

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 V_X in the circuit of Figure 1 using (a) nodal analysis and (b) Superposition. **04**
- (b)** Describe Laplace transformation method for solving differential equations; state its advantage over the classical method. **03**
- OR**
- (b)** (i) Derive Laplace transform of derivatives and integrals. **07**
- (ii)** Find Laplace transform of $\sin \omega t$.
- Q.3 (a)** Explain incident matrix of a linear oriented graph with example. **07**
- (b)** State and explain (i) Reciprocity theorem (ii)Nortons Theorem. **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 V_o in the circuit of figure 4 **07**
- (b)** Find V_o in the circuit of figure 5 using principle of superposition. **07**
- OR**
- Q.4 (a)** Using loop Analysis find V_o 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**

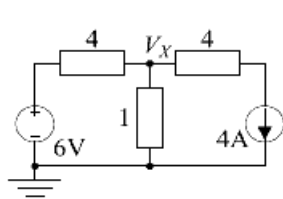


Figure 1(Que2 A)

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

Figure 2 (Que 3A or)

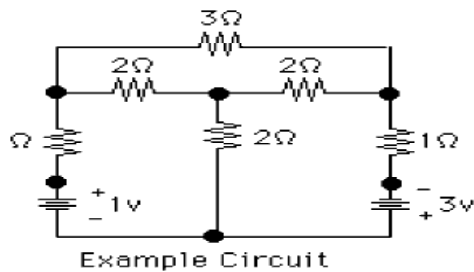


Figure 3(Qu3 3B or)

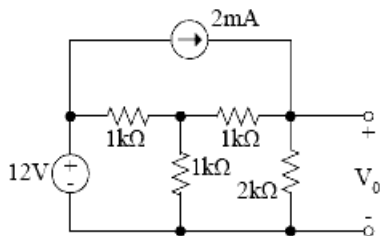


Figure 4(Que 4A)

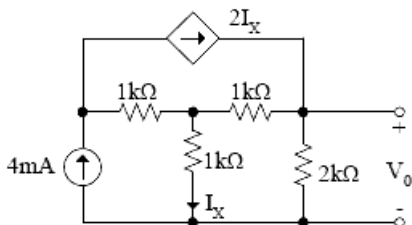


Figure 6 (Que 4A or)

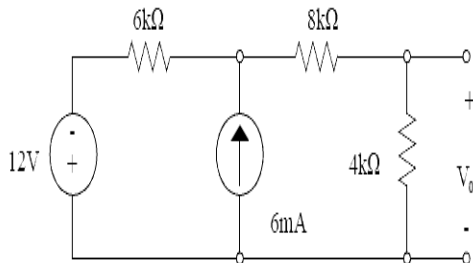


Figure 5(Que 4B)

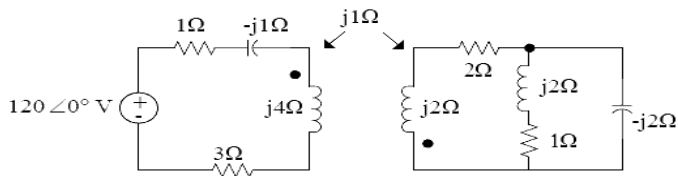


Figure 7(Que 4B or)

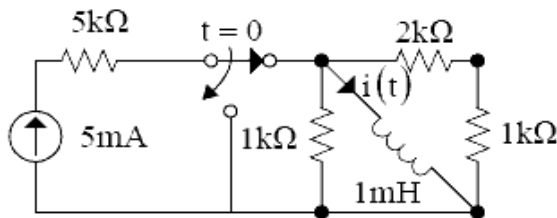


Figure 8(Que 5 A)
