

**BACHELOR OF COMPUTER APPLICATION
FIRST SEMESTER
DIGITAL LOGIC AND DESIGN
BCA-102**

**SET
B**

[USE OMR FOR OBJECTIVE PART]

Duration: 3 hrs.

Full Marks: 70

Time: 30 min.

Marks: 20

1X20=20

(**Objective**)

Choose the correct answer from the following:

1. How much input and output needed for demultiplexer?
 - a. Many outputs to one input
 - b. One input many outputs
 - c. One input one output
 - d. None of these
2. In the toggle mode, a JK flip-flop has
 - a. $J = 0, K = 1$
 - b. $J = 1, K = 1$
 - c. $J = 0, K = 0$
 - d. $J = 1, K = 0$
3. What is the binary subtraction of $101001 - 010110 = ?$
 - a. 010011
 - b. 011001
 - c. 100110
 - d. 010010
4. The Boolean expression $Y = (AB)'$ is logically equivalent to what single gate?
 - a. NAND
 - b. AND
 - c. NOR
 - d. OR
5. The number of inputs in a half adder is?
 - a. 8
 - b. 11
 - c. 2
 - d. 32
6. The binary number 10101 is equivalent to the decimal number _____.
 - a. 12
 - b. 21
 - c. 19
 - d. None of these
7. Applying the distributive law to the expression $A(B+C'+D)$, we get
 - a. $AB+AC+AD$
 - b. $ABCD$
 - c. $A+B+C+D$
 - d. $AB+AC'+AD$
8. A decoder converts N inputs to ____ outputs
 - a. N
 - b. N^2
 - c. 2^N
 - d. N^N
9. The basic storage element in a digital system is ____
 - a. Counter
 - b. Flip-flop
 - c. Multiplexer
 - d. Encoder
10. The Universal gate is ____
 - a. NAND gate
 - b. OR gate

- c. AND gate
- d. None of the above
11. How many select lines would be required for an 8-line-to-1-line multiplexer?
- a. 2
- b. 4
- c. 8
- d. 3
12. 2's complement of binary number 0101 is
- a. 1011
- b. 1110
- c. 1010
- d. 1101
13. What is the addition of the binary numbers 11011011010 and 010100101?
- a. 0111001000
- b. 1100110110
- c. 1110111111
- d. None of the above
14. The D flip-flop has ___ inputs
- a. 1
- b. 3
- c. 2
- d. 4
15. Which device has one input and many outputs?
- a. De multiplexer
- b. Multiplexer
- c. Counter
- d. Flip-flop
16. How many AND gates are required to realize $Y = CD + EF + G$?
- a. 4
- b. 5
- c. 3
- d. 2
17. $(A + B)(A' * B') = ?$
- a. 1
- b. 0
- c. AB
- d. AB'
18. The binary subtraction of $0 - 0 = ?$
- a. Difference = 0, borrow = 0
- b. Difference = 1, borrow = 0
- c. Difference = 1, borrow = 1
- d. Difference = 0, borrow = 1
19. DeMorgan's Law states that
- a. $(A+B)' = A'*B$
- b. $(AB)' = A' + B'$
- c. $(AB)' = A' + B$
- d. $(AB)' = A + B$
20. Which number system has a base 16?
- a. Hexadecimal
- b. Octal
- c. Binary
- d. Decimal

(Descriptive)

Time : 2 hrs. 30 min.

Marks : 50

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

1. a. Write the truth table and draw logic circuit diagram for full adder. 5+5=10
b. Explain 1 X 8 Demultiplexer.

2. a. Perform the following subtractions using 1's and 2's complement 4+3+3=10
methods: $1101_{(2)} - 1010_{(2)}$
b. Find the result $110011_{(2)} + 101100_{(2)}$
c. Convert $AB5_{(16)}$ to Binary.

3. How many types of shift registers are available? Explain each of them 10
with diagram.

4. Write truth table and logic diagram for AND, OR, NAND, NOR and 10
Ex OR.

5. Minimize the following with the help of K-map and draw the logic 5+5=10
circuit for the minimized expression.
I. $F = \Sigma(0,1,3,5,6,7)$
II. $F = \Sigma(0,1,3,4,5,7,12,13,15)$

6. a. How we create a Master- Slave flip flop using two JK flip flop? 4+6=10
b. Explain mod-10 negative edge asynchronous up counter with diagram.

7. Simplify the following expression 5+5=10
I. $X = AB + A(B+C) + B(B+C)$
II. $X = AB + A'B'C + A$

8. Write short notes on any two: 5+5=10
I. SR Flip Flop with NAND gate
II. ASCII Code
III. 4 x 1 Multiplexer

== *** ==