Model Question Paper-I with effect from 2023-24 (CBCS Scheme)

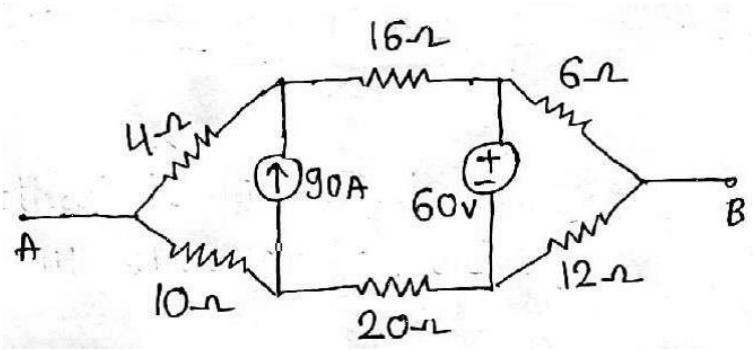
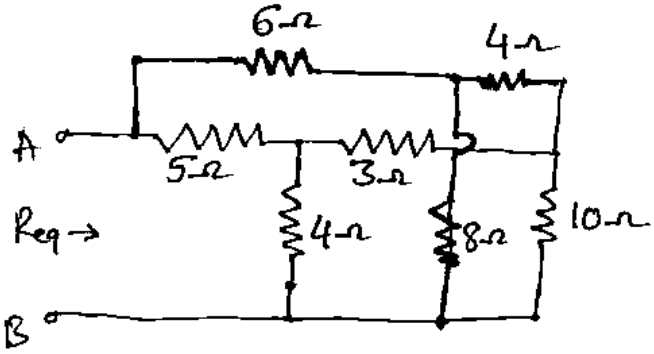
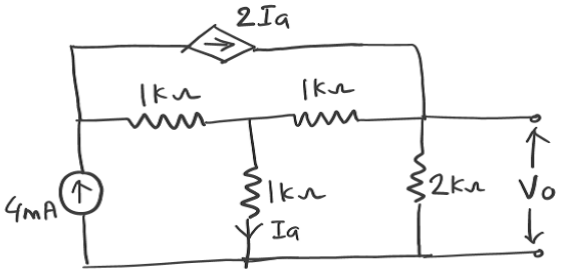
USN | | | | | | | | | | |

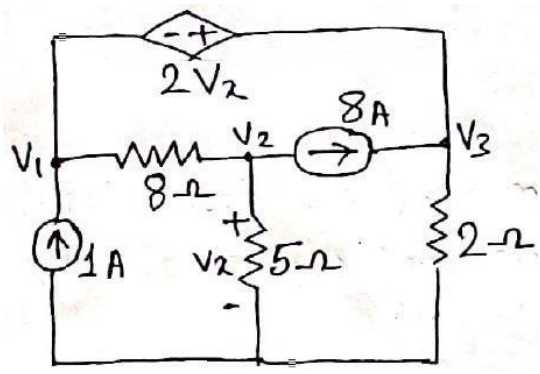
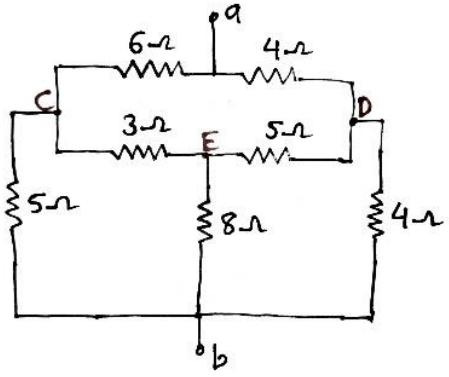
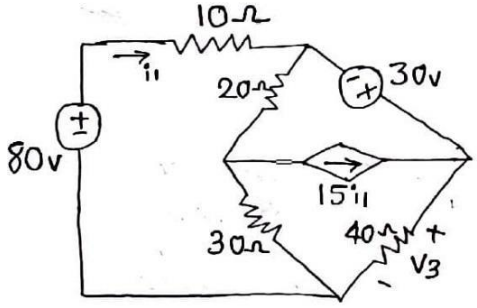
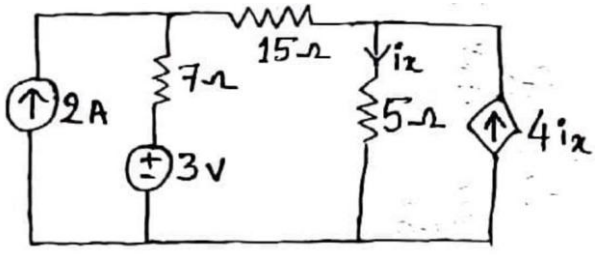
Third Semester B.E. Degree Examination

