Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–II EXAMINATION – SUMMER 2016

Subject Code:X20901 **Date:31/05/2016**

Subject Name:CIRCUITS AND NETWORKS

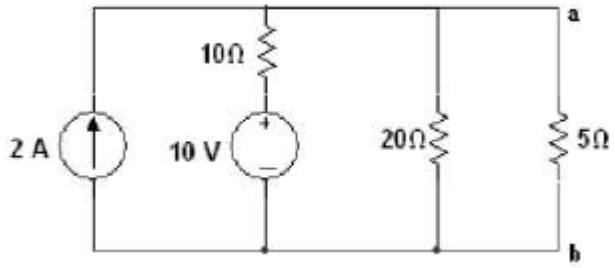
Time:10:30 AM to 01:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	What is capacitor? Discuss its characteristics from circuit, energy and geometrical point of view.	**07**
	(b)	State and explain reciprocity theorem.	**07**
Q.2	**(a)**	Derive the symmetry and reciprocity condition for h-parameters.	**07**
	(b)	Explain tree, co-tree and incidence matrix with one suitable example and also give the properties of tree.	**07**
		OR	
	(b)	Explain the concept of super mesh and super node with suitable example.	**07**
Q.3	**(a)**	What is complex frequency? Explain the significance of complex frequency..	**07**
	(b)	A voltage pulse of width 2 second and magnitude 4 volts is applied at time t= 0 to a series R-C circuit comprising R = 2 ohm and capacitor C = 0.1 F. Find the resulting current i(t) in the circuit.	**07**
		OR	
Q.3	**(a)**	A series RLC circuit with R = 1 ohm, L = 2 H and C = 0.4 Farad with the applied voltage V (t) = cost. Find i(t) if the switch is closed at t= 0. Use Laplace transform method.	**07**
	(b)	What is network function? Define the terms “driving point impedance” and “driving point admittance” of a one-port network.	**07**
Q.4	**(a)**	Derive the following matrix equations: 1) Loop equation 2) Node equation 3) Cut-set equation	**07**
	(b)	State and Explain super-position theorem	**07**
		OR	

Q.4 **(a)** Using norton's theorem find out the load current through 5 ohm resistance shown in figure below: **07**



Q.4 **(b)** Derive the step response of R-L series circuit. **07**

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

(b) Draw and explain equivalent circuit of two-port network using z-parameters. **07**

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 y-parameters of certain two-port networks are: **07**
y_{11} =0. 5 mho, y_{12} = y_{21} = o.2 mho, y_{22} = 0.8 mho find: ABCD parameters and h- parameters

****