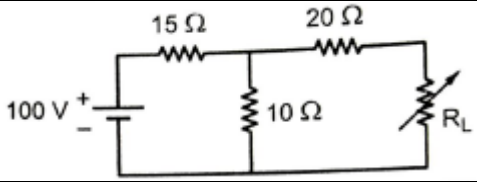
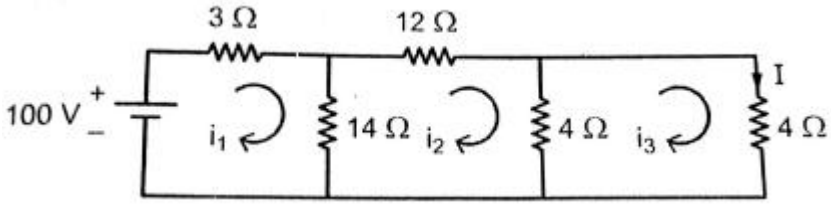
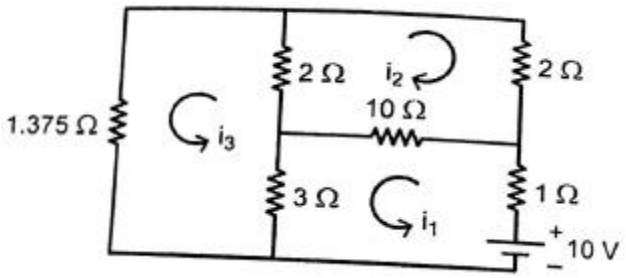
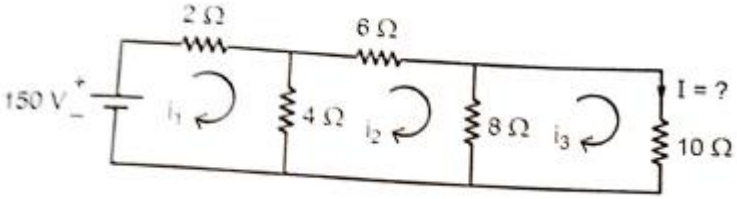
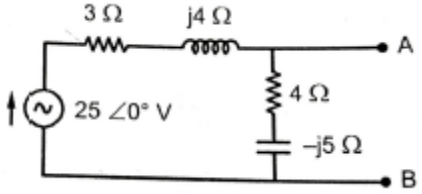
7.	Apply the mesh current method and determine the current through the resistor of the network shown in Fig. below 	CO1	BTL2	**Understand**
8.	In the network shown below, find V2 such that the current in (1 + j1) Ω branch is zero. 	CO1	BTL2	**Understand**
9.	Using Nodal analysis, determine the current in the 20 Ω resistor 	CO1	BTL3	**Apply**
10.	Find V1,V2 and V3 by nodal method for the given circuit. 	CO1	BTL3	**Apply**
11.	Find the voltage of the nodes 1 and 2 in the network shown below by using nodal method. 	CO1	BTL3	**Apply**
12.	Calculate the current through the 4 Ω resistor using nodal analysis	CO1	BTL3	**Apply**

	technique  			
13.	A coil having a resistance of 6 Ω and an inductance of 0.03H is connected across a 100V, 50HZ supply. Calculate the current, phase angle between current and voltage, power factor and power.	CO1	BTL4	**Analyze**
14.	A coil when connected to 200V, 50Hz supply takes a current of 10A and dissipates 1200W. Find the resistance and inductance of the coil.	CO1	BTL4	**Analyze**
15.	A capacitor having a capacitance of 10μF is connected in series with a non-inductive resistance of 120 Ω across 100V, 50Hz supply. Calculate the current, power and the phase difference between current and supply voltage.	CO1	BTL4	**Analyze**
16.	A coil of resistance 10 Ω and an inductance of 0.1H is connected in series with a condenser of capacitance 150μF across a 200V, 50Hz supply. Calculate the inductive reactance of the coil, capacitive reactance, net reactance, current and power factor of the circuit.	CO1	BTL4	**Analyze**
17.	Calculate the current through 6 Ω resistor by kirchoff's Law.  	CO1	BTL4	**Analyze**

