Seat No.: _____ Enrolment No._____

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

Subject Code: 2140910 **Date: 28/05/2015**
Subject Name: DIGITAL ELECTRONICS
Time: 10:30am-1.00pm **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)**	Explain the working of Master-Slave J-K flip-flop.	**07**
	(b)	Explain why NAND and NOR are known as universal gates and construct AND, OR and NOT using the universal gates.	**07**
Q.2	**(a)**	State and explain De Morgan's theorems with truth tables.	**07**
	(b)	Explain how four bit combined binary adder and subtractor circuit can be constructed using full adders?	**07**
		OR	
	(b)	Explain TTL and CMOS logic.	**07**
Q.3	**(a)**	Do as directed :- I. Find the XS-3 code of following decimal numbers (i) 26 (ii) 42 (iii) 63 II. $(4CD)_{16} = (\quad)_{10} = (\quad)_2$ III. Solve the following using 2's complement (i) (-4)-(-8) (ii) (3)-(6)	**07**
	(b)	Do as directed:- I. Add the following decimal numbers using 8421 BCD equivalent codes 679.6 + 536.8 II. Convert the following Binary to Gray Code (i)1001 (ii)1010 (iii) 1011 III. Multiply the binary numbers (1011.01) X (10.1)	**07**
		OR	
Q.3	**(a)**	Define the following general characteristics of logic families. (i) Propagation delay time (ii) Noise margin (iii) Fan-in (iv) Hold time (v) Clear (vi) Fan-out (vii) Power dissipation	**07**
	(b)	Describe multiplexer and de-multiplexer with circuit and application of each.	**07**
Q.4	**(a)**	Apply De Morgan's theorem to solve the following 1. $\overline{(A+\overline{BC})}(A\overline{B}+ABC) = 0$ 2. $A[B+\overline{C}\,\overline{(AB+A\overline{C})}] = AB$	**07**
	(b)	What are SOP and POS forms of boolean expressions? Minimize the following expression using K-map $Y = \Sigma m(4,5,7,12,14,15) + d(3,8,10)$	**07**
		OR	
Q.4	**(a)**	Describe the working of look-ahead-carry adder.	**07**
	(b)	Explain in brief the working of decoders.	**07**
Q.5	**(a)**	Classify the various modes of operation of shift registers. Explain the serial in parallel out operation of shift register.	**07**
	(b)	Discuss the applications of shift registers.	**07**

OR

Q.5	**(a)**	What is the basic difference between synchronous and asynchronous counter? Describe synchronous 3-bit up counter.	**07**
	(b)	Explain the working of Analog to Digital converter with necessary diagrams.	**07**

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