

GUJARAT TECHNOLOGICAL UNIVERSITY
B. E. - SEMESTER – III • EXAMINATION – WINTER 2012

Subject code: 130901**Date: 10-01-2013****Subject Name: Circuits and Networks****Time: 10.30 am – 01.00 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) State and prove Thevenins Theorem, find R_{th} and V_{th} for the network shown in Fig.1 **07**
- (b) Find ABCD parameters for the two port network shown in Fig.2. Also derive Y parameters from ABCD parameters **07**
- Q.2** (a) Explain the terms (i) NonLinear (ii) Uniilateral (iii) Passive (iv) Reciprocal (v) Time variant (vi) Lumped parameter and (vii) principal of Duality. **07**
- (b) Write down voltage and current relationships in resistor, inductor and capacitor .Also mention the initial and final condition for R,L and C components in the different cases. **07**

OR

- (b) Explain the “Dot Convention Rule” for the magnetically coupled Network using network shown in Fig-3.Also formulate KVL equations. **07**
- Q.3** (a) Explain the formulation of graph , tree and Incidence Matrix using suitable example. Hence discuss the procedure of forming reduced Incidence Matrix and its advantages. **07**
- (b) For the Network shown in fig-4, Draw the oriented Graph and all possible trees. Also prepare **07**
- (1)The Incidence Matrix.
- (2) Fundamental Tie set Matrix.
- (3)Fundamental cut set Matrix.

OR

- Q.3** (a) Explain various source transformation techniques. Using Source transformation techniques find current “i” in the network shown in fig-5 **10**

- (b) Explain following in Brief: Ideal and Practical Energy source 04
- Q.4 (a) Explain The Laplace Transformation method. Find Laplace Transform of Unit Step, and exponential function. 07
- (b) In the Network shown in fig-6 ,the switch k is closed at $t=0$,connecting voltage $V_o \sin \omega t$ to the parallel RL-RC circuit. Find (1) di_1/dt and (2) di_2/dt at $t=0^+$ 07

OR

- Q.4 (a) State and explain various Network Functions. 07
For the resistive two port network of fig-7,determine the numerical values for $G_{12}(s)$, $Z_{12}(s)$ and $\alpha_{12}(s)$.
- Q.5 (a) State and explain the Initial and final value theorem. 07
- (b) Find the particular solution for the current using laplace transformation in the n/w shown in fig-8.The switch k is closed at $t=0$.Assume zero initial conditions in the elements. 07

OR

- Q.5 (a) State and explain Superposition Theorem. Hence using this find V_{ab} in fig-9. 07
- (b) Find the current through the 2V source in fig-10 using Node voltage analysis. 07

FIGURES FOR THE SUBJECT CODE - 130901 (CN)

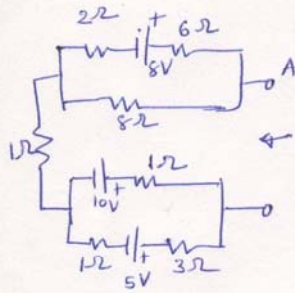


Fig. 1

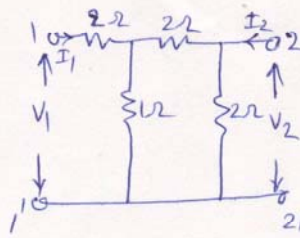


Fig. 2

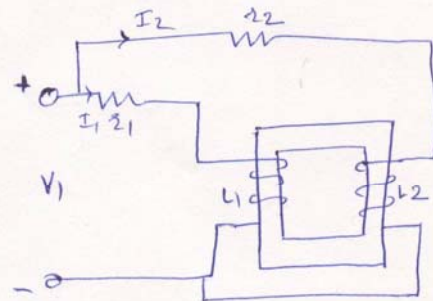


Fig. 3

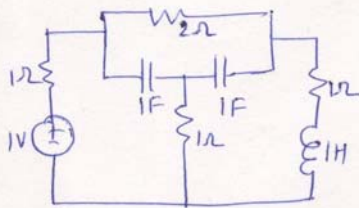


Fig. 4

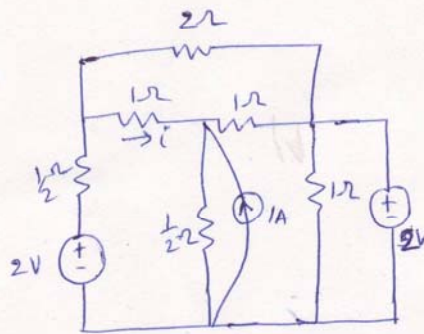


Fig. 5

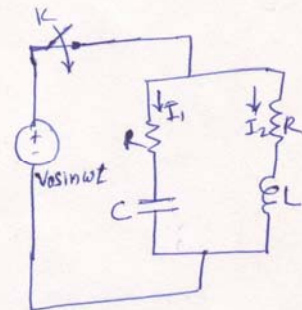


Fig. 6

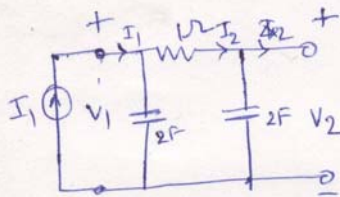


Fig. 7

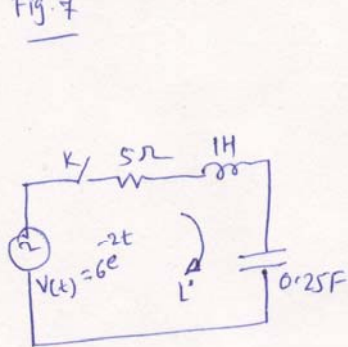


Fig. 8

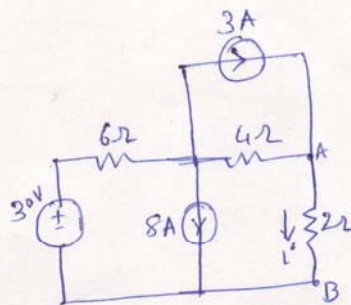


Fig. 9

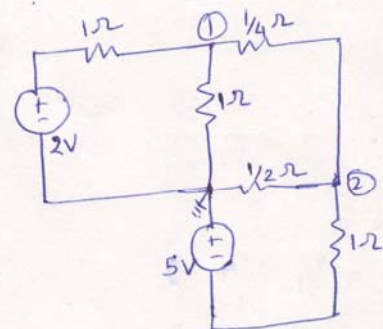


Fig. 10