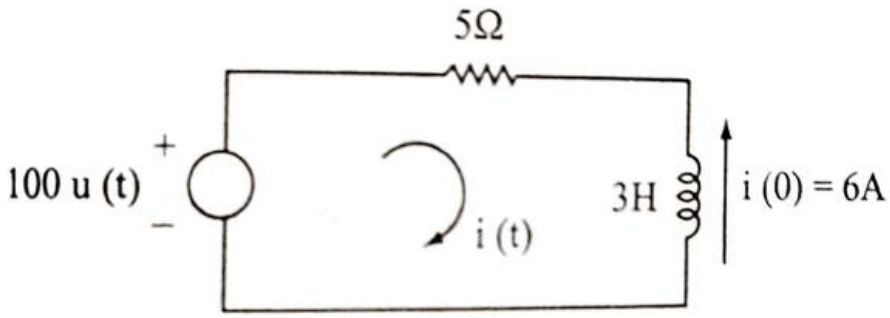
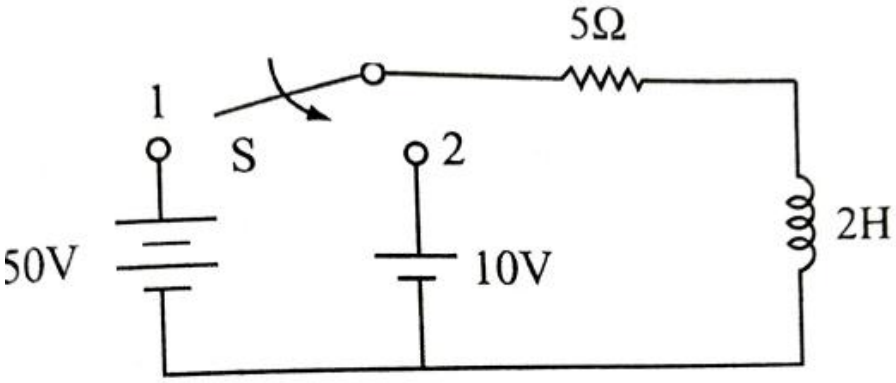
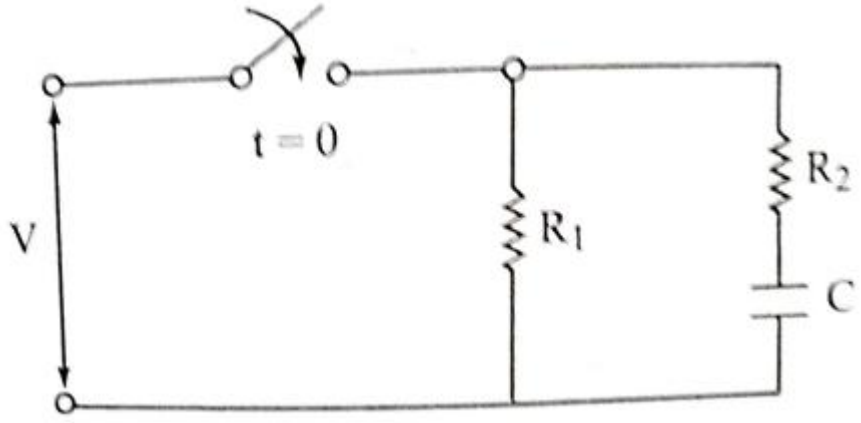
UNIT II - NETWORK REDUCTION & THEOREMS FOR DC AND AC CIRCUITS				
Network reduction: voltage and current division, source transformation – star delta conversion. Theorems – Superposition, Thevenin's and Norton's Theorem – Maximum power transfer theorem –Reciprocity Theorem – Millman's theorem.				
PART – A				
Q.No	**Questions**	**CO**	**BT Level**	**Competence**
1.	Distinguish linear and nonlinear elements with suitable example for each. .	CO2	BTL1	**Remember**
2.	Define the term Electric network.	CO2	BTL1	**Remember**
3.	Illustrate the equivalent voltage source for a current source of 15A when connected in parallel with 5 ohm resistance	CO2	BTL1	**Remember**
4.	Given that the resistors Ra, Rb and Rc are connected electrically in star. Formulate the equations for resistors in equivalent delta	CO2	BTL1	**Remember**
5.	Three resistors Rab, Rbc and Rca are connected in delta. Re-write the expression for resistors in equivalent star.	CO2	BTL1	**Remember**
6.	Write the formulae for voltage division rule with suitable circuit.	CO2	BTL1	**Remember**
7.	Write the formulae for current division rule with suitable circuit.	CO2	BTL2	**Understand**
8.	Draw the circuit of a practical voltage source and its equivalent current source	CO2	BTL2	**Understand**
9.	For the given circuit, apply voltage division rule and Find the values of V1 and V2. 	CO2	BTL2	**Understand**
10.	Explain Thevenin's Theorem.	CO2	BTL2	**Understand**
11.	A load is connected to a network of the terminals to which load is connected in which Rth=10 Ohms and Vth=40 Volts. Calculate the maximum power supplied to the load.	CO2	BTL2	**Understand**
12.	State reciprocity theorem.	CO2	BTL3	**Apply**
13.	Is reciprocity theorem applied to the circuit having resistors, capacitors and diodes? Give your reason.	CO2	BTL3	**Apply**
14.	State Superposition theorem.	CO2	BTL3	**Apply**
15.	List out the applications of maximum power transfer theorem.	CO2	BTL3	**Apply**
16.	Distinguish between DC Current and AC Current.	CO2	BTL3	**Apply**
17.	What is the condition for maximum power transfer in DC and AC circuits?	CO2	BTL3	**Apply**
18.	A load is connected to a network of the terminals to which load is connected, Rth=10 ohms and Vth=40 Calculate the maximum power supplied to the load.	CO2	BTL4	**Analyze**
19.	State Millman's theorem.	CO2	BTL4	**Analyze**
20.	State Reciprocity theorem.	CO2	BTL4	**Analyze**

