Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III • EXAMINATION – WINTER • 2014

Subject Code: 130901 **Date: 01-01-2015**

Subject Name: Circuits and Networks

Time: 02.30 pm - 05.00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Explain the terms (i) Linear (ii) Bilateral (iii) Passive (iv) Reciprocal (v) Time invariant (vi) Lumped parameter and (vii) Dual with reference to Network.	**07**
	(b)	Derive formulae to convert given 'Y' parameters into 'h' parameters.	**07**
Q.2	**(a)**	Calculate VX in the circuit of Figure 1 using (a) nodal analysis and	**04**
		(b) Superposition.	**03**
	(b)	Describe Laplace transformation method for solving differential equations; state its advantage over the classical method.	**07**
		OR	
	(b)	(i) Derive Laplace transform of derivatives and integrals. (ii) Find Laplace transform of sinωt.	**07**
Q.3	**(a)**	Explain incident matrix of a linear oriented graph with example.	**07**
	(b)	State and explain (i) Reciprocity theorm (ii)Nortons Theorm.	**07**
		OR	
Q.3	**(a)**	The incidence matrix of a graph is as shown in Fig 2 Obtain the corresponding graph.	**07**
	(b)	Prepare the circuit graph, graph tree and hence cut set matrix for circuit shown in figure 3.	**07**
Q.4	**(a)**	Using Nodal Analysis find Vo in the circuit of figure 4	**07**
	(b)	Find Vo in the circuit of figure 5 using principle of superposition.	**07**
		OR	
Q.4	**(a)**	Using loop Analysis find Vo in the circuit of figure 6.	**07**
	(b)	Determine the impedance seen by the source in the circuit in Fig 7.	**07**
Q.5	**(a)**	Use the differential equation approach to find i(t) for t > 0 in the circuit in Fig. 8 and plot the response including the time interval just prior to opening the switch	**07**
	(b)	Explain the dual network and concept of duality with suitable Example.	**07**
		OR	
Q.5	**(a)**	Discuss concept of poles and zeros in a network function.	**07**
	(b)	Discuss substitution theorem and steps for solution of a network using this theorem.	**07**

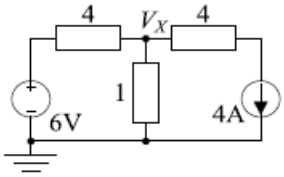

Figure 1(Que2 A)

$$\begin{pmatrix} 1 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & -1 & 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & -1 & 1 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & -1 & 1 \end{pmatrix}$$

Figure 2 (Que 3A or)

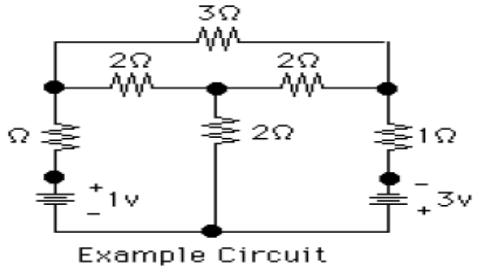

Figure 3(Qu3 3B or)

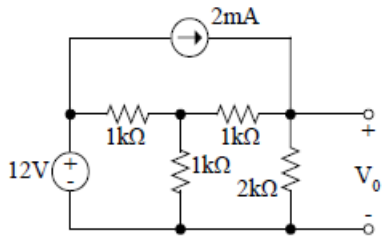

Figure 4(Que 4A)

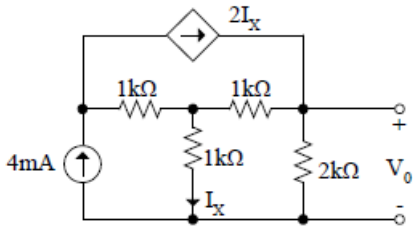

Figure 6 (Que 4A or)

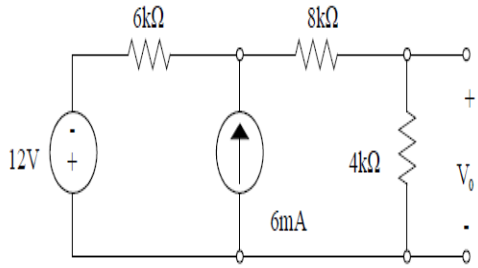

Figure 5(Que 4B)

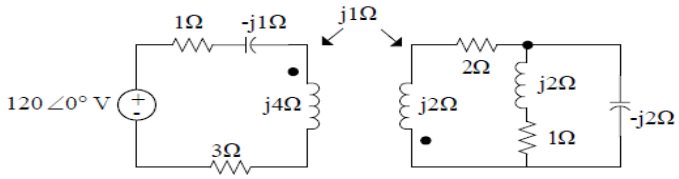

Figure 7(Que 4B or)

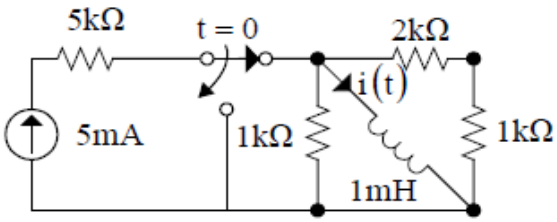

Figure 8(Que 5 A)

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