Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER– III (New) EXAMINATION – WINTER 2019

Subject Code: 3131707   **Date: 3/12/2019**

Subject Name: Network Analysis

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.**

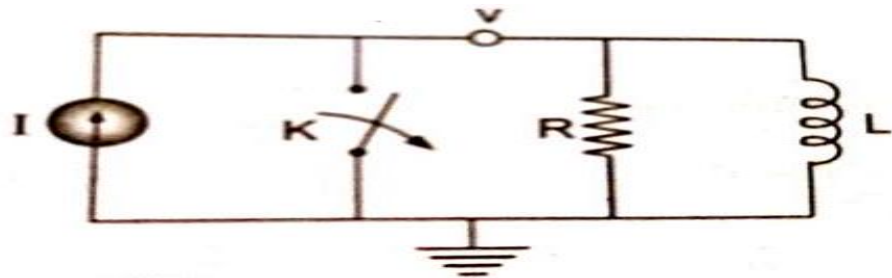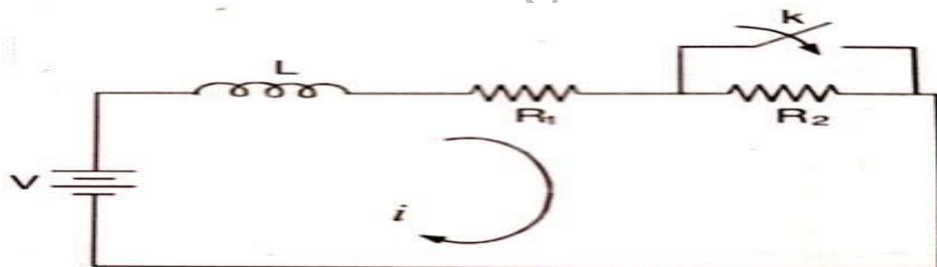|			MARKS
Q.1	**(a)**	State and explain superposition theorem.	03
	(b)	Explain the characteristics of an ideal voltage source.	04
	(c)	What is time constant? Explain time constant in terms of RL and RC circuits.	07
Q.2	**(a)**	State and explain reciprocity theorem.	03
	(b)	Briefly describe KVL and KCL.	04
	(c)	Find the currents I_1, I_2, I_3 and I_4 for the network shown in Figure 1.	07
		OR	
	(c)	Briefly describe the application of Laplace transform for transfer function approach in circuit analysis.	07
Q.3	**(a)**	Briefly describe millman's theorem.	03
	(b)	What is duality? Explain with example.	04
	(c)	Explain the procedure to obtain sinusoidal steady state response of a circuit.	07
		OR	
Q.3	**(a)**	State and explain initial value theorem.	03
	(b)	State and explain maximum power transfer theorem for AC and DC circuits.	04
	(c)	Find the voltage drop across x-y for Figure 2.	07
Q.4	**(a)**	Determine Y parameters in terms of Z parameters.	03
	(b)	Explain significance of poles and zeros in network functions.	04
	(c)	In the network shown in Figure 3, the switch k is opened at t=0. Solve for v, dv/dt and d^2v/dt^2 at t=0+ if I=10 A, R=10 Ω and L=1 H.	07
		OR	
Q.4	**(a)**	Determine H parameters in terms of Z parameters.	03
	(b)	State and explain source transformation method.	04
	(c)	In the network shown in Figure 4, the switch k is closed at t=0, a steady state having previously been attained. Find the particular solution for the current.	07
Q.5	**(a)**	Define unilateral and bilateral network, Active and passive network.	03
	(b)	Derive the condition for the network to be reciprocal for ABCD parameters.	04
	(c)	Determine i in a circuit of Figure 5 using superposition theorem.	07
		OR	
Q.5	**(a)**	List the advantages of Laplace transformation over classical method.	03
	(b)	What is initial condition? Explain the effect of initial condition on the elements of network.	04
	(c)	Explain how Laplace transform is useful in obtaining the transient response of a second order system.	07
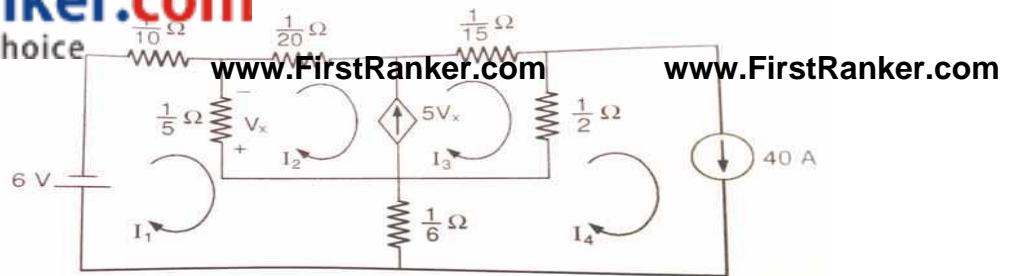
Figure 1
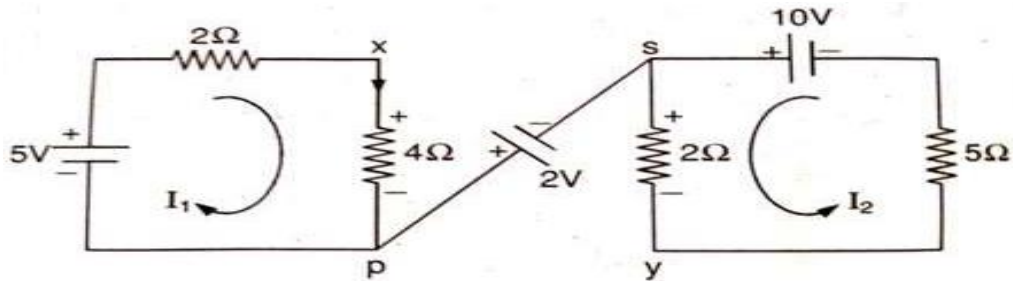
Figure 2

Figure 3

Figure 4

Figure 5

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