## **GUJARAT TECHNOLOGICAL UNIVERSITY** BE - SEMESTER- IV(NEW) EXAMINATION – SUMMER 2015

## Subject Code: 2142406Date:01/06/2015Subject Name: DIGITAL ELECTRONICS AND ITS APPLICATIONTime:10:30am-1.00pmTotal Marks: 70

## Instructions:

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

Q.1	(a)	Convert the followings (i) $(110101.011)_2 = (\_\_\_\_)_{10}$ (ii) $(106.125)_{10} = (\_\_\_\_)_2$ (iii) $(110110)_2 = (\_\_\_])_{gray}$ (iv) $(524) = (\_\_\_])_{gray}$	07 02 02 01
	(b)	<ul> <li>(i) (354)<sub>8</sub> - ()<sub>2</sub> - ()<sub>16</sub></li> <li>(i) Discuss NOR gate as universal gate (implement NOT, AND, OR &amp; NAND gate using NOR gate).</li> <li>(ii) Compare 1's complement and 2's complement method for subtraction.</li> </ul>	02 04 03
Q.2	(a)	Reduce the given function using tabulation method and implement the same using gates. $F(A,B,C,D) = \sum m (0,1,3,7,8,9,11,15)$	07
	(b)	Reduce the given function using K-map and implement the same using gates. $F(A,B,C,D) = \sum m (0,2,7,8,10,13,15) + \sum d (4,5)$	07
	<b>(b)</b>	Design BCD to excess-3 code converter circuit.	07
Q.3	(a)	(i) Discuss the properties and applications of Gray codes (ii) Reduce using Boolean algebra $E(A \cap B \cap C) = (A + B)(A' + C)(B + C)$	04 03
	<b>(b)</b>	Write the truth table of full adder and design full adder using two half adder.	03 07
		OR	
Q.3	( <b>a</b> )	Obtain the truth table of given function and express the function in SOP and POS form. $F(A,B,C) = (A'+B)(B'+C)$	07
	<b>(b)</b>	Write the truth table of full subtractor and design full subtractor using 3 X 8 decoder.	07
Q.4	(a) (b)	Explain the working of JK flip flop, derive its characteristics equation. Design synchronous BCD counter.	07 07
		OR	
Q.4	(a) (b)	Construct T-flip flop using RS flip flop and logic gates. Define register? Design a circuit for 4-bit bidirectional shift register.	07 07
Q.5	(a) (b)	Broadly classify the memory. Compare Static RAM and Dynamic RAM. With the help of neat sketch explain the working of Microprogram control unit.	07 07
		OR	
Q.5	(a)	With reference to register data transfer implement the hardware for statement x'T1: $A \leftarrow B$ (Assume x is input, T1 is timing input, A & B are the registers).	07
	<b>(b)</b>	(i) List out the various applications of ROM memory.	04
		(ii) Compare TTL, MOS and ECL logic families in terms of speed-power product.	03