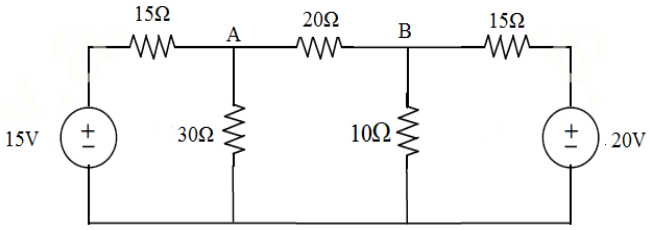
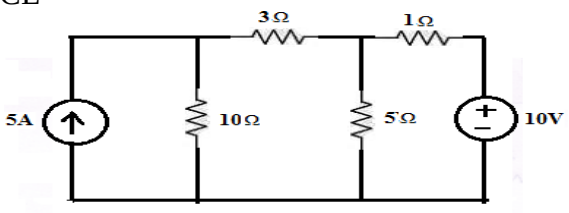
SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

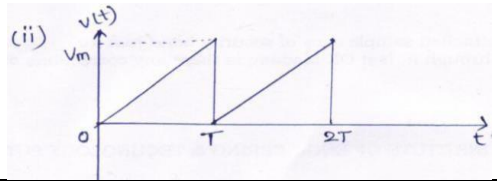
(Approved by AICTE, New Delhi & Affiliated to JNTUA, Ananthapuramu)
(Accredited by NAAC with "A" Grade & ISO 9001 : 2008 Certified Institution)

QUESTION BANK (DESCRIPTIVE)

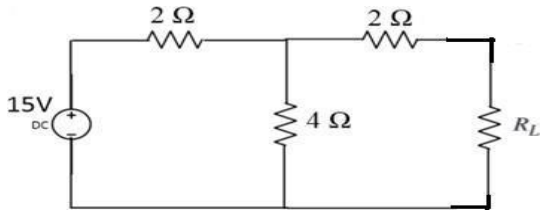
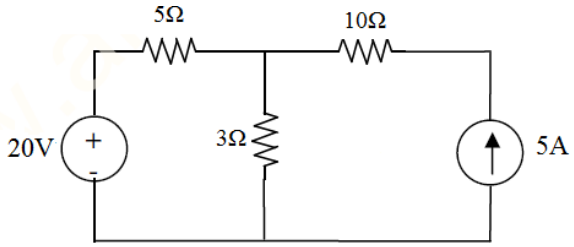
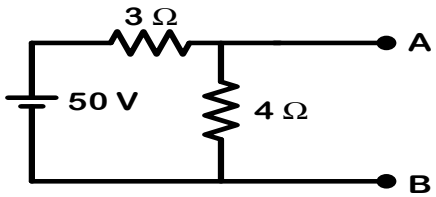
Subject with Code : FUNDAMENTALS OF ELECTRICAL CIRCUITS(20EE0201)
Course & Branch : B. Tech -EEE
Year & Semester : I - B. Tech. & II-Semester **Regulation :**R20