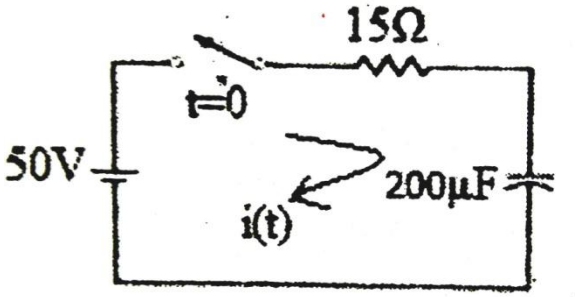
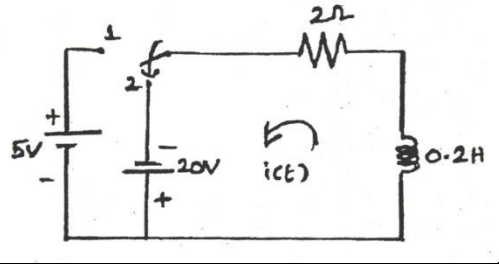
21.	Write the statement for Norton's theorem.	CO2	BTL4	**Analyze**
22.	Mention the different types of dependent source.	CO2	BTL4	**Analyze**
23.	What is the condition for maximum power transfer in DC Circuit?	CO2	BTL4	**Analyze**
24.	State Maximum power theorem.	CO2	BTL2	**Understand**
	PART – B			
1.	Obtain the delta connected equivalent for the star connected circuit shown below. 	CO2	BTL1	**Remember**
2.	Use the technique of delta-star conversion to find the equivalent resistance between A – B of the circuit shown. 	CO2	BTL1	**Remember**
3.	For the given ac circuit, obtain the delta network. 	CO2	BTL1	**Remember**
4.	Determine the star network for the given circuit. 	CO2	BTL1	**Remember**
5.	Find the current in 150Ω load resistor and the power consumed in it by the principle of superposition. 	CO2	BTL2	**Understand**
6.	Calculate the current in 4Ω using superposition theorem for the given	CO2	BTL2	**Understand**

	circuit. 			
7.	Illustrate superposition theorem for the given network. 	CO2	BTL2	**Understand**
8.	Use Thevenin's Theorem to find the current through 5Ω resistance in the circuit diagram shown below. 	CO2	BTL3	**Apply**
9.	Apply Thevenin's Theorem to determine the current through the 5Ω resistor. 	CO2	BTL3	**Apply**
10.	Find the thevenin's equivalent for the given network. 	CO2	BTL3	**Apply**
11.	With the help of Norton's Theorem, find the current through 6Ω resistor. 	CO2	BTL3	**Apply**
12.	In the circuit shown below, find the value of adjustable resistor R for maximum power transfer to R. Also calculate the maximum power.	CO2	BTL4	**Analyze**

				
13.	Verify reciprocity theorem for the circuit below. 	CO2	BTL4	**Analyze**
14.	Find I3 and prove the reciprocity theorem for the given circuit. 	CO2	BTL4	**Analyze**
15.	For the circuit below, validate the reciprocity theorem. 	CO2	BTL4	**Analyze**
16.	Determine the Norton's equivalent between the terminals AB. 	CO2	BTL4	**Analyze**
17.	State and explain Millman's Theorem with necessary illustration?	CO2	BTL2	**Understand**

