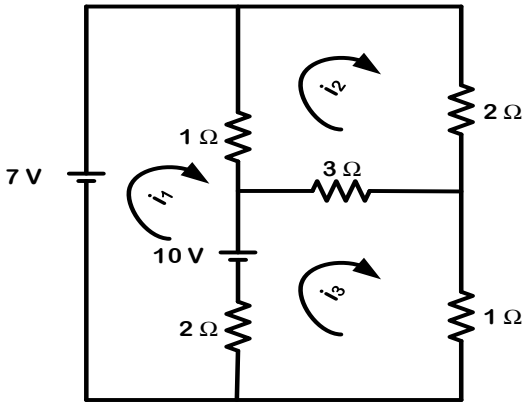
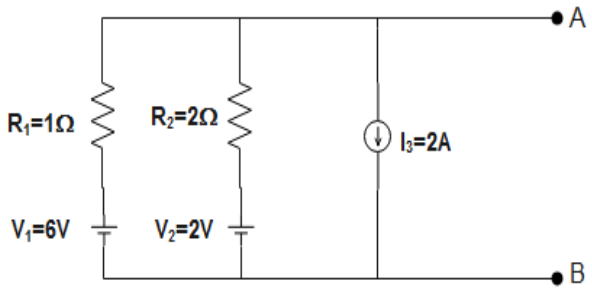
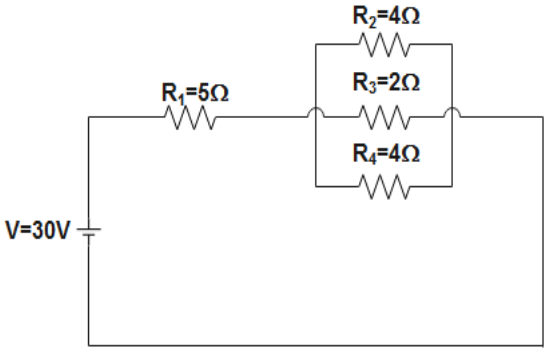
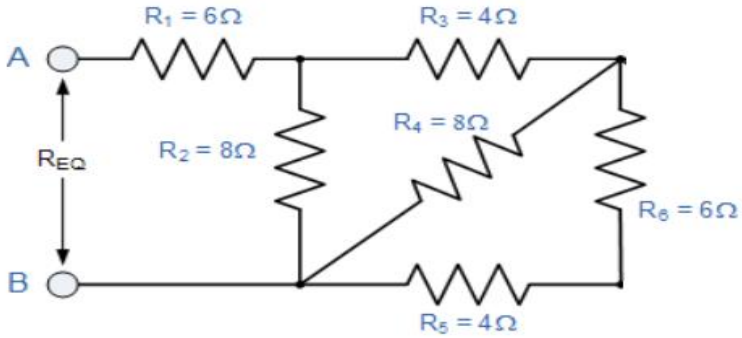
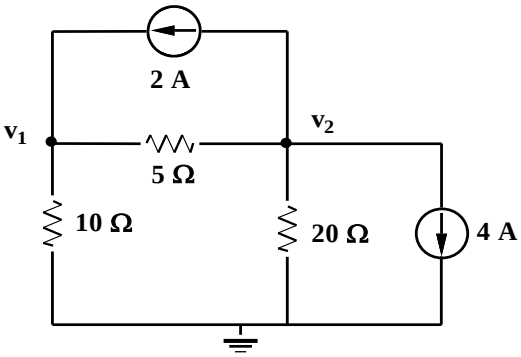
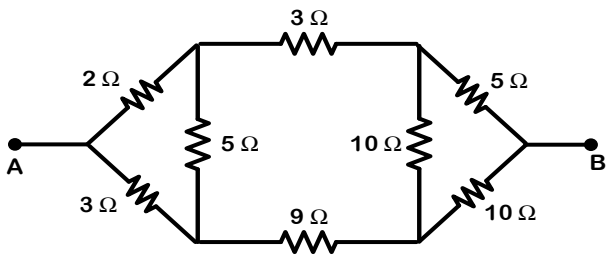
SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to JNTUA, Ananthapuramu)
(Accredited by NAAC with "A" Grade & ISO 9001 : 2008 Certified Institution)