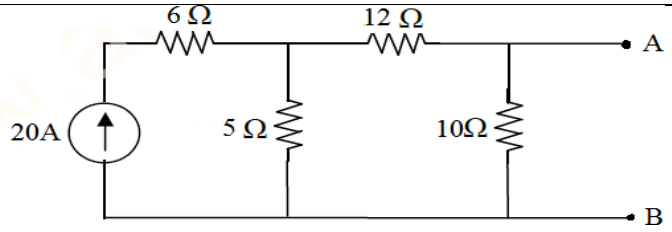
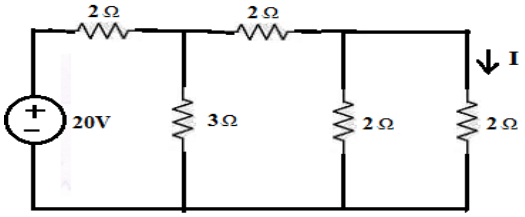
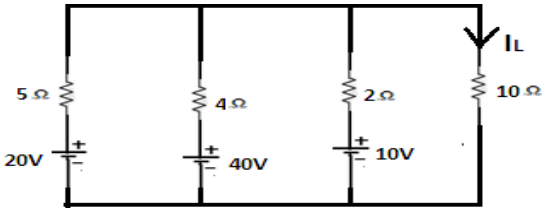
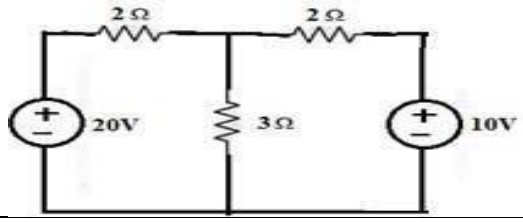
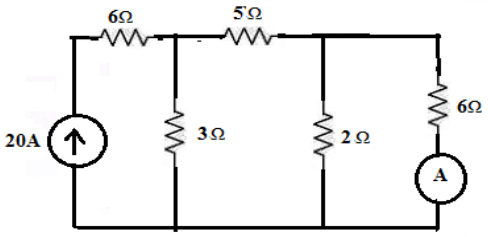
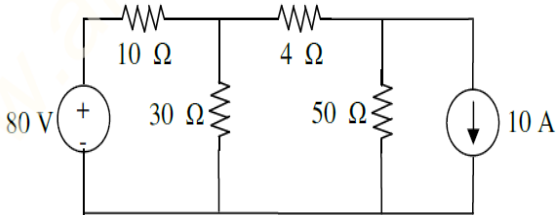
UNIT –I
D.C CIRCUITS & A.C CIRCUITS

1	a)	Explain in detail about passive elements.	[L2] [CO1][6M]
	b)	Determine the Equivalent Capacitance when two capacitor are connected in Series & Parallel.	[L2] [CO1] [6M]
2	a)	State and prove Kirchhoff's laws with suitable examples.	[L3] [CO1] [6M]
	b)	Determine the current in branch A-B by using KVL 	[L3] [CO1] [6M]
3	a)	Determine the Equivalent Resistance when three resistors are connected in Series & Parallel.	[L3] [CO1] [6M]
	b)	State and explain Ohm's law.	[L3][CO1][6M]
4		Explain the Classification of energy sources	[L3][CO1][12M]
5	a)	Determine the current in 10Ω resistor for the following network by using KCL 	[L3] [CO1] [8M]
	b)	Explain about Ideal and Practical Current sources in detail	[L1] [CO1] [4M]
6	**a)**	Derive an expression for RMS values of sine wave form.	[L2][CO3][6M]
	b)	An alternating current is expressed as I = 14.14 sin 314t. Determine. (i)Maximum current (ii)RMS current (iii)Frequency (iv)Instantaneous current when t = 0.02msec.	[L2][CO3][6M]
7	**a)**	Define power factor, apparent power, active power and reactive power	[L2][CO3][6M]
	b)	Define Admittance and impedance	[L2][CO3][6M]
8	**a)**	Find the RMS value for the following waveform	[L2][CO3][5M]

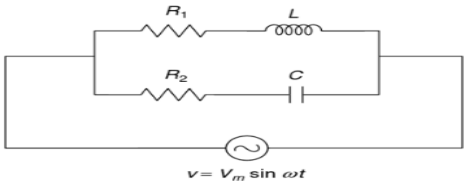
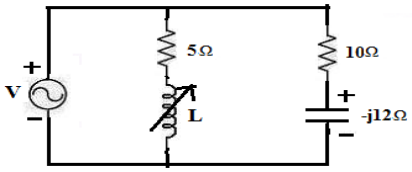
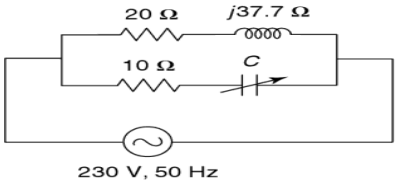
			
	b)	Explain the phasor relation for R, L & C elements.	[L4][CO3][6M]
9		Derive the relation of voltage and current for pure resistor, inductor& capacitor?	[L1][CO1][12M]
10	**a)**	Derive an expression for average values of sine wave form.	[L2][CO3][4M]
	b)	i) Define form factor. ii) Define peak factor. iii) Prove that the form factor of the sinusoidal wave is 1.11.	[L2][CO3][8M]

