17EC35

Visvesvaraya Technological University, Belagavi

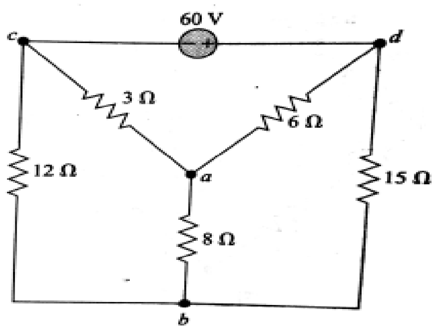
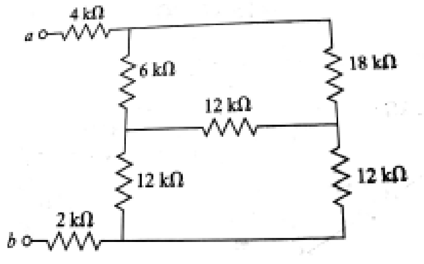
MODEL QUESTION PAPER

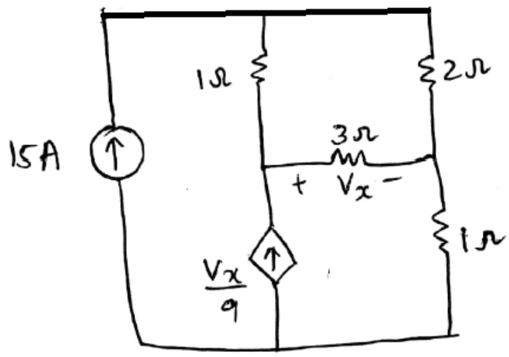
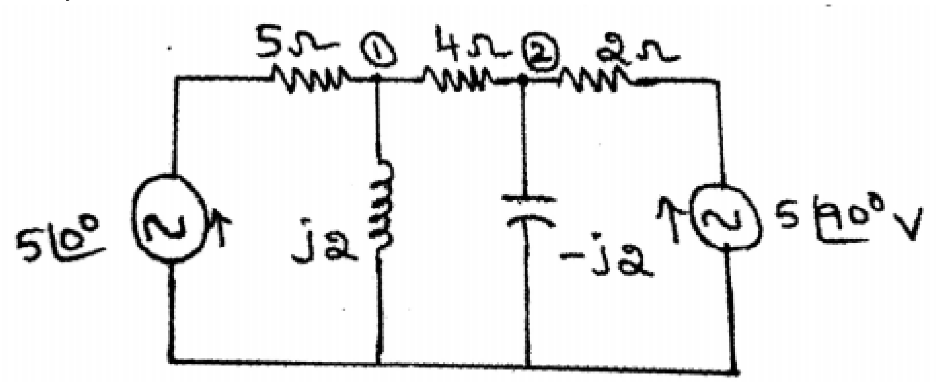
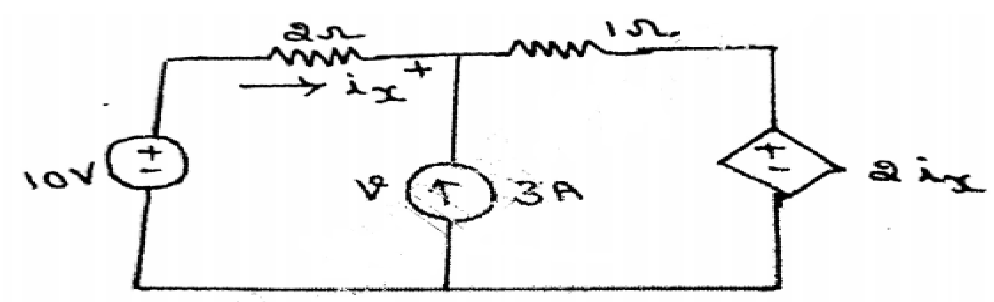
3rd Semester, B.E (CBCS 2017-18 Scheme)EC/TC

