

**BACHELOR of COMPUTER APPLICATION
FIRST SEMESTER
DIGITAL LOGIC & DESIGN
BCA – 103 [REPEAT]**

**SET
A**

Duration : 3 hrs.

(USE OMR SHEET FOR OBJECTIVE PART)

Full Marks : 70

Time : 30 min.

{ Objective }

Marks : 20

Choose the correct answer from the following:

1X20=20

1. What is the addition of the binary numbers 11011011010 and 010100101?
a. 0111001000
b. 1100110110
c. 11101111111
d. None of the above
2. The decimal equivalent of the octal number $(645)_8$ is _____
a. $(450)_{10}$
b. $(451)_{10}$
c. $(421)_{10}$
d. $(501)_{10}$
3. On subtracting $(01010)_2$ from $(11110)_2$ using 1's complement, we get _____
a. 01001
b. 11010
c. 10101
d. 10100
4. The largest two digit hexadecimal number is _____
a. $(FE)_{16}$
b. $(FD)_{16}$
c. $(FF)_{16}$
d. $(EF)_{16}$
5. The minterm expansion of $f(P, Q, R) = PQ + QR' + PR'$ is
a. $m_2 + m_4 + m_6 + m_7$
b. $m_0 + m_1 + m_3 + m_5$
c. $m_2 + m_4 + m_6 + m_8$
d. None of the above
6. The simplified SOP (Sum Of Product) form of the boolean expression $(P + Q' + R') \cdot (P + Q' + R) \cdot (P + Q + R')$ is
a. $PQ' + R$
b. $P + QR$
c. $P + Q'R'$
d. None of the above
7. $(A + B)(A' * B') = ?$
a. 1
b. 0
c. AB
d. AB'
8. The expression $Y = AB + BC + AC$ shows the _____ operation.
a. EX-OR
b. SOP
c. POS
d. NOR
9. A K-map is a systematic way of reducing which type of expression ?
a. Product of sums
b. Exclusive NOR
c. Sum of products
d. None of the above

10. When A', B' are the inputs to a NAND gate, according to De- Morgan's theorem, the output expression could be
- $X = A + B$
 - $X = (AB)'$
 - $X = (A)(B)$
 - None of the above
11. How many AND gates are required to realize $Y = CD + EF + G$?
- 4
 - 5
 - 3
 - 2
12. The number of min-terms after minimizing the following Boolean expression is _____.
- $$[D' + AB' + A'C + AC'D + A'CD]'$$
- 1
 - 2
 - 3
 - 4
13. A decoder converts N inputs to _____ outputs
- N
 - N^2
 - 2^N
 - N^N
14. How many truth table entries are necessary for a four-input circuit?
- 4
 - 8
 - 12
 - 16
15. A full adder can be made out of _____
- Two half adders
 - Two half adders and OR gate
 - Two half adders and NOT gate
 - Three half adders
16. Which device has one input and many outputs ?
- De multiplexer
 - Multiplexer
 - Counter
 - Flip-flop
17. In a sequential circuit, the output at any time depends only on the input values at that time.
- Past output values
 - Intermediate values
 - Both past output and present input
 - Present input values
18. A ripple counter is a (n):
- Asynchronous Counter
 - Synchronous Counter
 - Parallel Counter
 - None of the above
19. The D flip-flop has _____ inputs
- 1
 - 3
 - 2
 - 4
20. The function $AB'C + A'BC + ABC' + A'B'C + AB'C'$ is equivalent to
- $A'B + AC' + AC$
 - $A'B' + A'C' + AC$
 - $AB' + AC' + A'C$
 - None of the above

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(Descriptive)

Time: 2 hrs. 30min.

Marks:50

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

1. Write truth table and logic diagram for five very important gates in digital system. 10

2. Minimize the following with the help of K-map and draw the logic circuit for the minimized expression. 5+5=10
 - a. $F = \Sigma(2,3,4,5,6,7,9,12,13,14,15)$
 - b. $F = ac' + a'b'c' + a'b + ab$

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

4. a. How we create a Master- Slave flip flop using two JK flip flop? 4+6=10
b. Explain mod-14 negative edge asynchronous up counter with diagram.

5. a. Write the truth table and draw logic circuit diagram for full adder which consist of two half adders and one OR gate. 5+5=10
b. Explain octal to binary encoder.

6. a. Perform the following subtractions using 1's and 2's complement methods: 4+4+2=10
 - i. $1101_{(2)} - 1010_{(2)}$
 - ii. $10101_{(2)} - 10111_{(2)}$
b. Convert $4AB_{16}$ to binary.

7. Simplify the following expression 4+6=10
 - a. $X = [AB'(C+BD) + A'B']C$
 - b. $X = A' + AB + AC' + AB'C'$

8. Write short notes on any two: 5+5=10
 - a. SR Flip Flop with NAND gate
 - b. Synchronous Down counter
 - c. 16:1 Multiplexer

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