GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–III (NEW) EXAMINATION – SUMMER 2019

Subject Code: 2130901   **Date: 04/06/2019**

Subject Name:Circuits and Networks

Time: 02:30 PM TO 05:00 PM   **Total Marks: 70**

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

			MARKS
Q.1	**(a)**	Mention the relations between voltage and current for the following passive elements. (1) Resistor (2) Capacitor.	**03**
	(b)	Define following terms: (a) Linear and Nonlinear Networks (b) Active and Passive Networks	**04**
	(c)	In the network of figure: 1, all sources are time invariant. Determine the branch current in the 2 ohm resistor using Source Transformation method.	**07**
Q.2	**(a)**	State and explain Thevenin's theorem	**03**
	(b)	Explain characteristic of an ideal voltage source.	**04**
	(c)	Find the value of all currents and the current in the 10Ω resistor for the network shown in figure 2 using mesh analysis.	**07**
		OR	
	(c)	In the network of figure 3, Determine the node voltages V1, V2, & V3 using node analysis.	**07**
Q.3	**(a)**	Determine the equivalent inductance at terminals A-B for the circuit shown in figure: 4.	**03**
	(b)	Construct the exact dual of the network of figure5.	**04**
	(c)	Determine the value of I1 in the network of figure 6 using superposition theorem.	**07**
		OR	
Q.3	**(a)**	State and explain maximum power transfer theorem.	**03**
	(b)	Explain and derive the step response to R-L series circuit using Laplace Transformation method.	**04**
	(c)	Explain the procedure to obtain sinusoidal steady state response of a circuit.	**07**
Q.4	**(a)**	Write the initial conditions in the inductor and capacitor at $t = 0+$ and $t = \infty$.	**03**
	(b)	Explain significance of poles and zeros in network functions.	**04**
	(c)	What is time constant? Explain time constant in terms of RL and RC circuit	**07**
		OR	
Q.4	**(a)**	Determine the Laplace transform of $(t) = e^{-at}\cos\omega t$.	**03**
	(b)	Define: (1) Oriented Graph (2)Tree (3) Tie-set (4) Incidence matrix	**04**
	(c)	The switch K is opened at t=0. Find out the values of 'v'; 'dV/dt' and 'd^2V/dt^2' just after switching (at time t = 0+) in the circuit shown in the following figure 7.	**07**
Q.5	**(a)**	State and explain initial value theorem.	**03**
	(b)	Derive the condition for the network to be reciprocal for ABCD-parameters.	**04**
	(c)	Find the Z parameters for the network shown in figure 8.	**07**
		OR	
Q.5	**(a)**	Briefly describe Millman's theorem.	**03**
	(b)	Determine y-parameters in terms of z-parameters.	**04**

1

www.FirstRanker.com   www.FirstRanker.com

Figure – 1

Figure – 2

Figure – 3

Figure – 4

Figure – 5

Figure – 6

Figure – 7

Figure – 8

****