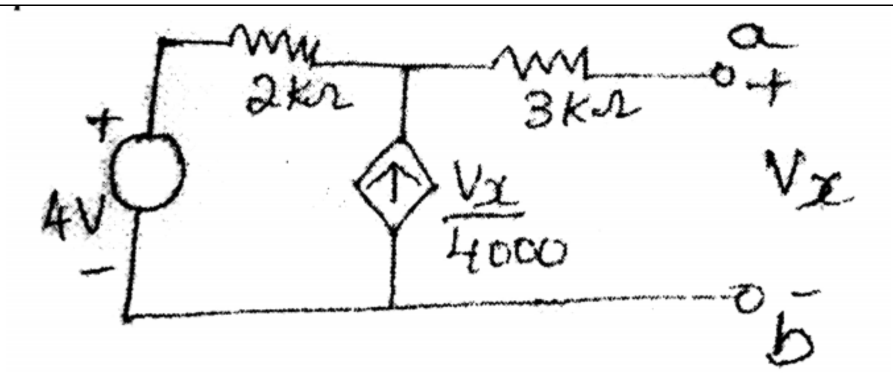
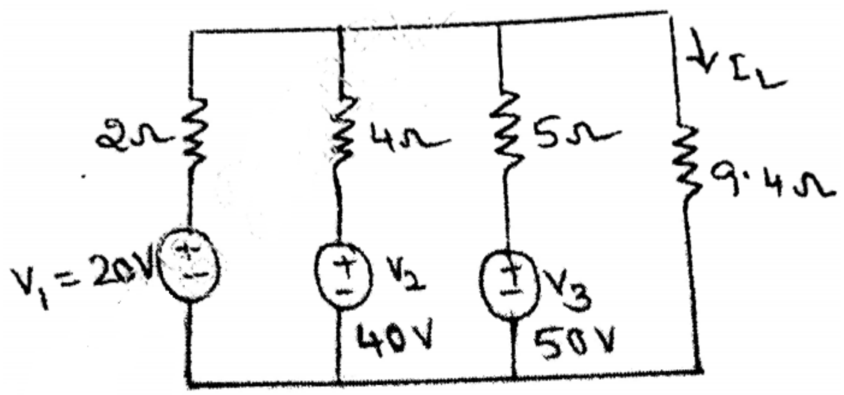
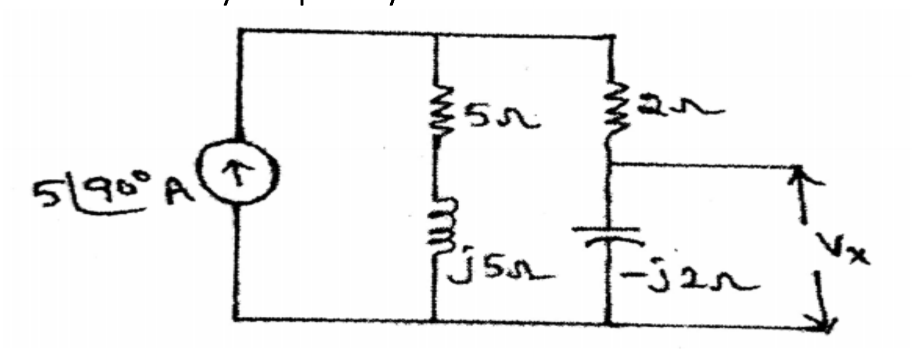
Course: 17EC35- Network Analysis, *Set No. 1*

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

Note: (i) Answer Five full questions selecting any one full question from each Module.
(ii) Question on a topic of a Module may appear in either its 1st or/and 2nd question.

		Module-1	**Marks**
1	a.	Derive the expression for i) Δ to Y transformation ii)Y to Δ transformation.	10
	b.	Using source shifting and source transformation techniques, calculate V_{ad} for the circuit shown in Fig.Q1 (b).  Fig. Q1(b)	10
		OR	
2	a.	Determine the equivalent resistance across the terminals a and b, shown in Fig.Q2(a)  Fig.Q2(a)	5
	b.	Determine the value of v_x using mesh analysis for Fig.Q2 (a) shown below.	5

		 Fig.Q2(a)	
	c.	For the network of Fig.Q2(b), determine the node voltage by nodal analysis.  Fig.Q2(b)	10
		Module-2	
3	a.	State superposition theorem. In the circuit of Fig.Q3(a),use the superposition principle to determine the value of i_x.  Fig.Q3(a)	10
	b.	Obtain the Thevenin's and Norton's equivalent for the network shown in Fig.Q3 (b).	10

