Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– III EXAMINATION – SUMMER 2015

Subject code: 130901 **Date: 09/06/2015**
Subject Name: Circuits and Networks
Time: 02.30pm-05.00pm **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)** Define the following with suitable example. **07**

1. Incident matrix
2. Bilateral and Unilateral parameters
3. Reciprocal network
4. Distributed and lumped parameter
5. Mesh and Loop
6. Tree and co tree
7. Planner and non planner graph

(b) Write down voltage and current relationships in resistor, inductor and capacitor .Also mention the initial and final conditions for R , L and C components in the different conditions. **07**

Q.2 **(a)** State and prove Maximum power transfer Theorem for a.c.circuits. For the network shown in Fig.1, find the value of R_{AD} for maximum power transfer. Also find the maximum power transfer. **07**

(b) Find Y parameters for the two port network shown in Fig.2. Also derive ABCD parameters from Y parameters **07**

OR

(b) Explain various source transformation techniques. Using Source transformation techniques find current "i_1" in the network shown in fig-3 **07**

Q.3 **(a)** (i) Explain the Reciprocity Theorem. **07**
(ii) Find Laplace transform of te^{-at}.

(b) For the Network shown in fig-4, Draw the oriented Graph and all possible trees. Also prepare **07**
(1)The Incidence Matrix.
(2)Tie set Matrix.
(3)Fundamental cut set Matrix.

OR

Q.3 **(a)** Explain the "Dot Convention Rule" for the magnetically coupled Network using network shown in Fig-5.Also formulate KVL equations. **07**

(b) Explain in brief: unit ramp and unit Impulse functions. Also explain convolution integral of function. Find Laplace inverse by using convolution integral of **07**

$$F(s) = \frac{1}{(s+1)(s+3)}$$

Q.4 **(a)** Explain the Laplace Transformation method and its advantages over the classical methods. **07**

(b) In the Network shown in fig-6,the steady state is reached with switch k open. At t=0+ switch is closed . Find **07**
(1) $I_1(0+)$, (2) $I_2(0+)$ and (3) $I_3(0+)$

OR

Q.4 **(a)** State and explain various Two port parameters and Network functions in brief. **07**

(b) Explain the Node voltage Analysis. Hence using it find " i " in the circuit shown in figure-7. **07**

Q.5 **(a)** Explain the step response to R- L- C series circuit and Hence derive the formula for loop current i(t) in series R-L-C circuit. **07**

(b) Explain the concept of Dual Network used in network Analysis. Draw the dual of system shown in fig-8. **07**

OR

Q.5 **(a)** Explain the various types of Interconnections of the Two port networks in brief. **07**

(b) Find the current in the 4 ohm resistor in fig-9 using Superposition theorem. **07**

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FIGURES FOR C & N (130901)
B.E. SEMESTER – III

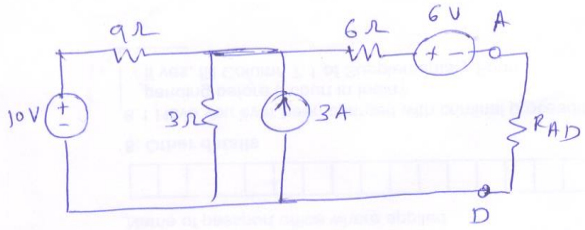

Fig-1

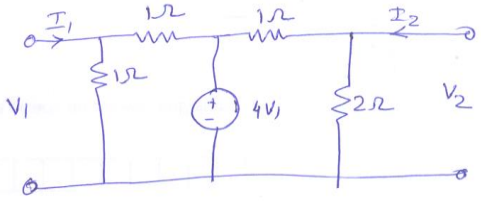

Fig-2

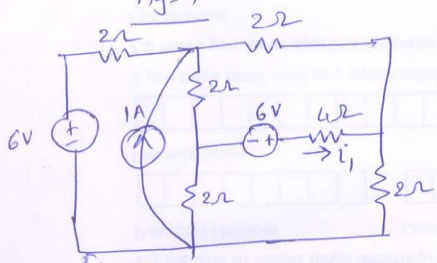

Fig-3

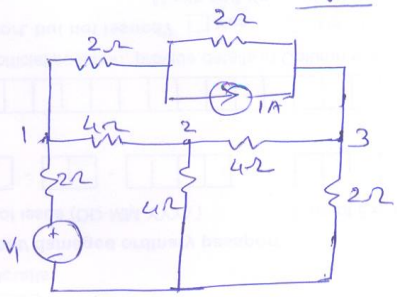

Fig-4

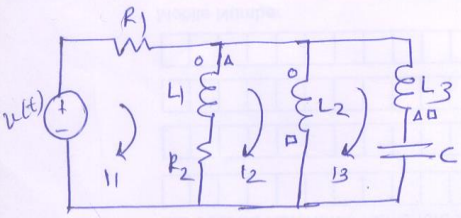

Fig-5

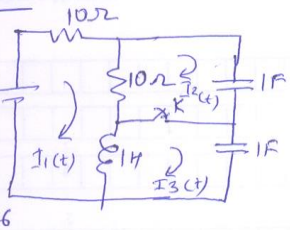

Fig-6

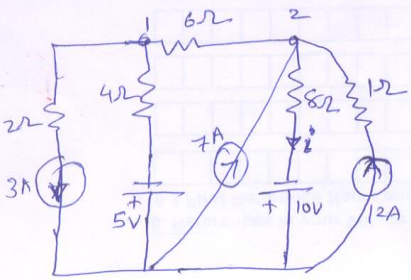

Fig. 7

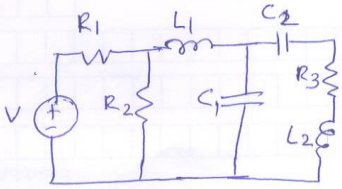

Fig. 8

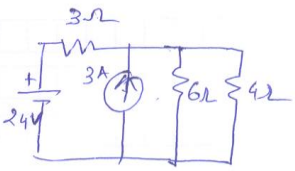

Fig.9