## **GUJARAT TECHNOLOGICAL UNIVERSITY** BE - SEMESTER-III • EXAMINATION – WINTER • 2014

Subje	ect Cod	le: 2130901 Date: 01-01-2015	
Subje Time Instrue	ect Nar : 02.30 etions:	ne: CIRCUITS AND NETWORKS pm - 05.00 pm Total Marks: 70	
	<ol> <li>Att</li> <li>Ma</li> <li>Fig</li> </ol>	empt all questions. ke suitable assumptions wherever necessary. ures to the right indicate full marks.	
Q.1	(a)	Define Charge, Current, Potential difference, Lumped parameter, Time invariant,	07
	<b>(b)</b>	Calculate the node voltages for all the nodes shown in figure: 1 using nodal analysis.	07
Q.2	2 (a)	State and explain the Maximum Power Transfer Theorem. Drive the condition for maximum power transfer to the load for DC and AC circuit.	07
	(b)	Draw the dual network shown in figure : 2. $\mathbf{OR}$	07
	<b>(b)</b>	Explain the dot convention rule for the magnetically coupled Network shown in figure: 3. Also formulates KVL equations.	07
Q.3	<b>b</b> (a)	For the circuit shown in figure: 4 find the voltages and currents for all circuit elements using mesh analysis.	07
	<b>(b)</b>	State and explain (1) Norton's theorem (2) Milliman's theorem.	07
Q.3	6 (a)	Find current in 20 ohm resistance in the circuit shown in figure: 5 using superposition theorem.	07
	(b)	State Thevenin's theorem. Calculate current passing through $60\Omega$ resistance in the circuit shown in figure: 6, using thevenin's theorem.	07
Q.4	(a)	In the circuit shown in figure: 7, the switch 'K' is closed at t=0. Assuming no initial current through inductor. Find current at $t = 0.3$ sec. Also find instant of time at which voltage across P equals voltage across I	07
	<b>(b)</b>	Find laplace transform of $f_1(t) = \sin \omega t$ $f_2(t) = e^{-at} \cos \omega t$ . <b>OR</b>	07
Q.4	(a)	In a circuit shown in figure: 8, the switch has been at position A for a long time and is moved to position B at $t = 0$ . Obtain current $i(t)$ at $t > 0$ .	07
	<b>(b)</b>	Explain the concept of Poles and zeros and their significance.	07
Q.5	5 (a) (b)	Finds h-parameters of the circuit shown in figure: 9 Derive expression of ABCD parameters in terms of Z and Y parameters. <b>OR</b>	07 07
Q.5	5 (a)	Derive relationship between incidence matrix (A), fundamental cut-set matrix $(O_f)$ and fundamental tie-set matrix $(B_f)$ .	07
	<b>(b)</b>	For the network shown in figure: 10 draw the oriented graph and Obtain (1) the incidence matrix (2) tieset matrix and (3) f-cutset matrix.	07

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Circuits and Networks (2130901)



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