GUJARAT TECHNOLOGICAL UNIVERSITY
PDDC SEM-II Examination-Dec-2011

Subject code: X20901   **Date: 22/12/2011**
Subject Name: Circuits & Network
Time: 10.30 am -1.00 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)** Give the classification of networks.   **07**
         (b) State and explain Millman's theorem.   **07**

Q.2 **(a)** Derive the symmetry and reciprocity condition for y-parameters.   **07**
         (b) Explain tree, co-tree and incidence matrix with one suitable   **07**
                  example and also give the properties of tree.
                                        OR
         (b) Discuss the techniques of Source transformation.   **07**

Q.3 **(a)** Give the important features and explain physical significance of   **07**
                  poles and zeros in network functions.
         (b) Obtain the Laplace transform of the following: **07**
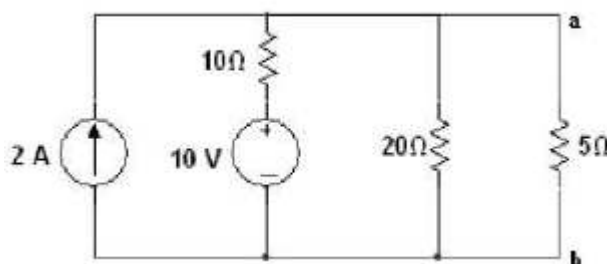   1) $u(t-a)$ 2) $r(t-a)$ 3) $\delta(t-a)$
                                        OR
Q.3 **(a)** A series RLC circuit with R = 2 ohm, L = 1 H and C = 0.5 Farad   **07**
                  with the applied voltage V (t) = sint. Find i(t) if the switch is
                  closed at t= 0. Use Laplace transform method.
         (b) What is time constant? Explain its significance through one   **07**
                  suitable example.

Q.4 **(a)** Give the advantage of node analysis over mesh analysis. Explain   **07**
                  the concept of super-node and Super-mesh.
         (b) State and Explain super-position theorem   **07**
                                        OR
Q.4 **(a)** Using thevenin's theorem find out the load current through 5   **07**
                  ohm resistance shown in figure below:

         (b) Derive the orthogonal relationship between fundamental loop   **07**
                  matrix and cut-set matrix.

Q.5 **(a)** Prepare a list of dual quantities encountered in electrical **07**
engineering. Give a procedure to draw the dual of network.

(b) State and explain the initial and final value theorem? Under what **07**
condition final value theorem is not applicable.

OR

Q.5 **(a)** Derive the conditions of maximum power transfer **07**
- When load consists of a variable resistance
- When load consists of a variable resistance and variable reactance

(b) The z-parameters of certain two-port networks are: $z_{11} = 5$ ohm, **07**
$z_{12} = z_{21} = 3$ ohm, $z_{22} = 4$ ohm find: ABCD parameters and h-paramtres

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