UNIT –II
NETWORK THEOREMS

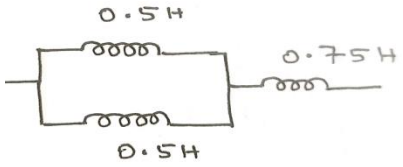
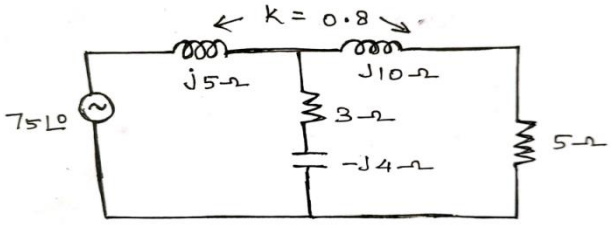
1	a)	State &explain Super position theorem	[L1] [CO1][4M]
	b)	Find load current by using Thevenin's theorem for the following circuit where R_L =3Ω 	[L3] [CO1][8M]
2	a)	State &explain Thevenin's theorem	[L1][CO1][4M]
	b)	By using superposition theorem find the current flowing through the 3-ohm resistor 	[L3][CO1][8M]
3	a)	State &explain Norton's theorem.	[L1][CO1][4M]
	b)	Find Norton's equivalent circuit across AB for the circuit shown 	[L3][CO1][8M]
4		State and prove Reciprocity theorem with suitable example.	[L3][CO1][12M]
5	**a)**	State &explain Milliman's theorem	[L3][CO1][6M]
	b)	Find the Norton's equivalent for the circuit shown below.	[L3][CO1][6M]

			
6		Verify reciprocity theorem for the network shown in below figure. 	[L3][CO1][12M]
7	**a)**	Find the current I_L, use millman's theorem as shown in figure below. 	[L3][CO1][6M]
	b)	State and prove Tellegen's theorem.	[L3][CO1][6M]
8	**a)**	Verify Tellegen's theorem for the circuit shown in below figure. 	[L3][CO1][6M]
	b)	State and prove Compensation theorem.	[L3][CO1][6M]
9		Determine the ammeter reading where it is connected to 6Ω resistor as shown in below figure. The internal resistance of the ammeter is 2Ω, by using compensation theorem. 	[L2][CO1][12M]
10		Verify Superposition Theorem for 4Ω resistor for the following circuit. 	[L3][CO1][12M]

