REV-00
BCA/41/46

2016/12

BCA
First Semester
Digital Logic & Design
(BCA- 104)

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

Part-A (Objective) =20
Part-B (Descriptive) =50

(PART-B: Descriptive)

Duration: 2 hrs. 40 mins. **Marks: 50**

Answer any *four* from *Question no.* 2 to 8
***Question no.* 1 is compulsory.**

1. **Write a short note on any Five:** **(2X5=10)**

   a.Gray Code b. Fixed Point Representation

   c. Floating Point Representation d. Registers

   e. ASCII Character f. Adders

   g. De Morgans's Law

2. **Solve the following:** **(2X5=10)**

   a. Evaluate the complement of the function:

   F_1=X`YZ` + X`Y`Z`

   b.Take the dual of the function and compliment each literal.

   F_2=X`YZ` + X`Y`Z

   c.By using Boolean Algebra for the given function evaluate:

   X`YZ + XY`Z + XYZ` + XYZ

   d.Simplify the Boolean function:

   X`YZ + XY`Z` +XYZ + XYZ`

   e.Use 2`s complement to perform M-N with the given binary numbers M and N. Where M = 1010100 & N = 1000100

3. Explain NAND and NOR Gate along with the suitable circuit diagram and truth table. How NOR Gate can be used to replace AND, OR and NOT Gates. **(5+5=10)**

4.Define Full Adder? Explain Full Subtractor along with the truth table and Logic Circuit. **(2+8)**

5. a) Write a function table and logic circuit diagram for 4:1 multiplexer. **(5)**

   b)Explain Decimal to BCD encoder. **(5)**

6. Briefly explain the design of a simple computer along with the block diagram. Explain the role of memory unit for communication with the system environment along with the suitable diagram. **(5+5=10)**
7. Define Counters? Explain Ripple Counter and Synchronous Counters. Draw Circuit diagram and count sequence table to Binary Ripple Counter. **(2+3+5=10)**
8. Define flip-flop. Explain basic flip-flop circuits with NAND Gates and NOR Gates in detail. Explain JK flip-flop. **(2+4+4=10)**

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Duration: 20 minutes **Marks – 20**

(PART A - Objective Type)

I. Choose the correct answer: **1×20=20**

1. The output of an AND gate with two inputs, A and B, is 1 when ----.

   a) A=0, B=0 b) A=1, B=0 c) A=0, B=1 d) A=1, B=1

2. ________ is a device that possesses two stable states and is capable of storing one bit of information.

3. A NOR gate output is LOW if any of its inputs is LOW.

   a) True b) False

4. A NAND gate and an AND gate operate in exactly the same way.

   a) True b) False

5. In a Boolean equation the use of the + symbol represents the OR function.

   a) True b) False

6. To perform product of maxterms Boolean function must be brought into

   a) AND terms b) OR terms c) NOT terms d) NAND terms

7. Boolean algebra is also called

   a) switching algebra b) arithmetic algebra
   c) linear algebra d) algebra

8. NAND & NOR are considered to be Universal gates because they are capable of performing the logical functionalities concerned to _______.

   a) AND gate. b) OR gate. c) NOT gate. d)All of the above

9. Which among the below stated Boolean expressions obey De-Morgan's heorem?

i. $\overline{X+Y} = X \cdot Y$

ii. $X.Y = X + Y$

iii. $X.Y = X+Y$

a) i and ii b) i, ii and iii c) iii d) ii

10. Primed or unprimed variable is

a) Map b) Logic Gates c) Literal d) Graph

11. A binary variable can take values

a) 0 and -1 b) 0 and 1 c) 1 and 2

12. x+y=y+x is the:

a) Commutative Property b) Inverse Property

c) Associative Property d) Identity Element

13. A.A' is equal to

a) 1 b) 0 c) A d) A'

14. A decimal Counter has:

a) 5 States b) 10 States c) 15 States d) 20 States

15. Memory that is called a read write memory is:

a) ROM b) EPROM c) RAM d) Registers

16. If a signal passing through a gate is inhibited by sending a 0 into one of the inputs, and the output is 1, the gate is a

a) AND b) NAND c) OR d) NOR

17. A logic gate has one or more output terminals and one input terminal.

a) True b) False

18. BCD stands for

a) Binary Counter Design b) Binary Counter Decimal

c) Binary Coded Design d) Binary Coded Decimal

19.Ripple counter cannot be described by

a) Boolean equation b) clock duration

c) graph d) flow chart

20.Simplest registers only consists of

a) Counters b) EPROM c) Latch d) FlipFlop

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