# MASTER OF COMPUTER APPLICATION FIRST SEMESTER <br> Digital System <br> MCA - 102 

Duration: 3 Hrs.
Marks: 70
Part: A (Objective) $=\mathbf{2 0}$
Part: B (Descriptive) $=50$
[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
2. Simplify using Boolean theorems

$$
\begin{aligned}
& B=\overline{X Y}+X Y+X \bar{Y}+\overline{X Y} \\
& Z=A \overline{B C}+A \overline{B C}+\overline{A B C}+\overline{A B C} \\
& Y=X Y+\overline{X Y}+X Y Z
\end{aligned}
$$

3. Find the answer for the following Boolean expression
i. $11001.1011+10011.011$
ii. Convert $(234.79)_{10}$ to binary equivalent
iii. $1001.1 \times 101.1$
iv. $100.100 / 11$
v. 1101-1001 (using 1's complement)
4. Simplify using K-Map $3+3+4$

$$
\begin{aligned}
& F(X, Y, Z)=(2,3,4,5) \\
& W=X \overline{Y Z}+\overline{X Y Z}+X Y Z+X \overline{Y Z}+\overline{X Y Z} \\
& F(A, B, C, D)=(0,2,4,5,6,7,8,10,13,15)
\end{aligned}
$$

5. Explain four different types shift registers. Design a negative edge $4+3+3$ triggered 3-bit ripple down counter. Give its logic diagram. $=10$
6. Describe full adder with truth table and logic diagram. Define $4+2+4$ multiplexer. Draw diagram and write the function table for 4:1 =10 multiplexer.
7. What is Flip Flop. Differentiate synchronous and asynchronous sequential circuit. Explain RS, JK Flip Flop with truth table and diagram.
8. Describe different types of semi conductor memory. Write about the $6+4=10$ instruction execution process

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$$

## MASTER OF COMPUTER APPLICATION

FIRSTSEMESTER
Digital System
MCA - 102

## [ PART-A: Objective]

## Choose the correct answer from the following:

$1 \times 20=20$

1. A combinational circuit that selects one from many inputs
a. Encoder
b. Decoder
c. MUX
d. DEMUX
2. Full adder performs addition on
a. 2 bits
b. 3 bits
c. 4 bits
d. 5 bits
3. 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. $X O R$
4. $x+x^{\prime} y=$
a. X
b. Y
c. $X+Y$
d. $X-Y$
5. The XNOR gate is equivalent to which gate followed by an inverter?
a. OR
b. AND
c. NAND
d. XOR
6. One that is not postulate of Boolean Algebra
a. Commutative
b. Duality
c. Associative
d. Identity element
7. $2^{\wedge} 3$ would have
a. 3 values
b. 4 values
c. 6 values
d. 8 values
8. 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
9. The sum of two n-bit binary numbers can be done
a. Serially
b. Parallel
c. Sequentially
d. Both A and B
10. Product of 1011 and 101
a. 110111
b. 110011
c. 111011
d. 111100
11. Digital number is said to be of base or radix
a. 8
b. 10
c. 2
d. 0
12. Full adder performs addition on
a. 2 bits
b. 3 bits
c. 4 bits
d. 5 bits
13. The minterms in a K-map are marked with a
a. X
b. $Y$
c. 0
d. 1
14. 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
15. A binary variable can take the values
a. 0 only
b. 0 and 1
c. 1 and 2
d. None of these
16. $(a+b+c)^{\prime}=$
a. $a^{\prime} b^{\prime} c^{\prime}$
b. $a^{\prime}+b^{\prime}+c^{\prime}$
c. $a b c$
d. $a+b+c$
17. What is a multiplexer?
a. It is a type of decoder which decodes several inputs and gives one output
b. A multiplexer is a device which converts many signals into one
c. It takes one input and results into many output
d. None of the Mentioned
18. Which combinational circuit is renowned for selecting a single input from multiple inputs \& directing the binary information to output line?
a. Data selector
b. Data distributor
c. Both A and B
d. None of these
19. How many inputs will a decimal-to-BCD encoder have?
a. 4
b. 8
c. 10
d. 16
20. How many possible outputs would a decoder have with a 6-bit binary input?
a. 32
b. 64
c. 128
d. 6

UNIVERSITY OF SCIENCE \& TECHNOLOGY, MEGHALAYA
[PART (A) : OBJECTIVE]
Duration : 20 Minutes
Serial no. of the main Answer sheet

Course : $\qquad$

Semester: Roll No :

Enrollment No : $\qquad$ Course code

## Course Title :

Session :
2017-18
Date : $\qquad$
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Instructions / Guidelines
> The paper contains twenty $(20)$ / ten (10) questions.
$>$ Students shall tick $(\checkmark)$ the correct answer.
$>$ No marks shall be given for overwrite / erasing.
$>$ Students have to submit the Objective Part (Part-A) to the invigilator just after completion of the allotted time from the starting of examination.

| Full Marks | Marks Obtained |
| :---: | :---: |
| 20 |  |
|  |  |