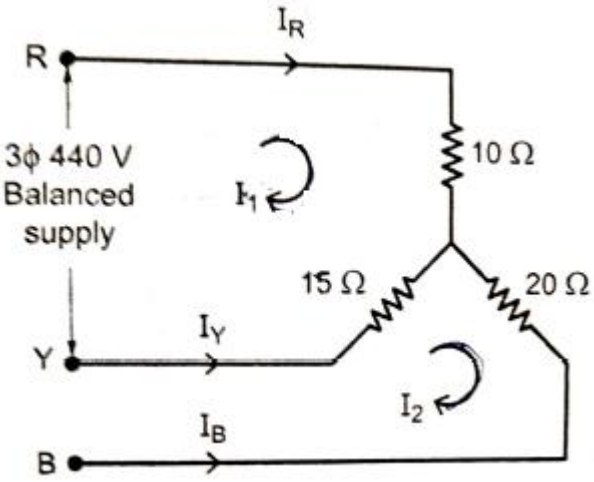
UNIT III - TRANSIENT RESPONSE ANALYSIS				
Transient response of RL, RC and RLC Circuits using Laplace transform for DC input and A.C. with sinusoidal input –Characterization of two port networks in terms of Z, Y and h parameters.				
PART – A				
Q.No	**Questions**	**CO**	**BT Level**	**Competence**
1.	In a series RLC circuit, L=2H and C= 5μF. Calculate the value of R to give critical damping.	CO3	BTL1	**Remember**
2.	What is the time constant for series RL and RC circuits?	CO3	BTL1	**Remember**
3.	Distinguish between transient response and steady state response of a circuit.	CO3	BTL1	**Remember**
4.	Generalize the frequency response of series RLC circuit.	CO3	BTL1	**Remember**
5.	Define the term 'Time Constant'. And write formulae for R_L, R_C Circuit.	CO3	BTL1	**Remember**
6.	Write Integral-differential equation of RLC Circuit with the supply voltage E.	CO3	BTL1	**Remember**
7.	Classify the periodic inputs.	CO3	BTL2	**Understand**
8.	Define (i) transient response (ii) Exponential decay response. Write the formulae for RL Transient Response	CO3	BTL2	**Understand**
9.	Distinguish between free and forced response.	CO3	BTL2	**Understand**
10.	Illustrate the time constant of RL Circuit having the resistance R=10 Ohm and L=0.1mH.	CO3	BTL2	**Understand**
11.	Define the terms (i) Transient Time (ii) Time Constant (iii) Natural response (iv) Steady state response.	CO3	BTL2	**Understand**
12.	Develop an equivalent circuit for inductor and capacitor at t=0+ when there is no initial energy.	CO3	BTL3	**Apply**
13.	A DC Voltage of 100 Volts is applied to Series RL Circuit with R=25 Ohm. Calculate the value of current in which time constant is twice.	CO3	BTL3	**Apply**
14.	Analyze the current given by $I(t) = 5 - 4e^{-20t} I(t) = 5 - 4e^{-20t}$	CO3	BTL3	**Apply**
15.	Define time constant for RL circuit. Draw the transient current characteristics.	CO3	BTL3	**Apply**
16.	Sketch the transient response of I, V_R,V_L in Series RL Circuit.	CO3	BTL3	**Apply**
17.	Describe about under damping.	CO3	BTL3	**Apply**
18.	Draw the phasor diagram for a pure inductor	CO3	BTL4	**Analyze**
19.	State the expression for capacitive reactance and its unit.	CO3	BTL4	**Analyze**
20.	State the relationship between frequency and period.	CO3	BTL4	**Analyze**
21.	Calculate the time constant for series RLC circuit?	CO3	BTL4	**Analyze**
22.	Let a RL circuits has 50Ω and 1mHelements and free of source but,the inductor has initial current of 1 mA at time t=0⁻s.Find the voltage across the resistor at time t=□.	CO3	BTL4	**Analyze**
23.	Find the time constant of RL Circuit with R=100 Ohms and L=20 mH?	CO3	BTL4	**Analyze**
24.	Define instantaneous value of a.c voltage.	CO3	BTL2	**Understand**

	PART – B			
1.	Derive the expression for transient response of RL series circuit excited by DC voltage.	CO3	BTL2	**Understand**
2.	Derive the expression for transient response of RC series circuit excited by DC voltage.	CO3	BTL2	**Understand**
3.	In the given circuit, find the expression for the transient current and the initial rate of growth of the transient current. 	CO3	BTL3	**Apply**
4.	In the following circuit, the switch S is in position 1 for a long time and brought to position 2 at time t=0. Determine the circuit current. 	CO3	BTL3	**Apply**
5.	Find how long it takes after the key is closed before the total current from the supply reaches 25mA, when V = 10V, R1 = 500Ω, R2 = 700Ω and C = 100μF. 	CO3	BTL3	**Apply**
6.	A series RLC circuit with R = 5Ω, L = 0.1H and C = 500μF has a DC voltage of 100V applied at t=0 through a switch. Find the resulting current transient.	CO3	BTL3	**Apply**
7.	A sinusoidal voltage of 10sin100t is connected in series with a switch and R=10Ω and L=0.1H.If the switch is closed at t=0, Determine the transient current i(t).	CO3	BTL1	**Remember**
8.	In the circuit shown, determine the transient current after switch is	CO3	BTL2	**Understand**