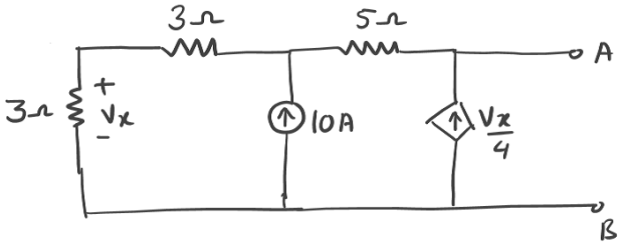
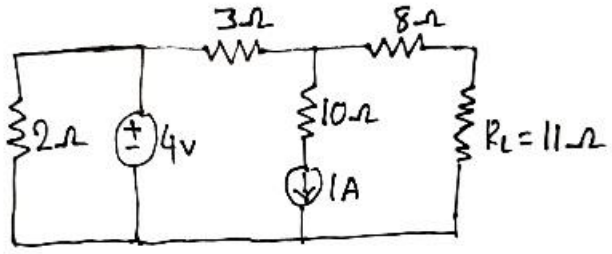
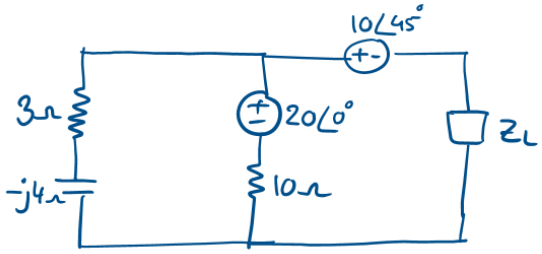
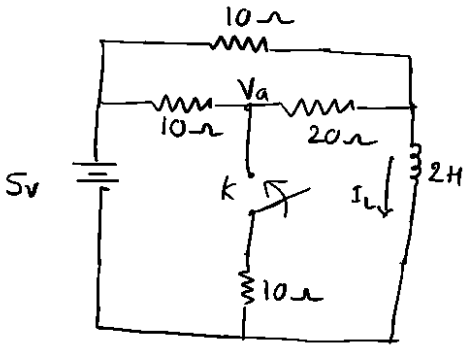
Network Analysis

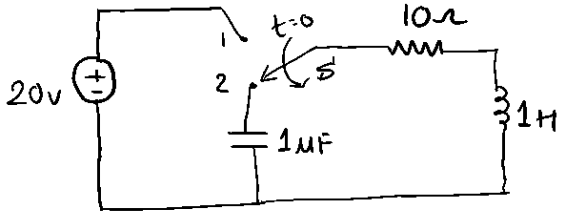
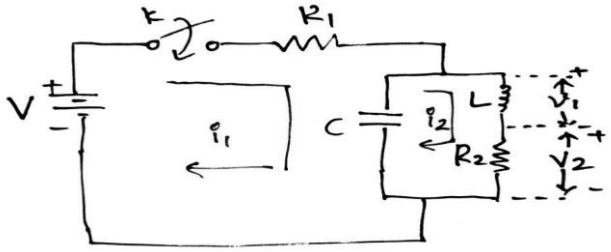
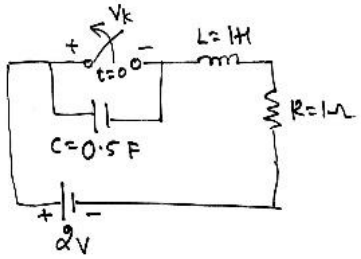
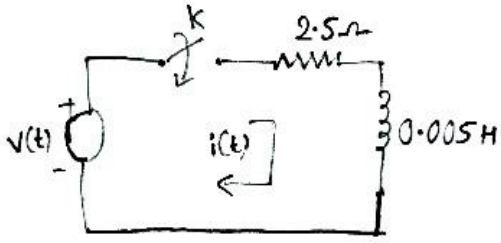
TIME: 03 Hours **Max. Marks: 100**

