Enrollment No: _____ Exam Seat No: _____

C.U.SHAH UNIVERSITY

Winter Examination-2018

Subject Name: Digital Circuits

Subject Code: 4TE03DCI1 Branch: B.Tech (Electrical)

Semester: 3 Date: 01/12/2018 Time: 02:30 To 05:30 Marks: 70

Instructions:

(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1 Attempt the following questions: (14)

1) The bit 0 and 1 represents _____ number system.

A) Binary B) Octal C) Hexadecimal D) Decimal

2) The NOT gate represents the opposite output status of input signal.

A) True B) False

3) The Number F represents _____ number in hexadecimal system.

A) 11 B) 10 C) 14 D) 15

4) The binary equivalent of 4 is _____.

A) 001 B) 100 C) 101 D) 000

5) NOR gate is used as universal Gate.

A) True B) False

6) The Decimal number systems have _____ digits.

A) 0 to 1 B) 0 to 9 C) 0 to F D) None of the above

7) Which type of logic gate is also defined as an inverter?

A) OR Gate B) NOR Gate C) NOT Gate D) NAND Gate

8) In the positive logic system 1 is high and 0 is low.

A) True B) False

9) Any basic gate can be used in combinational logic circuit.

A) True B) False

10) The binary system is based on the principle of _____.

A) Boolean Algebra B) Ordinary Algebra C) Complex Algebra

D) Any of the above

11) An n variable K-map have_____ cells

A) n^2 B) 2^n C) n^n D) n^{2n}

12) A flip flop has two outputs which are_____

A) Always 0 B) Always 1 C) Always Complementary D) None of the above

13) Write the full form of BCD?

14) Draw the symbol of exclusive OR gate (XOR) and exclusive NOR gate (X-NOR).

Attempt any four questions from Q-2 to Q-8

Q-2 **Attempt all questions** **(14)**

(a) Simplify the below shown expression. **07**

i) $x + x'y = x + y$ ii) $x(x'+y) = xy$

(b) Do as directed. **07**

i) Convert $(10101)_2$ to decimal.

ii) Convert $(52)_{10}$ to binary.

iii) Write the 1's complement of 01001001.

iv) Convert the decimal number $(378)_{10}$ to octal.

Q-3 **Attempt all questions** **(14)**

(a) Explain any four laws of Boolean algebra. **07**

(b) Explain the BCD system briefly. **07**

Q-4 **Attempt all questions** **(14)**

(a) Draw the symbol of AND GATE and NAND GATE. Write its truth table and boolean expression. **07**

(b) Draw the symbol of OR GATE and NOR GATE. Write its truth table and boolean expression. **07**

Q-5 **Attempt all questions** **(14)**

(a) Convert the below expression to min terms. **07**

i) $\overline{A} + \overline{B}\overline{C}$ ii) $\overline{A} + B + CA$

(b) Convert the below expression to max terms. **07**

i) $A(B + \overline{C})$ ii) $(A + \overline{B})(\overline{A} + D)$

Q-6 **Attempt all questions** **(14)**

(a) Draw the logic diagram and truth table of HALF ADDER.Write its Boolean **07**

expression and explain its operation.

(b) Draw the logic diagram and truth table of HALF SUBTRACTOR.Write its Boolean expression and explain its operation. **07**

Q-7 **Attempt all questions** **(14)**

(a) Draw the logic diagram and truth table of S-R latch and explain its operation. **07**

(b) Draw the logic diagram and truth table of J-K flip-flop and explain its operation. **07**

Q-8 **Attempt all questions** **(14)**

(a) Draw the logic diagram of 4-bit buffer register and explain its operation. **07**

(b) Draw the logic diagram and truth table 1-bit magnitude comparator and explain its operation. **07**