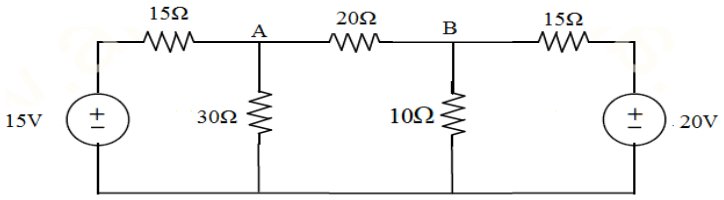
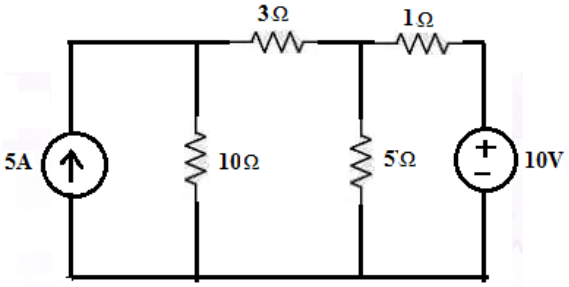
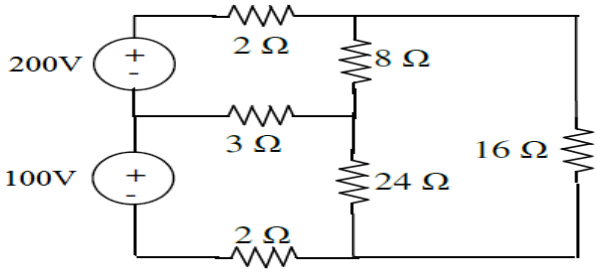
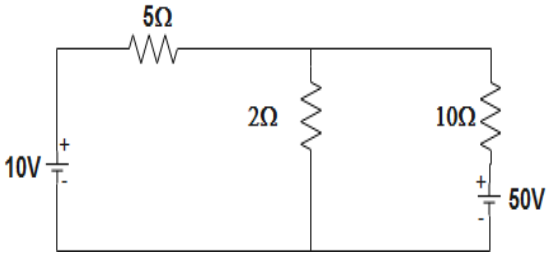
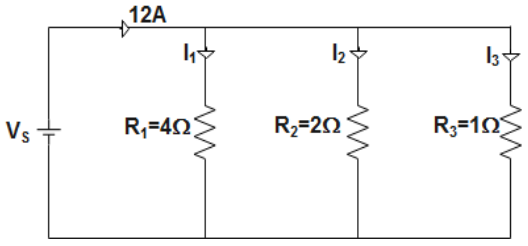
QUESTION BANK (DESCRIPTIVE)

Subject with Code : PRINCIPLES OF ELECTRICAL CIRCUITS (20EE0253)
Course & Branch : B. Tech -ECE
Year & Semester : I - B. Tech. & I - Semester **Regulation :** R20

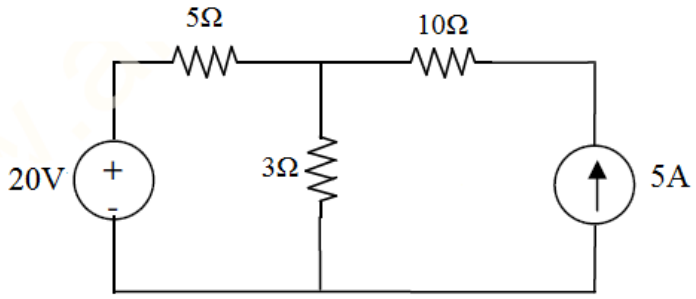
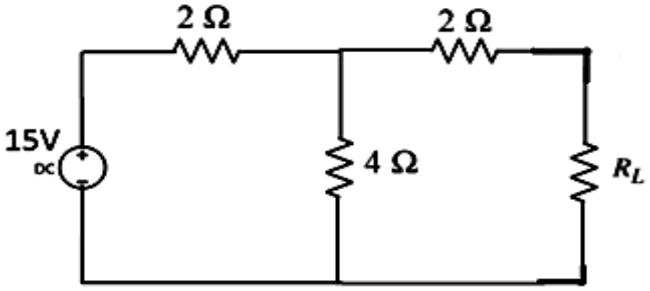
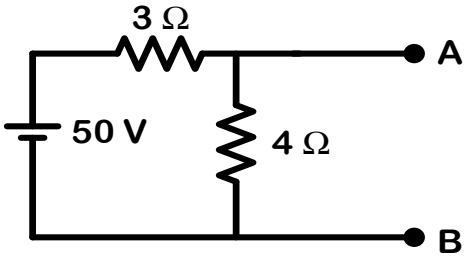
UNIT-I
FUNDAMENTALS OF ELECTRIC CIRCUITS

