

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 **07**
.Also mention the initial and final conditions for R , L and C components in the different conditions.
- Q.2** **(a)** State and prove Maximum power transfer Theorem for a.c.circuits. For the **07**
network shown in Fig.1, find the value of R_{AD} for maximum power transfer.
Also find the maximum power transfer.
- (b)** Find Y parameters for the two port network shown in Fig.2. Also derive ABCD **07**
parameters from Y parameters
- OR**
- (b)** Explain various source transformation techniques. Using Source transformation **07**
techniques find current " i_1 " in the network shown in fig-3
- 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 **07**
trees. Also prepare
(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 **07**
network shown in Fig-5.Also formulate KVL equations.

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

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

- 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 (1) $I_1(0+)$, (2) $I_2(0+)$ and (3) $I_3(0+)$ 07

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

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

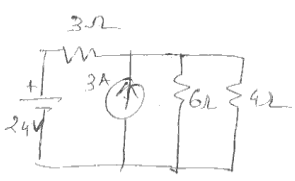
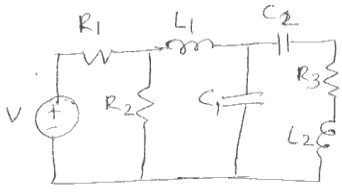
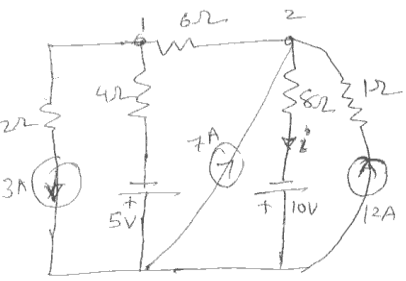
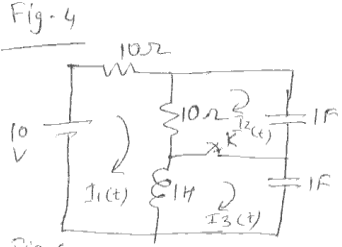
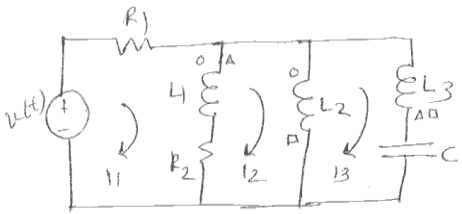
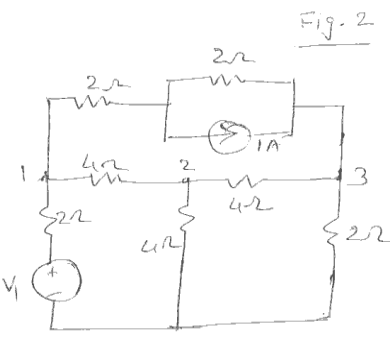
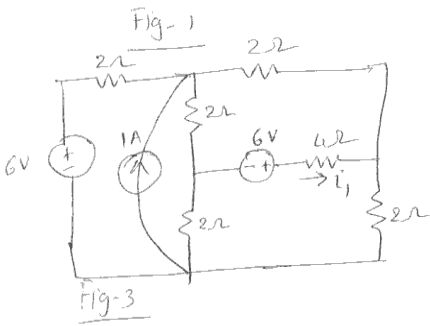
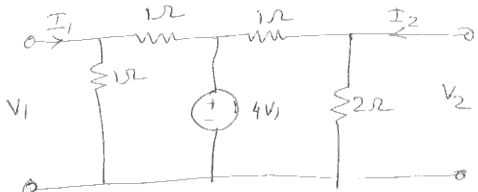
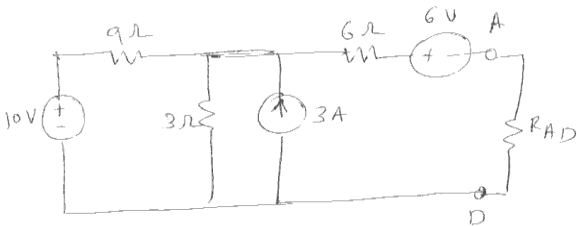


Fig. 7

Fig. 8

Fig. 9