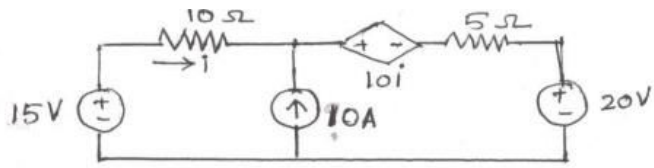
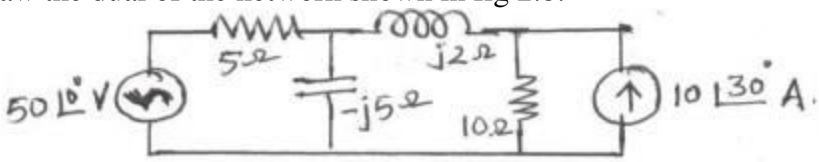
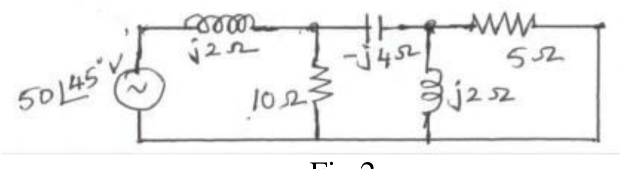
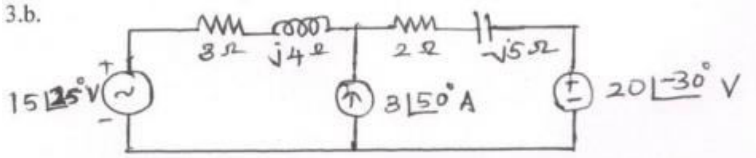
USN | | | | | | | | | | | **BEE302**

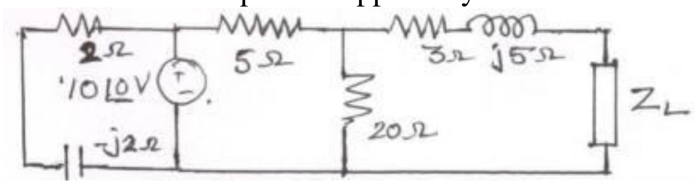
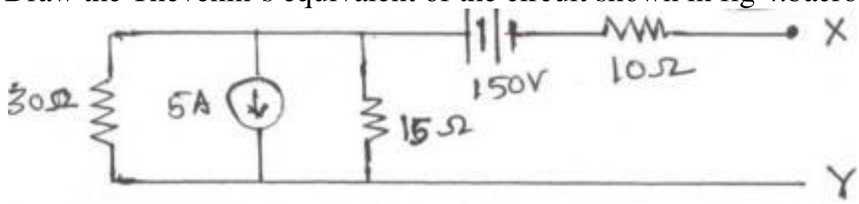
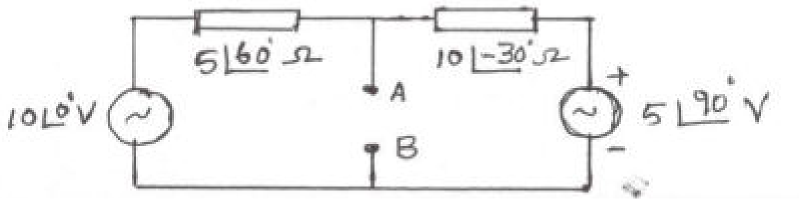
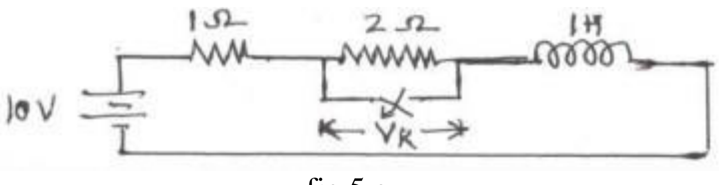
III Semester B.E. Semester End Examination, MAR/APR. 2023-24

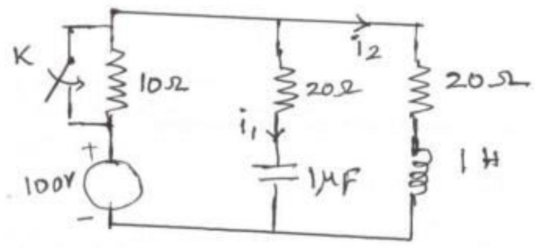
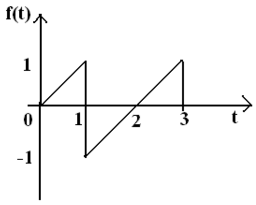
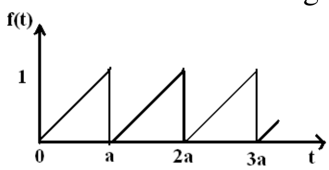
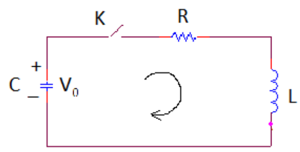
BEE302 (Model Question Paper)