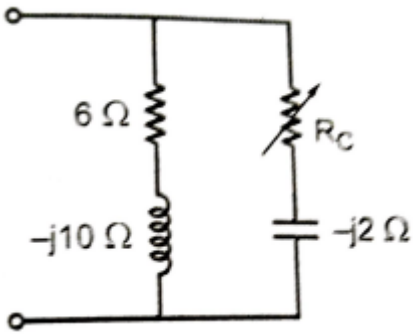
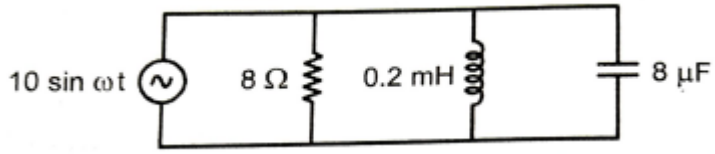
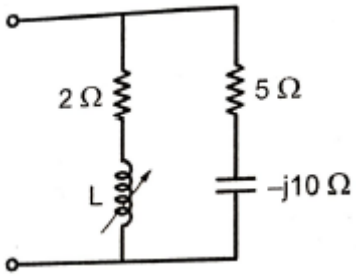
	closed at time t=0, given that an initial charge of 100μC is stored in the capacitor. Derive the necessary equations. 			
9.	In the RL circuit shown in fig, the switch is closed to position 1 at t=0. After t=100ms, the switch is changed to position 2.Find i(t) and sketch the transient. 	CO3	BTL2	**Understand**
10.	Derive the h- parameters for a two port network.	CO3	BTL1	**Remember**
11.	Illustrate the derivation of Z – parameters for a two port network.	CO3	BTL1	**Remember**
12.	With the help of necessary equations , explain how to express h-parameters in terms of Y-parameters	CO3	BTL4	**Analyze**
13.	The Z – parameters of a two port network are Z_{11} = 40Ω, Z_{22} = 50Ω, Z_{12} = Z_{21} = 20Ω. Find the equivalent T – network..	CO3	BTL4	**Analyze**
14.	For a two port network, measurements are made and observed as below: (i) With output terminal pair open, a voltage of 100∠ 0° through the input port resulted in I1 = 20∠ 0° Amperes and V2 = 25∠ 0° Volts (ii) With input terminal pair open, the same voltage applied to the output terminal pair resulted in I2 = 20∠ 0° Amperes and V1 = 40∠ 0° Volts. Find the Z – parameters and write the loop equations	CO3	BTL4	**Analyze**
15.	The Z – parameters of a two port network are Z_{11} = 25Ω, Z_{22} = 40Ω, Z_{12} = Z_{21} = 10Ω. Find the Y – Parameters.	CO3	BTL4	**Analyze**
16.	For a two port network, Y – parameters are : Y_{11} = 0.1mho, Y_{22} = 0.05mho, Y_{12} = Y_{21} = -0.02 mho. Calculate the Z – parameters for the same network.	CO3	BTL4	**Analyze**
17.	Tabulate the conversion expression between Z, Y and h parameters.	CO3	BTL1	**Remember**

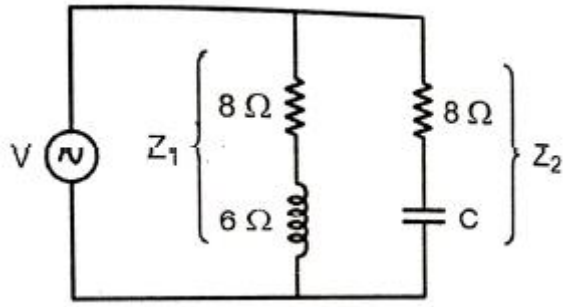
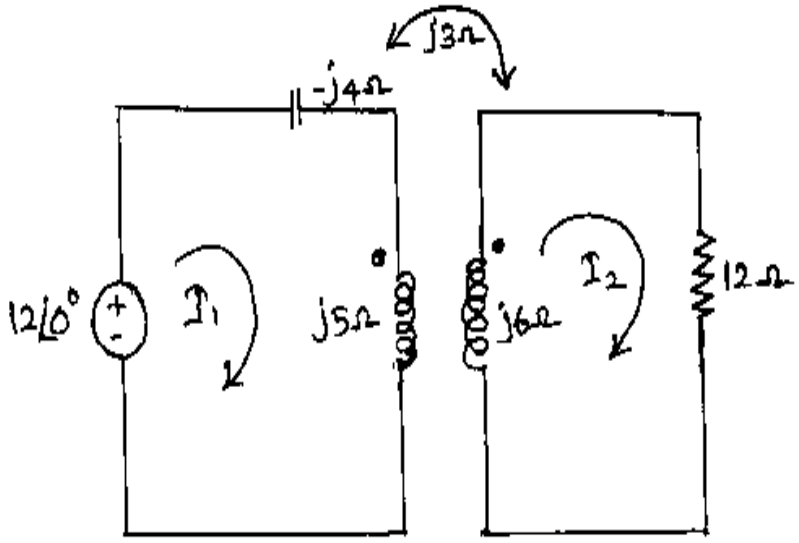
UNIT IV – THREE PHASE CIRCUITS				
Three phase balanced / unbalanced voltage sources –analysis of three phase 3- wire and 4-wirecircuits with star and delta connected loads, balanced &un balanced –phasor diagram of voltages and currents –power and power factor measurements in three phase circuits				
PART – A				
Q.No	**Questions**	**CO**	**BT Level**	**Competence**
1.	Point out the advantages of 3-phase system over 1phase system.	**CO4**	**BTL 4**	**Analyze**
2.	Assess the various methods of power measurement in 3Φ circuits	**CO4**	**BTL 5**	**Evaluate**
3.	Define (i) Average value (ii) RMS value (iii) Crest factor (iv)Form factor.	**CO4**	**BTL 1**	**Remember**
4.	Evaluate the voltage across Y and B in a 3 Φ balanced delta system with voltage across R and Y is 400∠00 V. Assume RYBphase	**CO4**	**BTL 5**	**Evaluate**
5.	Distinguish between unbalanced source and unbalanced load.	**CO4**	**BTL 2**	**Understand**
6.	A 3Φ 400V supply is given to a balanced star connected load of impedance 8+j6 ohms in each branch. Formulate the line current.	**CO4**	**BTL 6**	**Create**
7.	Define power factor in terms of impedance and power components.	**CO4**	**BTL 2**	**Understand**
8.	Define form factor. What is the value of Form factor for sinusoidal signal.	**CO4**	**BTL 3**	**Apply**
9.	Calculate the power factor if $V(t)=V_m\sin\omega t$ and $I(t)=I_m\sin(\omega t-450)$.	**CO4**	**BTL 3**	**Apply**
10.	Evaluate the formulae for two watt meter method for the measurement of power.	**CO4**	**BTL 4**	**Analyze**
11.	Compare star and delta connected system.	**CO4**	**BTL 4**	**Analyze**
12.	Define average value and RMS value.	**CO4**	**BTL 1**	**Remember**
13.	Define power factor.	**CO4**	**BTL 1**	**Remember**
14.	Describe the terms (i) Line voltage (ii) Line current .	**CO4**	**BTL 2**	**Understand**
15.	Differentiate active and reactive power in electrical circuits.	**CO4**	**BTL 2**	**Understand**
16.	How do you differentiate Power and Energy in Electrical Circuits?	**CO4**	**BTL 1**	**Remember**
17.	Draw the phasor diagram of voltages derived from a 3phase source.	**CO4**	**BTL 6**	**Create**
18.	Distinguish between balanced supply and unbalanced load.	**CO4**	**BTL 2**	**Understand**
19.	In a reactive circuit, the current leads the voltage by angle 45^o. Find whether the resultant reactive is either inductive or capacitive and power factor.	**CO4**	**BTL 3**	**Apply**
20.	Write the expression for determining reactive and apparent power in a three phase circuit.	**CO4**	**BTL 1**	**Remember**