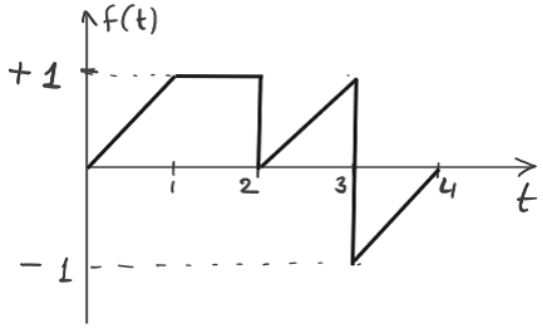
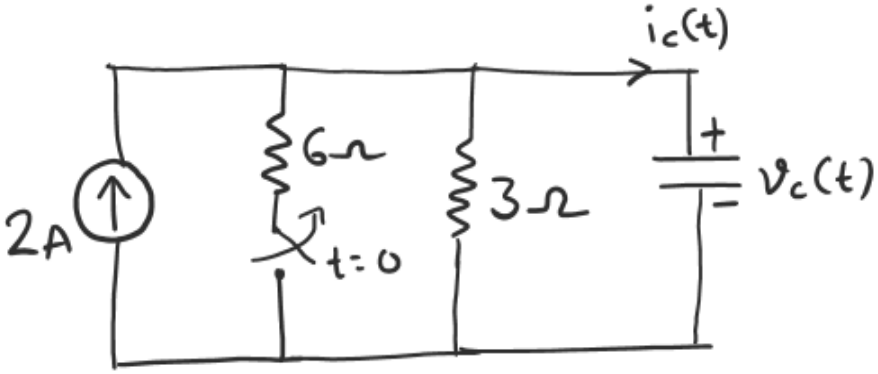
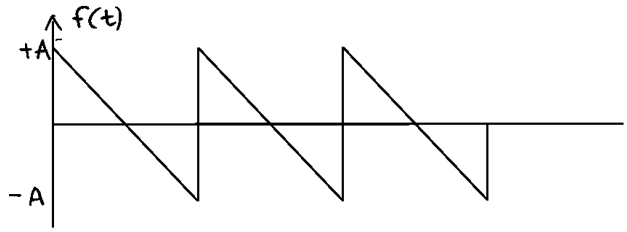
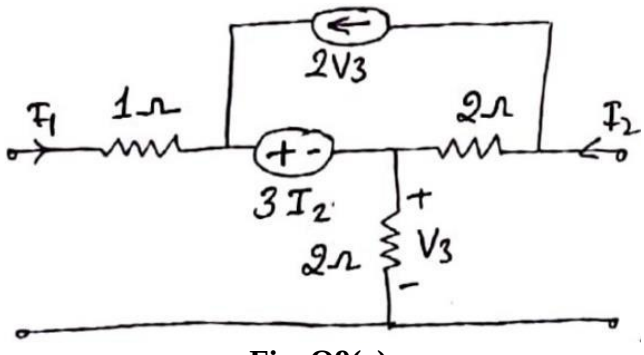
Note: Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**

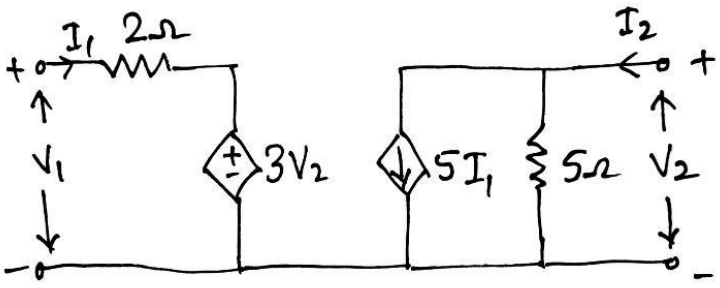
		Module -1	*Bloom's Taxonomy Level	Marks
Q.01	a	Reduce the Network shown in Fig. 1(a), to a single voltage source in series with a resistance using source shifting and source transformation.  **Fig. Q1(a)**	L3	7
	b	Find equivalent resistance between A and B using star delta transformation for the network shown in Fig. 1(b).  **Fig. Q1(b)**	L2	7
	c	Determine Vo using mesh analysis for the network shown in Fig. 1(c) below.  **Fig. Q1(c)**	L3	6
		OR		