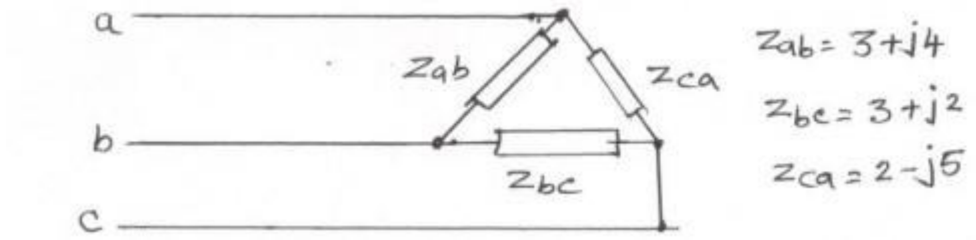
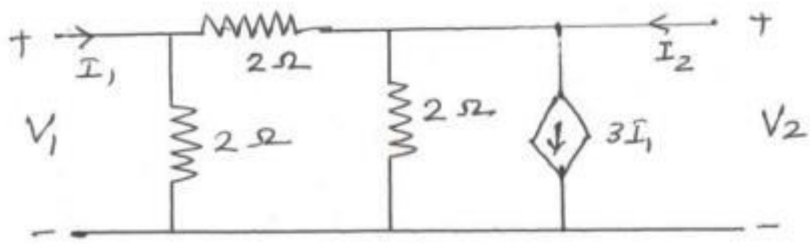
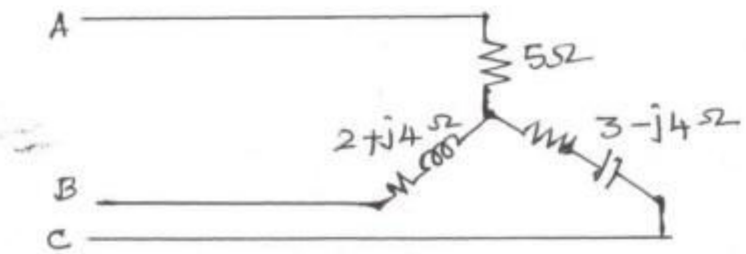
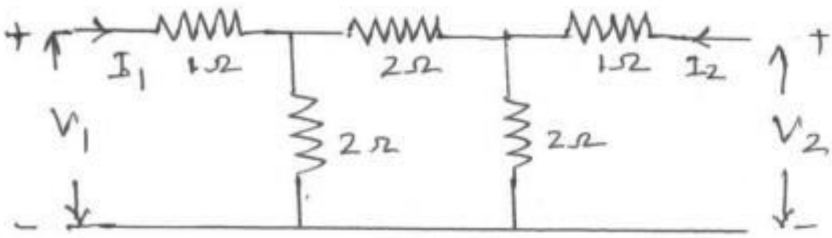
Time: 3 Hours **Max. Marks: 100**

Instructions:	*1.*	*Answer any Five full questions choosing ONE from each unit.*

		UNIT - I	**L**	**CO**	**PO**	**M**
1	a.	Explain the following terms with example i) Active Elements ii) Passive elements				
			(1)	**(1)**	**(1)**	**(4)**
	b.	Given a three Star connected impedance across terminals ABC, derive the expression for delta connected impedances across terminals ABC.				
			(2)	**(1)**	**(1)**	(8)
	c.	In the network shown in fig 1.c, find the current through 10 ohm resistor using mesh Analysis.  Fig 1.c				
			(3)	**(1)**	**(1)**	**(8)**
2	a.	Given a three Delta connected impedance across terminals ABC, derive the expression for Star connected impedances across terminals ABC.				
			(2)	**(1)**	**(1)**	**(8)**
	b.	Draw the dual of the network shown in fig 2.b.  Fig 2.b				
			(3)	**(1)**	**(1)**	**(6)**
	c.	In the network shown in fig 2.c, find the current through 10 ohm resistor using nodal Analysis.  Fig 2.c				
			(3)	**(1)**	**(1)**	**(6)**
		UNIT – II	**L**	**CO**	**PO**	**M**
3	a.	State and explain Thevenin's theorem.				
			(1)	**(2)**	**(1)**	**(8)**
	b.	Using super position theorem find the voltage across the coil with impedance Z= (3+j4)Ω in the circuit shown in fig 3.b. 3.b.  fig 3.b				