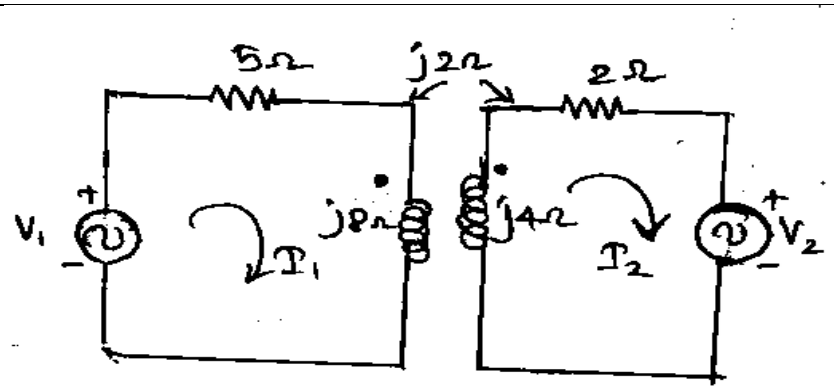
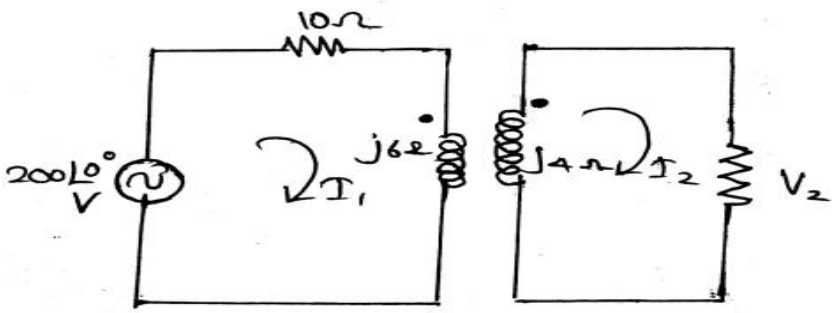
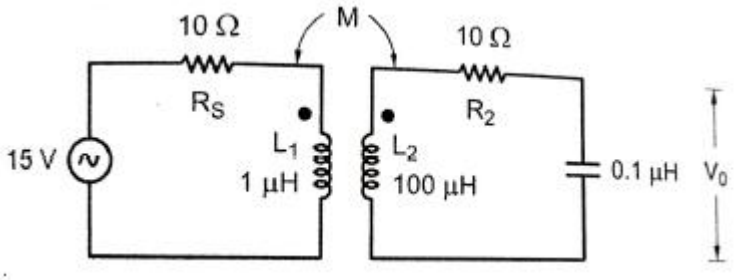
21.	Define the terms : Phase and Phase difference.	**CO4**	**BTL 1**	**Remember**
22.	What are the three types of power in AC Circuits ?	**CO4**	**BTL 2**	**Understand**
23.	Define Phasor diagram	**CO4**	**BTL 1**	**Remember**
24.	What is the phase sequence of a three phase system?	**CO4**	**BTL 2**	**Understand**
	PART – B			
1.	A balanced three phase load consists of a 6 Ω resistor and 8 Ω resistor (inductive) in each phase. The supply is 230V, 3-phase, 50 Hz. Find (i) the phase current (ii) line current (iii) the total power. Assume the load to be connected in star.	**CO4**	**BTL3**	**Apply**
2.	A symmetrical 3-phase, 400V system supplies a balanced delta connected load. The current in each branch is 20A and phase angle 60°C (lag). Calculate the line current and total power.	**CO4**	BTL 4	**Analyze**
3.	**(i)** A 3-phase balanced delta-connected load of (4+j8) Ω is connected across a 400V,3-phase supply. Determine the phase currents and line currents. Assume the RYB phase sequence. Also calculate the value of the power drawn by the load. **(ii)** Three equal inductors connected in star, take 5kW at 0.7pf when connected to a 400V,50Hz, three phases ,three wire supply. Calculate the line currents (1) if one of the inductors is disconnected (2) if one of the inductors is short circuited.	**CO4**	BTL 4	**Analyze**
4.	Discuss in detail about the three phase 3-wire circuits with (i) Star connected balanced loads (ii) Delta balanced Loads.	**CO4**	BTL 1	**Remember**
5.	A delta connected balanced load is supplied from a 3 phase 400V supply. The line current is 20A. Total power taken by load is 10000W. Calculate the impedance in each branch, the line current, power factor and total power consumed if the same load is connected in star.	**CO4**	BTL3	**Apply**
6.	Explain three phase power measurement by 2 wattmeter method for star and delta connected load and determine the power equation and draw phasor diagram.	**CO4**	BTL2	**Understand**
7.	The two wattmeter produces wattmeter readings P_1=1560W and P_2=2100W When connected to delta connected load. If the line voltage is 220V, Calculate (1)the per phase average power (2) total reactive power. (3) Power factor (4) the phasor impedance. Is the impedance inductive or Capacitive?	CO4	BTL3	**Apply**
8.	Explain the following Three Phase Loads for Balanced and Unbalanced Loads for (i) Star Connected Loads (ii)Delta Connected Loads. **(i)** Determine the line current, power factor and total power when a 3- phase 400V supply is given to a balanced load of impedance(8+j6) Ω in each branch is connected instar.	CO4	BTL2	**Understand**
9.	Discuss the method of measuring power in a three phase system with balanced and unbalanced load conditions.	CO4	BTL 1	**Remember**
10.	An unbalanced star – connected load is supplied from a 3 phase 440V, symmetrical system. Determine the line currents and the power output to the circuit shown in Figure. Assume RYB sequences. Take phase voltages V_{RN}	CO4	BTL 4	**Analyze**