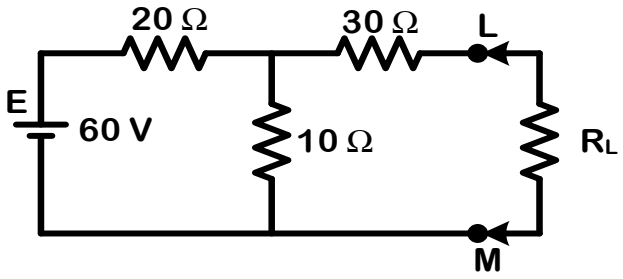
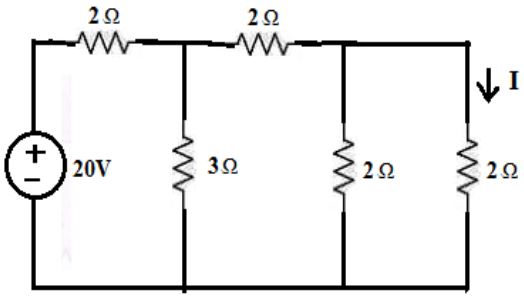
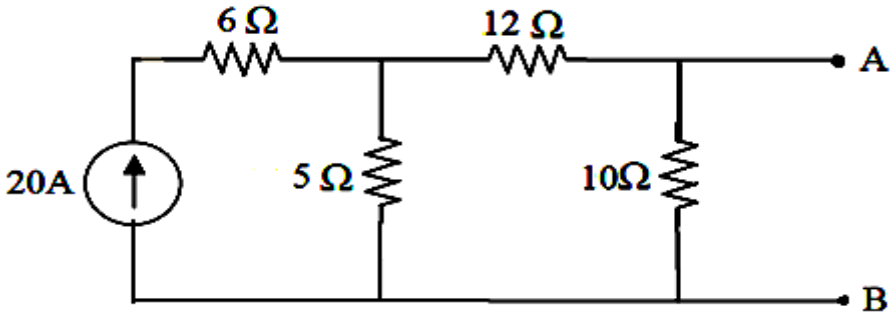
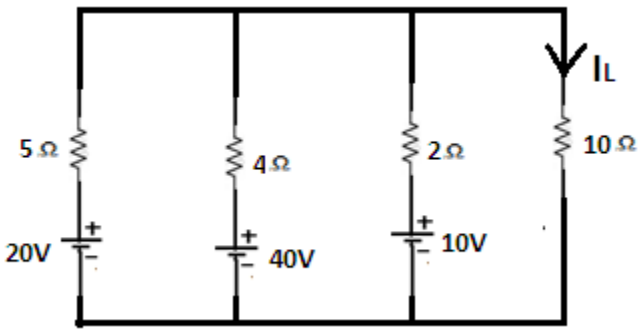
1.	a)	Explain in detail about passive elements.	[L1] [CO1][6M]
	b)	State and explain Ohm's law.	[L1] [CO1] [6M]
2.	a)	Three resistances of values 20, 30 and 50 are connected in series across 20 V DC supply. Calculate, i) Equivalent resistance of the circuit. ii) Total current from the supply. iii) Voltage drop across each resistor. iv) Power dissipated in each resistor.	[L3] [CO1] [6M]
	b)	Determine the Equivalent capacitance when the capacitor are connected series and parallel	[L3] [CO1] [6M]
3.	a)	State and prove Kirchhoff's laws with suitable examples.	[L2] [CO1] [6M]
	b)	Find i_1, i_2, i_3 for the given circuit by using Kirchhoff's laws? 	[L3] [CO1] [6M]
4	a)	Determine the equivalent current source between the terminals A-B. 	[L3] [CO1] [6M]