UNIT –III
SERIES AND PARALLEL RESONANCE

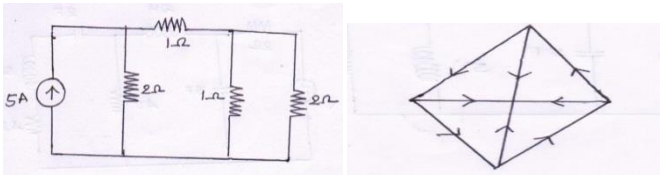
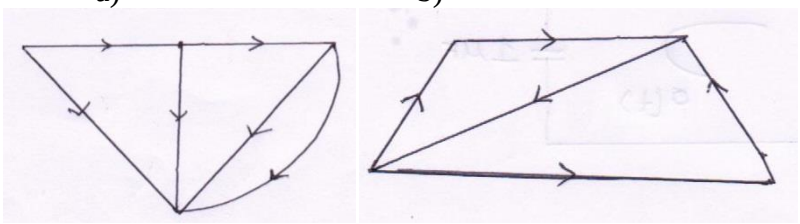
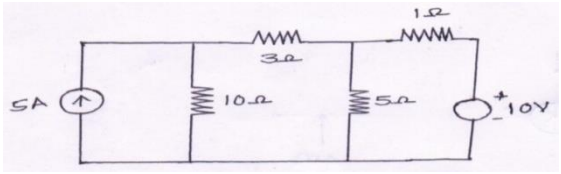
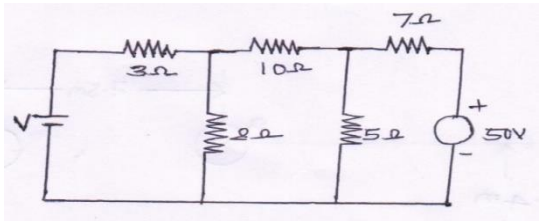
1	**a)**	Explain about Series resonance with phasor diagrams.	[L2][CO3][6M]
	b)	A series RLC circuit has R=10Ω, L=0.1H and C=50μF. The applied voltage is 100V. Find Resonant frequency & Quality factor of a coil	[L4][CO3][6M]
2		Explain resonance for series RLC circuit and derive the equation for resonant frequency.	[L4][CO3][12M]
3	**a)**	Explain about Parallel resonance with phasor diagrams.	[L2][CO3][6M]
	b)	Determine the quality factor of coil for the series circuit consisting of R=10Ω, L=0.1H and C=10μF	[L2][CO3][6M]
4		Derive the expression of resonant Frequency of the following circuit. 	[L4][CO3][12M]
5	**a)**	Explain about Quality factor and Band-width of Series resonance.	[L4][CO3][5M]
	b)	Find the value of 'L' at which the circuit resonates at a frequency of 1000 rad/sec in the circuit shown in figure. 	[L4][CO3][7M]
6		Find the value of C in the circuit shown to get resonance. 	[L4][CO3][5M]
7		Explain resonance for parallel RLC circuit for a tank and derive the equation for resonant frequency.	[L4][CO3][12M]
8	**a)**	Explain about Quality factor of parallel resonance.	[L2][CO3][6M]
	b)	Determine the variation of impedance and phase angle of series resonant circuit with frequency	[L2][CO3][6M]
9	**a)**	Explain about Band-width of parallel resonance.	[L2][CO3][6M]
	b)	Explain the importance of resonance and find the condition for series resonance?	[L2][CO3][6M]
10		Explain parallel resonance and resonant frequency of tank circuits	[L4][CO3][12M]

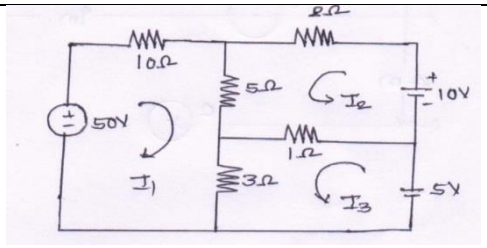
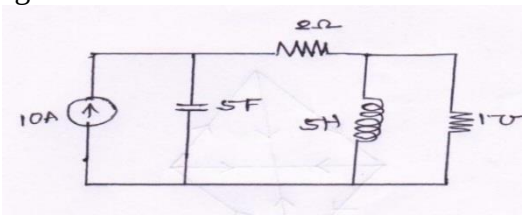
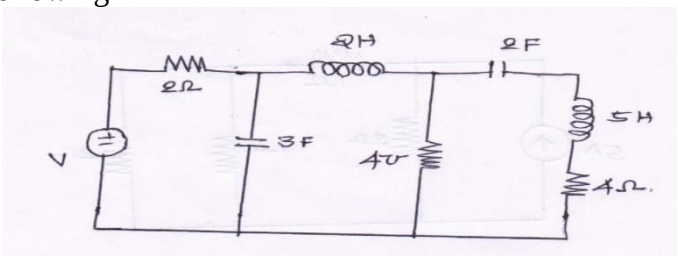
UNIT –IV
COUPLED CIRCUITS

