Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (OLD) EXAMINATION – WINTER 2018

Subject Code:130901 **Date:28/11/2018**

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)**	Define self and mutual inductance with dot convection method	**07**
	(b)	What is mesh? Determine $i_1, i_2,$ and i_3 using Mesh analysis in shown in Fig1.1	**07**
Q.2	**(a)**	State, Prove and Summarize conditions for Maximum power transfer in DC circuit and different case in AC circuit.	**07**
	(b)	Compare Thevenin theorem and Norton theorem.	**07**
		OR	
	(b)	Classify DC responce of first order RL and RC circuits	**07**
Q.3	**(a)**	Analyze time domain responce of source free second order linear networks	**07**
	(b)	In the network of figure 3.1, If t=0, switch 'k' is closed. Find the values of i, di/dt and d2 i/dt2 at t =0+ for element values as follows; V= 100V, R= 1000 and L= 1H.	**07**
		OR	
Q.3	**(a)**	Analyze time domain responce of second order linear networks with constant inputs	**07**
	(b)	Consider the R-C circuit shown in fig 3.2, switch 'S' is closed at t=0 and assume that there is no initial charge in the capacitor. Find the initial conditions i(0+) and di(0+)/dt. Discuss this for RLC series circuit.	**07**
Q.4	**(a)**	A function in Laplace domain is given by $F(S) = \frac{2(s+4)}{(s+3)(s+8)}$ Find the initial and final value by initial and final value theorem.	**07**
	(b)	A 10 volts step voltage is applied across a RC circuit at t=0. Find I(t) at t=0+ and obtain the value of $di/dt\|_{t=0+}$. Assume R=100Ω, C=100μF	**07**
		OR	
Q.4	**(a)**	The system responce of a function in frequency domain is describe by the following equation $S^2F(s) + sF(s) = \frac{2}{S^2}$ Find f(t).	**07**
	(b)	A differential equation is represented by $\frac{d^2x}{dt^2} - x = e^{-t}$ Assuming zero initial condition, find x(t) at t>0	**07**
Q.5	**(a)**	Derive the condition of reciprocity and symmetry in Z-parameter and	**07**
	(b)	Describe cut-set method	**07**

OR

Q.5 **(a)** Derive equation of ABCD parameters in terms of h-parameter **07**

(b) Describe Tie-set method **07**

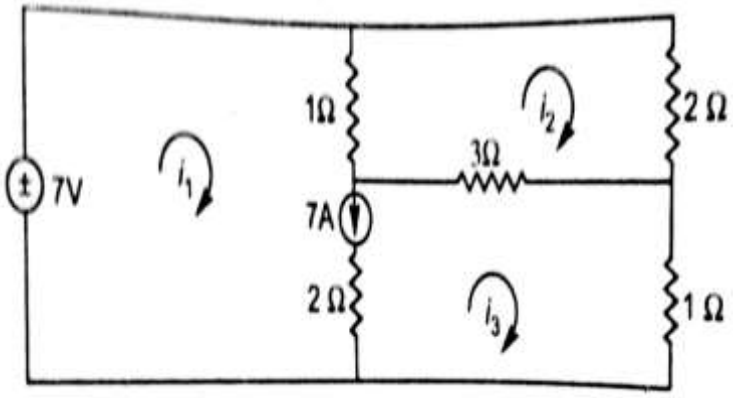

Fig 1.1

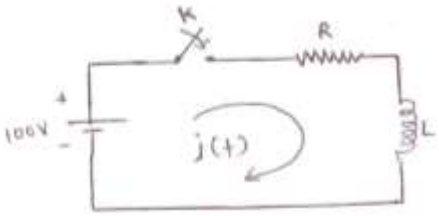

Fig 3.1

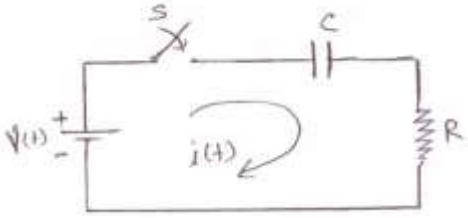

Fig 3.2

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