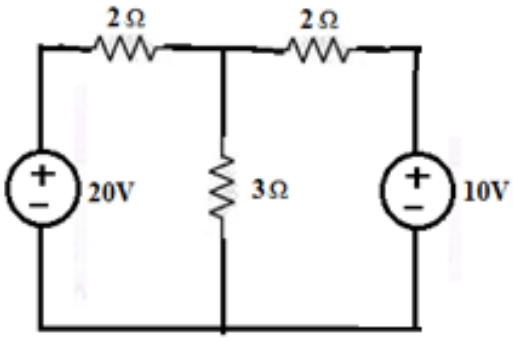
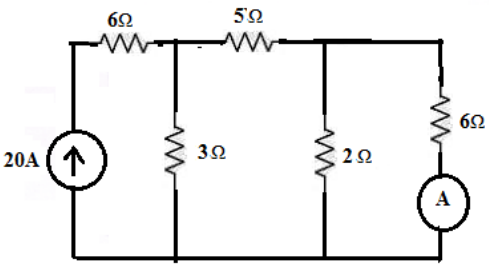
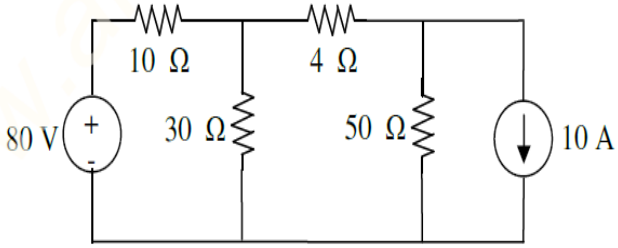
	b)	Determine Current through each resistor in the circuit? Using Current division method? 	[L3] [CO1] [6M]
5.	a)	Find the equivalent resistance for the circuit shown below. 	[L3] [CO1] [6M]
	b)	Determine the current in 5Ω resistor for the following network by using nodal analysis. 	[L3] [CO2] [6M]
6.		Find the voltage to be applied across AB in order to drive a current of 5A into the circuit. 	[L3] [CO1] [12M]
7.		Explain in detail about star to delta and delta to star transformation of given resistive network.	[L2] [CO1] [12M]

8.	a)	Determine the current in branch A-B by using KVL 	[L2] [CO1] [6M]
	b)	Determine the current in 10Ω resistor for the following network by using nodal analysis. 	[L3] [CO2][6M]
9.	a)	Determine the mesh currents for the circuit shown below. 	[L3] [CO2] [6M]
	b)	Explain about source transformation briefly.	[L1][CO1][6M]
10.	a)	Write the Mesh Current equations in the Circuit shown in figure below, and determine the currents 	[L3] [CO2][6M]
	b)	Determine Current through each resistor in the circuit? Using Current division method? 	[L3] [CO1] [6M]

UNIT - II
NETWORK THEOREMS

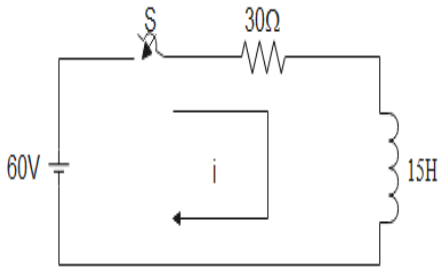
1.	a)	State Super position theorem	[L1] [CO3][2M]
	b)	By using superposition theorem find the current flowing through the 3 ohm resistor 	[L3] [CO3] [10M]
2.	a)	State Thevenin's theorem	[L1] [CO3] [2M]
	b)	Find load current by using Thevenin's theorem for the following circuit where R_L =3Ω 	[L3] [CO3] [10M]
3.	a)	State Norton's theorem.	[L1] [CO3] [2M]
	b)	Find Norton's equivalent circuit across AB for the circuit shown. 	[L3] [CO3] [10M]
4.	a)	Explain the maximum power transfer theorem.	[L3][CO3][6M]
	b)	Determine the maximum power delivered to the load resistance R_L	[L2][CO3][6M]

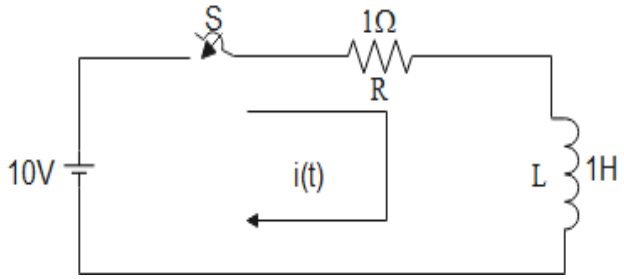
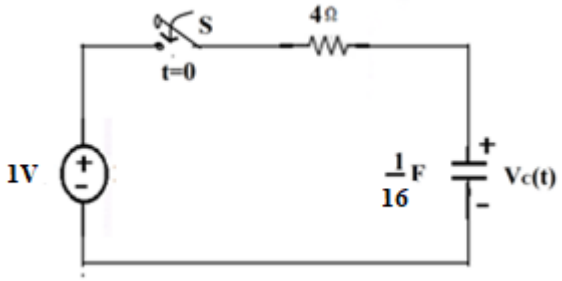
			
