Seat No: _____ **Enrollment No: _____**

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

B.Tech., Winter 2017 - 18 Examination

Semester: 3 **Date: 30/12/2017**
Subject Code: 03107203 **Time: 10:30am to 1:00pm**
Subject Name: Digital Electronics **Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Objective Type Questions (Each of one mark) **(15)**

1. The _____ gate produces a HIGH output whenever the two inputs are unequal.

2. Statement of Associative law is _____.

3. Gray code of number 11100101 is _____.

4. In Boolean algebra A.A is equal to _____.

5. 10's complement of number 935 is_____

6. What are the symbols used to represent digits in the binary number system?

7. The decimal value of binary 10010 _____.

8. Convert the fractional decimal number 6.75 to binary.

9. When output of NOR gate is HIGH?

10. Convert the following octal number to decimal. $(17)_8$

11. A logic circuit that can store one bit of information is a _____.

    A. flip-flop

    B. counter

    C. gate

    D. code converter

12. If a HIGH logic level is assigned a binary zero (0), and a low level is assigned a binary one (1), the logic is called _____.

    A. negative logic

    B. positive logic

    C. invalid logic

    D. assertion-level logic

13. A half-adder does not have _____.

    A. carry in

    B. carry out

C. two inputs

D. all of the above

14. The Boolean equation for the exclusive-OR function is _____.

A. $X = \overline{A\,B} + A\,B$

B. $X = \overline{A}\,B + \overline{A\,B}$

C. $X = \overline{A}\,\overline{B} + A\,B$

D. $X = \overline{A}\,B + A\,\overline{B}$

15. The Boolean equation _____ results from this Karnaugh map.

	$\overline{C}$	C
$\overline{A}\ \overline{B}$	1	1
$\overline{A}$ B		1
A B	1	
A $\overline{B}$	1	

A. $(\overline{A}\,\overline{B}) + (\overline{A}\,C) + (A\,\overline{C})$

B. $(\overline{A}\,\overline{B}) + (A\,\overline{B}) + (B\,\overline{C})$

C. $(A\,\overline{B}) + (\overline{A}\,B) + (\overline{B}\,\overline{C})$

D. $(\overline{A}\,B) + (\overline{B}\,\overline{C}) + (\overline{B}\,C)$

Q.2 Answer the following questions. (Attempt any three) **(15)**

A) Prove Demorgan's Laws for 2 input variables.

B) Simplify following Boolean function using K-map and implement with only NOR gates. F(w,x,y,z) = Σm (1 , 3 , 7 , 11 , 15)
with don't care conditions d(w,x,y,z) = Σm (0, 2 ,5)

C) What is Multiplexer? Explain working of 8*1 MUX with necessary diagrams.

D) Define Decoder. Explain working of 3:8 line Decoder with diagram and truth table.

Q.3 A) Compare ROM, RAM and EPROM. **(07)**

B) Explain working of Positive Edge Triggered D flip flop with logic diagram and truth table. **(08)**

OR

B) Design counter for below sequence using D flip flop: 000,010,111,011,001,110 **(08)**

Q.4 A) Simplify following Boolean function using K-Map method **(07)**
F (a,b,c,d) = ∏M (0,2,4,6,8).∏D (1,12,9,15) and implement using NAND/NOR gates.

OR

A) Define state table, state diagram, state graph, input and output equations. **(07)**

B) Design sequence detector for below state graph: **(08)**