	as reference in the supply side.  			
11.	Explain the measurement of power in 3 phase circuit using one wattmeter method.	CO4	BTL2	**Understand**
12.	(i)Mention the Merits of Three Phase System compare with Single Phase System. (ii) Explain the following connection wiring for Three Phase Systems (a) Interconnection of Winding (b) Star Connection (c) Delta Connection with Phasor Diagram.	CO4	BTL 1	**Remember**
13.	Three impedances Z1 = 20∠ 30°, Z2 = 40∠ 60°, Z3 = 10∠ – 90° ohms are delta connected to a 400 V, three phase system. Determine the phase currents and total power consumed by the load.	CO4	BTL 4	**Analyze**
14.	Derive the relationship between the phase voltage and line voltage of a 3 phase star connected balanced system.	CO4	BTL2	**Understand**
15.	Two wattmeter are used to measure power in a three phase load. The wattmeter readings are 400W and -35W. Calculate total active power, power factor and reactive power.	CO4	BTL3	**Apply**
16.	Explain the power and power factor measuring in the three phase by two wattmeter method.	CO4	BTL1	**Remember**
17.	Two wattmeter are connected to measure the power in a 3 phase 3 wire balanced loads. Determine the total power and power factor if the two wattmeter read (i) 1000W each, both positive and (ii) 1000W w each of opposite sign.	CO4	BTL 4	**Analyze**