5	a)	State Reciprocity theorem.	[L1] [CO3] [2M]
	b)	Verify reciprocity theorem for the network shown in below figure. 	[L3][CO3][10M]
6.	a)	State Norton's theorem.	[L1] [CO3] [2M]
	b)	Find the Norton's equivalent for the circuit shown below. 	[L3][CO3][10M]
7.	a)	Explain Milliman's theorem in detail	[L1][CO3][6M]
	b)	Find the current I_L, use millman's theorem as shown in figure below. 	[L3][CO3][6M]
8.	a)	State Tellegen's theorem.	[L2][CO3][2M]
	b)	Verify Tellegen's theorem for the circuit shown in below figure.	[L3][CO3][10M]

			
9.	a)	State Compensation theorem.	[L2][CO3][2M]
	b)	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. 	[L3][CO3][12M]
10		Verify Superposition Theorem for 4Ω resistor for the following circuit. 	[L3][CO3][12M]

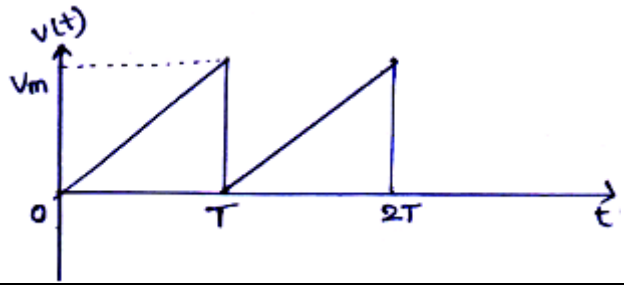
UNIT – III

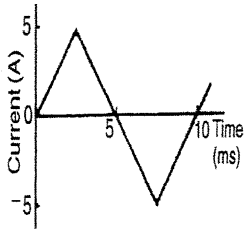
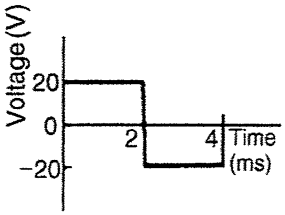
DC TRANSIENT ANALYSIS

1	a)	Define transient response.	[L1][CO4][4M]
	b)	Derive the Transient Response of series RL-circuit with D.C excitation.	[L3][CO4][8M]
2	a)	Explain the application of transient analysis.	[L1][CO4][6M]
	b)	Derive the Transient Response of series RC-circuit with D.C excitation.	[L3][CO4][6M]
3		The Circuit Consists Of Resistance=20 Ohm, Inductance = 0.05H, Capacitance = 20uF in Series With a 100V Constant at t=0. Find The Current Transient.	[L3][CO4][12M]
4		Derive the Transient Response of series RLC-circuit with D.C excitation.	[L2][CO4][12M]
5	a)	Derive the Laplace Transform of Series RL Circuit.	[L2][CO4][6M]
	b)	What is the transient response of series RL and RC circuits with D.C excitation?	[L3][CO4][6M]
6	a)	Derive the Laplace Transform of Series RC Circuit	[L2][CO4][6M]
	b)	A series RL circuit with R=30Ω and L= 15H has a constant voltage V=60v applied at t=0.Determine the current "I", voltage across resistor and voltage across inductor. 	[L3][CO4][6M]
7		A series RC circuit consists of a resistor of 10Ω and capacitor of 0.1 F with a constant voltage of 20v, is applied to the circuit at t=0.Obtain the current equation. Determine the voltage across the resistor and the capacitor.	[L3][CO4][6M]
8		A Series RC circuit consists of R=5000Ω,C=20MF has a constant voltage V=100v applied at t=0 and capacitor has no initial charge. Find the equation of i, V_R and V_C.	[L3][CO4][12M]
9	a)	A Series RL circuit with R=50Ω and L=10H has constant voltage V=100volts applied at t=0 by the closing the switch find the complete current.	[L3][CO4][6M]