		 Fig.Q3(b)	
		OR	
4	a.	State and explain maximum power transfer theorem.	4
	b.	Using Millman's theorem, find I_L through R_L for the network shown in Fig.Q4 (b).  Fig.Q4(b)	6
	c.	State and verify reciprocity theorem for the circuit shown in Fig.Q4(c).  Fig.Q4(c)	10
		Module-3	
5	a.	State and prove initial value theorem and final value theorem.	10
	b.	In the circuit shown in Fig.Q5(b), the switch was inposition **a** forsufficiently long time to have achieved steady state.At t=0, the switch	10

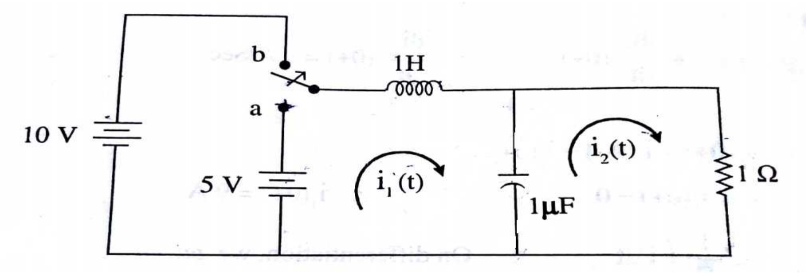
<table>
<tr><td></td><td></td><td>was changed from a tob. Determine I_L and V_C, their first and second order derivatives at t=0+.


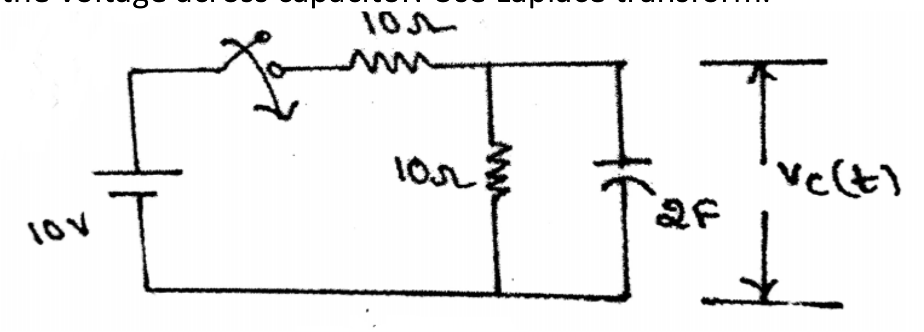
Fig.Q5 (b)</td><td></td></tr>
<tr><td></td><td></td><td>OR</td><td></td></tr>
<tr><td>6</td><td>a.</td><td>The switch in the network shown in Fig.Q6 (a) is closed at t=0.Determine the voltage across capacitor. Use Laplace transform.