1	**a)**	Explain self-inductance with expressions	[L1][CO4][6M]
	b)	What is the maximum possible mutual inductance of two inductively coupled coils with self-inductance of 50mH and 200mH?	[L2][CO4][6M]
2	**a)**	Derive the expressions for mutual inductance with expressions	[L3][CO4][6M]
	b)	Two coupled coils have a self-inductances 37.5 mH and 193 mH, with the mutual inductance of 63.75mH. Find the co efficient of coupling.	[L3][CO3][6M]
3	**a)**	Explain coefficient of coupling	[L2][CO4][6M]
	b)	A 15mH coil is connected in series with another coil. The total inductance is 70mH. When one of the coils is reversed, the total inductance is 30mH. Find the self-inductance of second coil, mutual inductance and coefficient of coupling.	[L4][CO3][6M]
4	**a)**	What are single and double tuned circuits? Where the tuned coupled circuits are employed?	[L2][CO4][6M]
	b)	What is dot convention? Why it is required?	[L3][CO3][6M]
5	**a)**	State Dot rule for coupled circuits	[L3][CO4][6M]
	b)	Explain ideal transformer with phasor diagram	[L4][CO3][6M]
6	**a)**	Find the equivalent inductance of the given circuit 	[L2][CO3][6M]
	b)	Write the expression for equivalent inductance of two coupled coils connected in series and parallel	[L3][CO4][6M]
7	**a)**	What is ideal transformer and draw its phasor diagram	[L4][CO3][6M]
	b)	An ideal transformer is rated at 2400/120 V, 9.6 kVA, and has 50 turns on the secondary side. Calculate: (a) the turns ratio, (b) the number of turns on the primary side, and (c) the current ratings for the primary and secondary windings.	[L4][CO3][6M]
8	**a)**	Explain about the conductively coupled circuits and mutual impedance	[L3][CO3][6M]
	b)	In the coupled circuit find the voltage across 5ohm resistor 	[L4][CO4][6M]
9	**a)**	Explain series connection of coupled inductors	[L4][CO4][6M]
	b)	Two coils connected in series have a self-inductance of 20mH and 60mH respectively. The total inductance of the combination was found to be 100mH. Determine the amount of mutual inductance that exists between the two coils (a) aiding each other,(b) opposing	[L4][CO4][6M]

		each other	
10	**a)**	Explain parallel connection of coupled inductors	[L4][CO4][6M]
	b)	Two inductors whose self-inductances are of 75mH and 55mH respectively are connected together in parallel aiding. Their mutual inductance is given as 22.5mH. Calculate the total inductance of the parallel combination. (a) aiding each other,(b) opposing each other	[L4][CO4][6M]

UNIT –V
NETWORK TOPOLOGY

1		Find the cut-set matrix for the followings? a) b) 	[L3][CO5][12M]
2		Find the tie-set matrix for the followings? a) b) 	[L3][CO5][12M]
3		Determine current in 10Ω resistor for the following network by using nodal analysis. 	[L3][CO5][12M]
4		Find voltage V for the circuit shown in fig which makes the current in the 10Ω resistor is zero by using nodal analysis? 	[L4][CO5][12M]
5		Write the procedure for constructing tie-set matrix	[L5][CO5][12M]
6		Determine mesh currents for the following network.	[L5][CO5][12M]

			
7		a) Define graph. b) Define planar and non-planar graph. c) Define duality.	[L1][CO5][4M] [L1][CO5][4M] [L1][CO5][4M]
8		Write the procedure to draw the dual network and find dual network for the following 	[L4][CO5][12M]
9	**a**	Write the procedure to draw the dual network and find dual network for the following 	[L4][CO5][6M]
	b	Define cut-set. Define tie-set.	[L1][CO5][3M] [L1][CO5][3M]
10	**a**	Write the procedure for constructing cut-set matrix	[L4][CO5][6M]
	b	Explain the relationship between branch current matrix and loop current matrix	[L4][CO5][6M]

Prepared by: Dr.RAJAN.V.R