			(3)	**(2)**	**(1)**	**(8)**
	c.	In the Circuit shown in fig 3.c, find the value of load impedance, such that the power transferred to the load is 50% of power supplied by the source.  fig 3.c				
			(3)	**(2)**	**(1)**	(4)
4	a.	State and explain super position theorem.				
			(1)	**(2)**	**(1)**	(8)
	b.	Draw the Thevenin's equivalent of the circuit shown in fig 4.bacross the terminals X and Y.  fig 4.b				
			(3)	**(2)**	**(1)**	(6)
	c.	Draw the Norton's equivalent of the circuit shown in fig 4.c across terminals A and B.  fig 4.c				
			(3)	**(2)**	**(1)**	(6)
		UNIT – III	L	CO	PO	M
5	a.	Define quality factor and derive the expression for Q-factor of a coil.				
			(2)	**(3)**	**(1)**	(6)
	b.	For the series RLC circuit,derive theexpression for resonance frequency, and bandwidth				
			(2)	**(3)**	**(1)**	(6)
	c.	For the circuit shown in fig 5.c, find $v_k(0+)$, $\frac{dv_k}{dt}(0+)$, $\frac{d^2v_k}{dt^2}(0+)$, when the switch 'k' is opened at t=0.  fig 5.c				
			(3)	**(3)**	**(1)**	(8)
6	a.	What are half power frequencies? For the series RLC circuit, connected with 100V supply, find the current through the circuit under half power frequencies if R=10 ohms, L= 2 mH and C= 10 micro farad.				
			(3)	**(3)**	**(1)**	(6)
	b.	Explain the behavior of a resistor, inductor, capacitor at time t = 0+ after a disturbance at t= 0.				
			(2)	**(3)**	**(1)**	(6)
	c.	In the circuit shown in fig 6.c find $i_1(0+)$, $\frac{di_1}{dx}(0+)$, $i_2(0)$, $\frac{di_2}{dx}(0+)$.				

		 fig 6.c				
			(3)	**(3)**	**(1)**	(8)
		UNIT - IV	L	CO	PO	M
7	a.	Find the Laplace transform of the signal shown in fig 7.a  Fig.7.a				
			(3)	**(4)**	**(1)**	(8)
	b.	Find the Laplace transform of unit step,unit impulse and unit ramp functions.				
			(2)	**(4)**	**(1)**	(6)
	c.	Find the initial and final value of the following functions i)$V(s) = \frac{10}{s(s+3)}$ii) $i(t) = 10u(t) - 4e^{-2t}$				
			(3)	**(4)**	**(1)**	(6)
8	a.	State and prove initial and final value theorem.				
			(1)	**(4)**	**(1)**	(8)
	b.	Find the Laplace transform of the periodic wave shown in fig 8.b  fig 8.b				
			(3)	**(4)**	**(1)**	(6)
	c.	Consider a series RLC circuit with the capacitor initially charged to voltage V_0=1 volt. Find the current in the circuit when the switch is closed at t=0. Let R=1Ω, L=1 H and C=1/2 F.  fig 8.c				
			(3)	**(4)**	**(1)**	(6)
		UNIT -V	L	CO	PO	M
9	a.	Find the line currents and phase currents of the delta connected circuit, connected to a balanced3phase, 240 V, 50 Hz supply. Also find the real and reactive power consumed in Zab.				

		 fig 9.a				
			(3)	(5)	(1)	(8)
	b.	Define impedance parameters of a two port network				
			(2)	(5)	(1)	(6)
	c.	Find the z-parameters of the network shown in fig 9.b  fig 9.b				
			(3)	(5)	(1)	(6)
10	a.	Find the line currents of the star connected circuit, connected to a balanced 3phase, 240 V, 50 Hz supply. Also find the real and reactive power consumed in each phase.  fig 10.a				
			(3)	(5)	(1)	(8)
	b.	Define ABCD (Transmission Line) parameters of a two port network				
			(2)	(5)	(1)	(6)
	c.	Find the y-parameters of the network shown in fig 10.b.  fig 10.b.				
			(3)	(5)	(1)	(6)