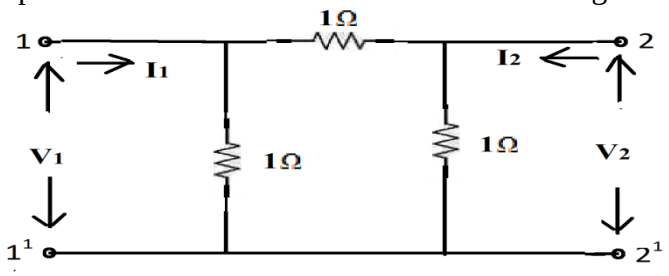
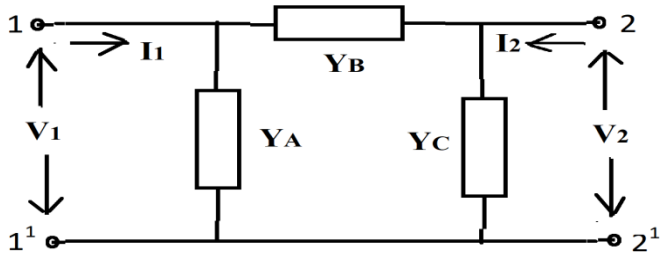
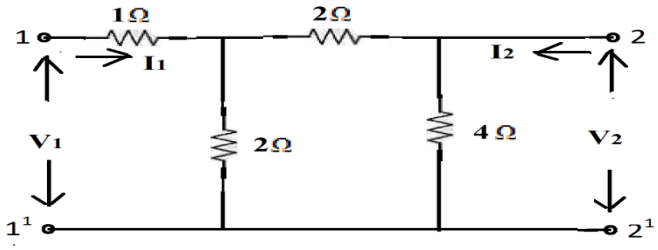
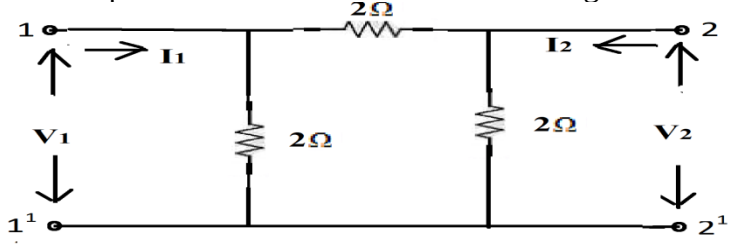
	b)	A series RL circuit Switch 'S' is Closed at time t = 0. There is no current through 'L' Prior to Switching obtain the particular solution for i(t). 	[L3][CO4][6M]
10		Determine The Current I for T>0 If $V_c(0)$ = 9V For The Circuit Shown In Fig. 	[L3][CO4][12M]

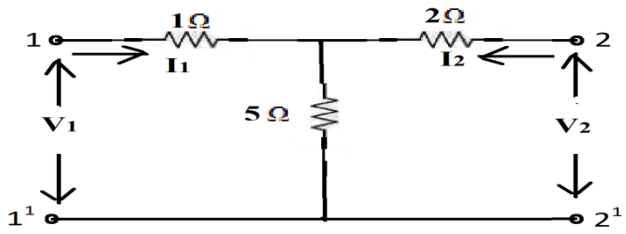
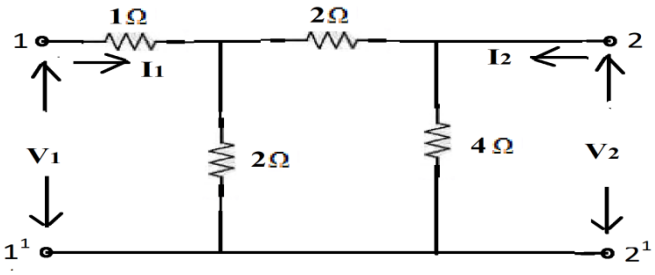
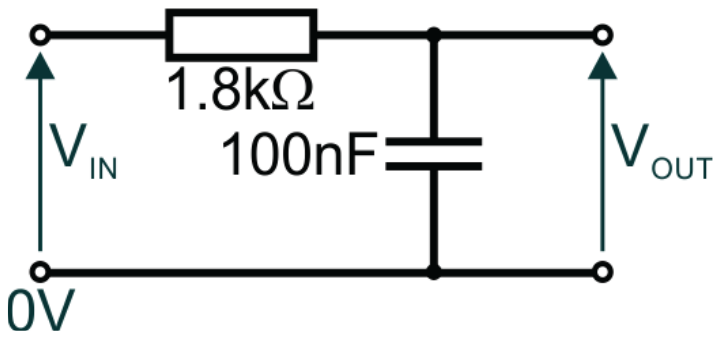
UNIT –IV
SINGLE PHASE AC CIRCUITS