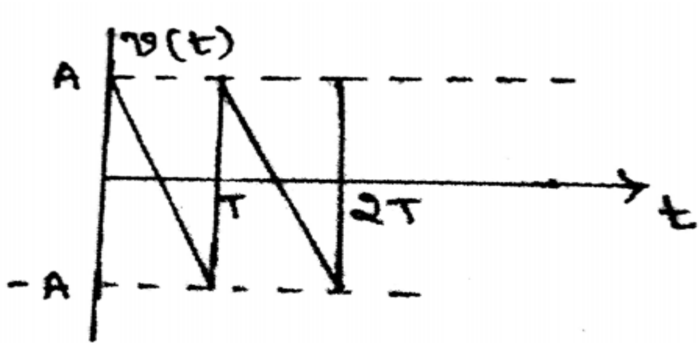
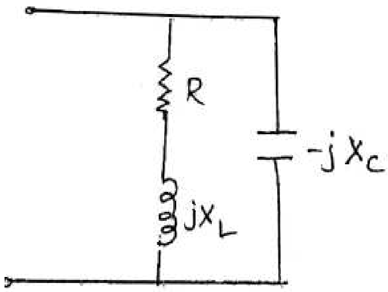
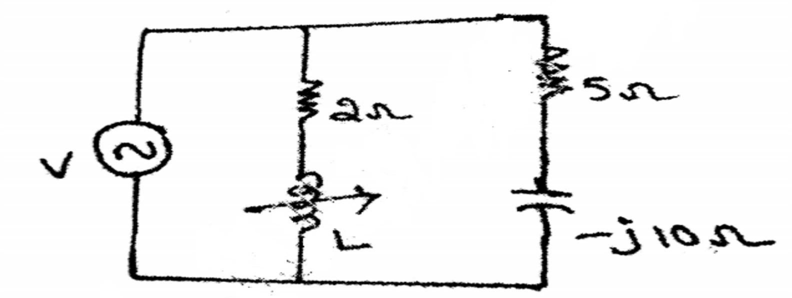
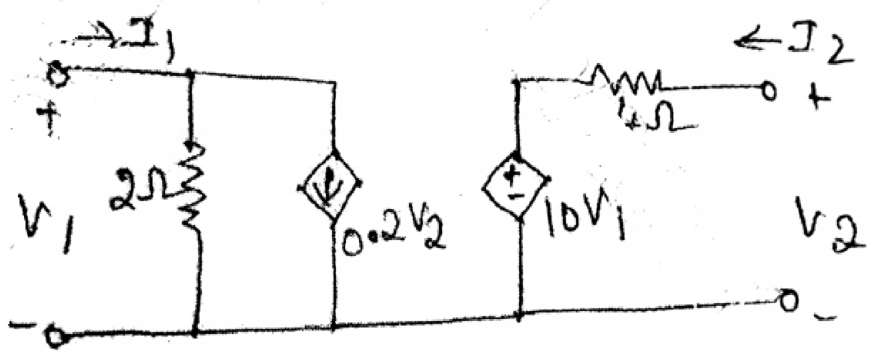
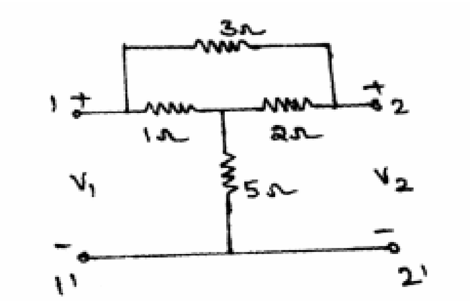
Fig.Q6(a)</td><td>10</td></tr>
<tr><td></td><td>b.</td><td>Determine the Laplace transform of the periodic saw tooth waveform of Fig.Q6 (b).Use gate function.


Fig.Q6 (b)</td><td>10</td></tr>
<tr><td></td><td></td><td>Module-4</td><td></td></tr>
<tr><td>7</td><td>a.</td><td>What is resonance?Derive an expression for half power cutoff frequencies.</td><td>8</td></tr>
<tr><td></td><td>b.</td><td>Define Q-factor, resonant frequency, selectivity and bandwidth.</td><td>4</td></tr>
<tr><td></td><td>c.</td><td>A series RLC circuit consists of R=10Ω, L=0.01H and C=0.01μF is connected across a supply of 10mV.Determine,i)f_0 ii)Q-factor iii)BW iv)f_1</td><td>8</td></tr>
</table>

		and f_2 v)I_0.	
		OR	
8	a.	Prove that for a series resonant circuit, the resonant frequency is the geometric mean of two half power frequencies.	4
	b.	Obtain the expression for the resonant frequency for the circuit shown in Fig.Q8 (b).  Fig.Q8 (b)	8
	c.	Find the value of L for which the circuit shown in Fig.Q8(c) is resonant at a frequency of w=5000 rad/sec.  Fig.Q8(c)	8
		Module-5	
9	a.	Define y-parameters. Also, find y-parameters for the two-port –network shown in Fig.Q9 (a).  **Fig.Q9 (a).**	10

	b.	Define ABCD parameters. Express y-parameters in terms of ABCD parameters.	10
		OR	
10	a.	Define hybrid parameters (h). Express hybrid parameters in terms of impedance parameters (z).	10
	b.	Define z parameters. Also, find z parameters for the network shown in Fig.Q10 (b).  Fig.Q10 (b).	10

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