Q.02	a	Find Vx in the network shown in Fig. 2(a) using Node analysis.  **Fig. Q2(a)**	L3	7
	b	Find the equivalent resistance between a and b using star delta transformation for the circuit shown in Fig. 2(b)  **Fig. Q2(b)**	L2	7
	c	Determine Voltage V3 in the circuit shown in Fig. 2(c)using mesh analysis.  **Fig. Q2(c)**	L3	6
		Module-2		
Q. 03	a	Find current Ix, in the circuit shown in Fig. 3(a) using superposition theorem.  **Fig. Q3(a)**	L3	10

	b	Find Thevenin's equivalent at terminals A and B for the circuit shown in Fig. 3(b).  **Fig. Q3(b)**	L3	10
		OR		
Q.04	a	Determine the current through the load resistance in the circuit shown in Fig. 4(a) using Norton's theorem  **Fig. Q4(a)**	L2	8
	b	Find the value of ZL for which maximum power transfer occurs in the network shown in Fig. 4(b).  **Fig. Q4(b)**	L3	8
	c	State Millman's Theorem	L1	4
		Module-3		
Q. 05	a	In the network shown in Fig. 5(a), a steady state is reached with the switch k open. At time t=0 +, the switch is closed. Determine the value of Va(0-) and Va(0+).  **Fig. Q5(a)**	L3	10

	b	For the circuit shown in Fig. 5(b), the switch 'S' is changed from position 1 to 2 at $t = 0$, the steady state is reached at position 1. Find the value of i, $\frac{di}{dt}$, $\frac{d^2i}{dt^2}$ at $t = 0^+$. Assume that the capacitor is initially uncharged.  **Fig. Q5(b)**	L3	10
		OR		
Q. 06	a	For the circuit shown in Fig. 6(a), has zero capacitor voltage and zero inductor current when the switch k is open. At t=0, the switch k is closed. Solve for i) v_1 *and* v_2 at $t = 0^+ ii)$ $\frac{dv_1}{dt}$ and $\frac{dv_2}{dt}$ at $t = 0^+$  **Fig. Q6(a)**	L3	10
	b	For the network shown in Fig. 6(b), the network is steady state with switch k closed. At $t = 0$, switch is opened. Determine voltage across switch Vk, $\frac{dVk}{dt}$, at $t = 0^+$.  **Fig. Q6(b)**	L3	10
		Module-4		
Q. 07	a	In the circuit shown in Fig. 7(a), the source voltage is V(t)=50sin250t V. Using Laplace Transform determine current when switch k is closed at t=0.  **Fig. Q7(a)**	L3	10

	b	Determine the Laplace transform of the waveform shown in Fig. 7(b).  **Fig. Q7(b)**	L3	10
		OR		
Q. 08	a	Determine $v_c(t)$ *and the current* $i_c(t)$ for $t \geq 0$ for the circuit shown in Fig. 8(a).  **Fig. Q8(a)**	L3	10
	b	Determine the Laplace transform of periodic saw tooth waveform for the circuit shown in Fig. 8(b).  **Fig. Q8(b)**	L3	10
		Module-5		
Q. 09	a	Find Z and T parametersfor the circuit shown in Fig. 9(a).  **Fig. Q9(a)**	L3	7

	b	Obtain the impedance parameters in terms of Hybrid parameters.	L2	6
	c	A coil of 20 Ω resistance has inductance of 0.2H and is connected in parallel with capacitance of 100μF. Find the resonant frequency at which circuit will act as non-inductive resistance. Also find dynamic resistance	L2	7
		OR		
Q. 10	a	Determine Transmission parameters for the circuit shown in Fig. 10(a).  **Fig. Q10(a)**	L2	7
	b	Express Z parameters in terms of Transmission (ABCD) parameters	L2	6
	c	A 400Hz AC source is connected in series with a capacitor and a coil whose resistance and inductance are 20mΩ and 6mH respectively. If the circuit is in resonance at 200Hz, Find i Value of Capacitor ii Voltage across capacitor. iii Maximum energy stored. iv Half power frequencies	L2	7