UNIT V – RESONANCE AND COUPLED CIRCUITS				
Series and parallel resonance –frequency response – Quality factor and Bandwidth – Self and mutual inductance – Coefficient of coupling Analysis of coupled circuits– Single Tuned circuits.				
PART – A				
Q.No	**Questions**	**CO**	**BT Level**	**Competence**
1.	Write the expression for coefficient of coupling.	CO5	BTL1	**Remember**
2.	What is meant by Resonance?	CO5	BTL1	**Remember**
3.	What is meant by anti-resonance circuit? Illustrate the frequency response curve for Parallel RLC Circuit?	CO5	BTL1	**Remember**
4.	Write the expression for resonant frequency for series RLC Circuit.	CO5	BTL1	**Remember**
5.	Express the term tuned circuits. Mention the different tuned circuits.	CO5	BTL1	**Remember**
6.	Draw the series resonant circuit.	CO5	BTL1	**Remember**
7.	Illustrate the expression of maximum energy stored in (i) Inductor (ii) Capacitor.	CO5	BTL2	**Understand**
8.	Discuss about the quality factor of a series resonant circuit.	CO5	BTL2	**Understand**
9.	Define the term Coefficient of coupling.	CO5	BTL2	**Understand**
10.	Illustrate the quality factor of a coil for the series resonant circuit consisting of R= 10 ohm, L= 0.1 henry and C= 10 microfarad.	CO5	BTL2	**Understand**
11.	Define bandwidth of a resonant circuit.	CO5	BTL2	**Understand**
12.	Describe the expression which relates the self and mutual inductance.	CO5	BTL3	**Apply**
13.	Examine the maximum possible mutual inductance of two inductively coupled circuits with self inductanceL1 =16 H and L2=4H.	CO5	BTL3	**Apply**
14.	Define the term Mutual inductance (ii) Coefficient of coupling.	CO5	BTL3	**Apply**
15.	What is an antiresonance circuit? Create the frequency response of RLC Parallel Circuit.	CO5	BTL3	**Apply**
16.	Illustrate the expression for effective inductance of two series connected magnetically coupled coils.	CO5	BTL3	**Apply**
17.	Two coupled coils with L1=0.02 H, L2=0.01 H and K=0.5 are connected in series aiding arrangement. Obtain the equivalent inductance.	CO5	BTL3	**Apply**
18.	Define self-inductance and mutual inductance of a coil.	CO5	BTL4	**Analyze**
19.	What is meant by single tuned coupled circuits?	CO5	BTL4	**Analyze**
20.	Define quality factor Q of a coil.	CO5	BTL4	**Analyze**
21.	Two identical coils with L=0.03H have a coupling coefficient of K=0.8.Find the mutual inductance and the equivalent inductance with the coils connected in series opposing mode.	CO5	BTL4	**Analyze**
22.	What is meant by tuned circuits ? List some applications of tuned circuits.	CO5	BTL4	**Analyze**
23.	A resistor of 50 Ohm an inductor of 0.02 H and a capacitor of 5 μF are connected in series. Find the resonant frequency and power factor at resonance.	CO5	BTL4	**Analyze**

24.	Compare the properties of series and parallel resonant circuits.	CO5	BTL2	**Understand**
	PART – B			
1.	Explain briefly about the concept of parallel resonance.	CO5	BTL1	**Remember**
2.	A series circuit with R = 10ohms, L = 10mH and C = 1μF has an applied voltage of 200V at resonant frequency. Calculate the (i) Resonant frequency, Quality factor and bandwidth (ii) Current in the circuit and voltage across the elements of resonance	CO5	BTL3	**Apply**
3.	Determine the value of Rc in the network shown in figure to yield resonance? 	CO5	BTL3	**Apply**
4.	For a Series RLC Circuit i) Derive the condition for resonance ii) Explain the frequency response and Obtain quality factor and bandwidth.	CO5	BTL1	**Remember**
5.	In the parallel RLC circuit in Figure, Calculate resonant frequency, bandwidth and Q factor 	CO5	BTL4	**Analyze**
6.	The circuit shown in figure is resonant at a frequency of ω = 5000 rad/sec. Find the value of L. 	CO5	BTL4	**Analyze**
7.	For the circuit shown in figure, determine the value of C which it resonates when f = 100Hz.	CO5	BTL3	**Apply**

				
8.	Two inductively coupled coils have self inductance L1 = 30mH and L2 = 100mH. If the coefficient of coupling is 0.5 (i) Find the value of mutual inductance between the coils (ii) What is the maximum possible mutual inductance?	CO5	BTL3	**Apply**
9.	Two identical coupled coils in series has an equivalent inductance of 0.080H and 0.0354H when connected in series aiding and series opposing respectively. Find the values of the inductance, mutual inductance and the coefficient of coupling.	CO5	BTL4	**Analyze**
10.	Draw the conductively coupled equivalent circuit for the given circuit in fig. and also find the voltage drop across 12Ω resistor. 	CO5	BTL2	**Understand**
11.	The number of turns in two coupled coils are500 turns and 1500 turns respectively. When 5A current flows in coil 1, the total flux in this coil is 0.6 x 10-3 wb and flux linking in second coil is 0.3 x 10-3 wb. Determine L_1, L_2, M and K.	CO5	BTL2	**Understand**
12.	For the circuit shown in Fig. determine the voltage ratio V_1/V_2, which will make the current I_1 equal to zero.	CO5	BTL4	**Analyze**

				
13.	A coil having an inductance of 100mH is magnetically coupled to another coil having an inductance of 900mH. The coefficient of coupling between the coils is 0.45. Calculate the equivalent inductance if the two coils are connected in 1) Series opposing 2)Parallel opposing.	CO5	BTL1	**Remember**
14.	In the circuit shown in Fig. , Find the phasor voltage V2. 	CO5	BTL2	**Understand**
15.	Two coupled coils of self inductance L1 = 2H and L2 = 4 H are coupled in (i) series aiding (ii) series opposing (iii) parallel aiding (iv) parallel opposing. If the mutual inductance is 0.5H, Find the equivalent inductance in each case.	CO5	BTL4	**Analyze**
16.	Express the term self inductance and mutual inductance for the coupled circuits.	CO5	BTL1	**Remember**
17.	Consider the single tuned circuit shown in figure and determine resonant frequency, the output voltage at resonance, the maximum output voltage. Assume Rs>>ωrL1 and K = 0.9. 	CO5	BTL2	**Understand**