Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III(New) EXAMINATION – SUMMER 2016

Subject Code:2131004 **Date:27/05/2016**

Subject Name:Digital Electronics

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 **Short Questions.** **14**

1. What is difference between latch and flip-flop?
2. Define Fan-out.
3. What is the use of state diagram?
4. Which gates are called as universal gates? What are its advantages?
5. State the associative property of Boolean algebra
6. List the types of ROM.
7. What are called Don't care conditions?
8. What is propagation delay?
9. What is prime implicant?
10. How many words a 16*8 memory can store?
11. Define race around condition.
12. Which TTL logic gate is used for wired ANDing?
13. What is a state equation?
14. Define Nibble.

Q.2 **(a)** Explain the working of multiplexer. **3**

(b) State and explain De Morgan's theorems with truth tables. **4**

(c) Explain two input CMOS NAND gate. **7**

OR

(c) Write short note on half adder and full adder. **7**

Q.3 **(a)** Define the following terms. **3**

I. Noise Margin II. PROM III. Negative Logic

(b) What are the different types of the codes used in digital systems? Explain them. **4**

(c) Design 4 bit binary to gray code converter. **7**

OR

Q.3 **(a)** Do as directed : **3**

I. Given that $(16)_{10} = (100)_x$, find the value of x.

II. Add $(6E)_{16}$ and $(C5)_{16}$

III. $(4433)_5 = (\quad)_{10} = (\quad)_2$

(b) Do as directed : **4**

I. $(1011011101101110)_2 = (\quad)_{16}$

II. Subtract $(45)_8$ from $(66)_8$

III. Covert the Gray code 1101 to binary

IV. Find the XS-3 code of 37

(c) Show that $A \odot B = AB + A'B' = (A \oplus B)' = (AB'+A'B)'$. Also construct the corresponding logic diagrams. **7**

Q.4	**(a)**	Give the applications of Decoder.	**3**
	(b)	Implement the given function using multiplexer F(A,B,C) = Σm(1,2,4,7)	**4**
	(c)	Reduce the expression F = Σm(0,2,3,4,5,6) using K-map and implement using NAND gates only.	**7**

OR

Q.4	**(a)**	Reduce the expression F = ((AB)'+A'+AB)'	**3**
	(b)	Explain the types of finite state machines?	**4**
	(c)	Distinguish between combinational and sequential logic circuits. Give the applications of flip-flops.	**7**

Q.5	**(a)**	Write a short note on FPGA.	**3**
	(b)	Design 4-to-16 Decoder from two 3-to-8 Decoders.	**4**
	(c)	Design a synchronous BCD counter with JK flip-flops.	**7**

OR

Q.5	**(a)**	Implement T flip flop using D flip flop.	**3**
	(b)	Give the comparison between synchronous and asynchronous counters.	**4**
	(c)	Write a note on Memory.	**7**

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