1	a)	Derive an expression for RMS values of sine wave form.	[L2][CO5][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][CO5][6M]
2		Derive an expression for the current and impedance for a series RL circuit excited by a Sinusoidally alternating voltage. Draw the phasor diagrams.	[L2][CO5][12M]
3	a)	Define power factor, apparent power, active power and reactive power	[L1][CO5][8M]
	b)	Define Admittance and impedance	[L1][CO5][4M]
4	a)	Find the rms value for the following waveform 	[L3][CO5][6M]
	b)	Explain the phasor relation for R, L & C elements.	[L1][CO5][6M]
5	a)	A resistor of 50Ω and inductance of 100mH are connected in series across 200V, 50Hz supply. Determine the following (i) Impedance (ii) current flowing through the circuit (iii) power factor	[L2][CO5][6M]
	b)	Explain resonance for series RLC circuit and derive the equation for resonant frequency.	[L2 [CO5][6M]
6		Derive an expression for the current and impedance for a series RC circuit excited by a Sinusoidally alternating voltage. Draw the phasor diagrams.	[L2][CO5][12M]

7		For the waveform shown below, determine for each (i) the frequency (ii) the average value over half a cycle (iii) the r.m.s. value (iv) the form factor  (a)  (b)	[L3][CO5][12M]
8		Find the peak value, the r.m.s. value, the frequency, the periodic time and the phase angle (in degrees and minutes) of the following alternating quantities: (a) $v = 90 \sin 400\pi t$ volts (b) $i = 50 \sin(100\pi t + 0.30)$ amperes (c) $e = 200 \sin(628.4t - 0.41)$ volts	[L2][CO5][12M]
9		Derive an expression for the voltage and impedance for a series RLC circuit excited by a Sinusoidally alternating voltage.	[L2][CO5][12M]
10		A coil of resistance 10Ω and inductance of 0.1H is connected in series with a 150μF capacitor across a 200V, 50Hz. Calculate (i)inductive reactance (ii) capacitive reactance (iii) impedance (iv) current (v) power factor (vi) power in the circuit.	[L3][CO5][12M]

UNIT –V
TWO PORT NETWORK &FILTERS

1	a)	Explain about Impedance parameters.	[L1][CO6][6M]
	b)	Find the Z-parameters of the network shown in below figure. 	[L3][CO6][6M]
2	a)	Explain about short-circuit parameters.	[L1][CO6][6M]
	b)	Find the Short-circuit parameters for the circuit shown in figure. 	[L2][CO6][6M]
3	a)	Explain about h-parameters in terms of y-parameters	[L1][CO6][6M]
	b)	Find the h-parameters of the network shown in figure. 	[L3][CO6][6M]
4	a)	Explain about ABCD-parameters	[L1][CO6][6M]
	b)	Find the transmission parameters for the circuit shown in figure. 	[L3][CO6][6M]
5	a)	Find the transmission parameters for the circuit shown in figure.	[L3][CO6][6M]

			
	b)	Determine the y-parameters of the following network. 	[L3][CO6][6M]
6	a)	Explain about classification of filters.	[L1][CO6][6M]
	b)	Design a High –pass filter having a cut-off frequency of 1kHz with a load resistance of 600Ω.	[L2][CO6][6M]
7		Explain about Constant-K band -pass filter in detail	[L2[CO6][12M]
8	a)	Explain about Constant-K low-pass filter in detail.	[L1][CO6][6M]
	b)	Design a Band-elimination filter having design impedance of 600Ω and cut-off frequencies f_1= 2kHz and f_2= 6 kHz.	[L2][CO6][6M]
9		Explain about Constant-K High-pass filter in detail.	[L1][CO6][12M]
10		The low-pass filter shown in the diagram, V_{IN} = 10 V. Calculate: (a) the reactance of the capacitor at 10 Hz, 1 kHz, and 100 kHz (b) the output voltage at each of these frequencies (c) the break frequency of this circuit (d) V_{OUT} at the break frequency. 	[L3][CO6][12M]

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