# BCA (Repeat)
## 2$^{ND}$ SEMESTER
## DIGITAL LOGIC & DESIGN
## BCA201

**Duration: 3 Hrs.**                                    **Marks: 70**

$$\left\{ \begin{array}{l} \text{PART : A (OBJECTIVE)} = 20 \\ \text{PART : B (DESCRIPTIVE)} = 50 \end{array} \right\}$$

## [ PART-B : Descriptive ]

**Duration: 2 Hrs. 40 Mins.**                          **Marks: 50**

### [ Answer question no. One (1) & any four (4) from the rest ]

1. Describe AND, OR, NOT, NOR, NAND, XOR, XNOR gates with their truth tables and logic gates    **10**

2. Describe full subtractor with truth table and logic diagram. Draw the logic diagram of full adder using two half adder and gates.    **6+4 =10**

3. What is Flip Flop. Explain RS, D and T Flip Flop with truth table and diagram.    **3+3+2+ 2=10**

4. Explain four different types shift registers. Design a negative edge triggered 2-bit ripple down counter. Give its logic diagram.    **4+3+3 =10**

5. Define multiplexer. Write the function table for 4:1 multiplexer with 2 data select lines and draw the logic circuit diagram.    **2+4+4 =10**

6. *Simplify using Boolean theorems:*    **3+3+4 =10**
   i) $B=\overline{X}Y+XY+X\overline{Y}+\overline{X}\overline{Y}$
   ii) $Z=A\overline{B}\overline{C}+A\overline{B}C+\overline{A}BC+\overline{A}\overline{B}C$
   iii) $Y=XY+\overline{X}Y+XYZ$

7. *Simplify using K-Map:*    **3+3+4 =10**
   i) $F(X,Y,Z)=(2,3,4,5)$
   ii) $W=\overline{X}\overline{Y}Z+\overline{X}YZ+XYZ+X\overline{Y}Z+\overline{X}Y\overline{Z}$
   iii) $F(A,B,C,D)=(0,2,4,5,6,7,8,10,13,15)$

8. *Find the answer for the following:*    **2x5=10**
   i) 0.1001-0.011
   ii) 100111/100
   iii) 11110x0.111
   iv) Binary equivalent of $(FD5.E)_{16}$
   v) Decimal equivalent of $(77.77)_{8}$

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[ PART-A : Objective ]

**Choose the correct answer from the following:**                      1X20=20

1. In which of the following gates, the output is 1, if and only if at least one input is 1.
   a. AND
   b. OR
   c. NOT
   d. NAND

2. Adding of 1001 and 0010 gives output
   a. 1011
   b. 1111
   c. 0
   d. 1010

3. Adding of 1001 and 0010 gives output
   a. Addition
   b. Subtraction
   c. Multiplication
   d. Division

4. X+X'Y=
   a. X
   b. Y
   c. x+y
   d. x-y

5. Which of the following gates are added to the input of OR gate to convert it to the NAND gate
   a. NOT
   b. OR
   c. AND
   d. XOR

6. Which of the following expression is not equivalent to 'X'
   a. X NAND X
   b. X NOR X
   c. X NAND 1
   d. X NOR 1

7. A 1-to 4 line de-multiplexer is to be implemented using a memory. How many bits must each word have?
   a. 1
   b. 2
   c. 4
   d. 8

8. The XNOR gate is equivalent to which gate followed by an inverter?
   a. OR
   b. AND
   c. NAND
   d. XOR

9. One that is not postulate of Boolean Algebra
   a. Commutative
   b. Duality
   c. Associative
   d. Identity element

10. Which table shows logical state of digital circuit for every
    a. Function Table
    b. Truth Table
    c. Excitation Table
    d. ASCII Table

11. The sum of two n-bit binary numbers can be done
    a. Serially
    b. Parallely
    c. Sequentially
    d. Both a and b

12. In excitation table of D flip flop next state is equal to
    a. Present state
    b. Next state
    c. Input state
    d. D state

13. Product of 1011 and 101
    a. 110111
    b. 110011
    c. 111011
    d. 111100

14. Digital number is said to be of base or radix
    a. 8
    b. 10
    c. 2
    d. 0

15. A combinational circuit that selects one from many inputs
    a. Encoder
    b. Decoder
    c. MUX
    d. DEMUX

16. Full adder performs addition on
    a. 2 bits
    b. 3 bits
    c. 4 bits
    d. 5 bits

17. The minterms in a K-map are marked with a
    a. Y
    b. X
    c. 0
    d. 1

18. ASCII stands for
    a. African Standard Code for Information Interchange
    b. American Standard Code for Integer Interchange
    c. American Standard Code for Information Interchange
    d. African Standard Code for Integer Interchange

19. A binary variable can take the values
    a. 0 only
    b. 0 and 1
    c. 1 and 2
    d. None of these

20. $(a+b+c)' =$
    a. $a'b'c'$
    b. $a'+b'+c'$
    c. $a\,b\,c$
    d. $a+b+c$

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# UNIVERSITY OF SCIENCE & TECHNOLOGY, MEGHALAYA

## Question Paper CUM Answer Sheet

### [PART (A) : OBJECTIVE]

Course : ................................................................

Semester : ..................................... Roll No : .....................

Enrollment No : ........................... Course code : ...................

Course Title : ...........................................................

Session : ............ 2016-17 ............ Date : ........................

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### Instructions / Guidelines

➢ The paper contains twenty (20) / ten (10) questions.

➢ The student shall write the answer in the box where it is provided.

➢ The student shall not overwrite / erase any answer and no mark shall be given for such act.

➢ Hand over the question paper cum answer sheet (Objective) within the allotted time (20 minutes / 10 minutes) to the invigilator.

| Full Marks | Marks Obtained | Remarks |
|------------|----------------|---------|
| 20 | | |

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Scrutinizer's Signature          Examiner's Signature          Invigilator's Signature