

**BACHELOR OF COMPUTER APPLICATION
SECOND SEMESTER
DIGITAL LOGIC & DESIGN
BCA – 201**

(Use separate answer scripts for Objective & Descriptive)

Duration: 3 hrs.

Full Marks: 70

(PART A : Objective)

Time: 20 min.

Marks: 20

Choose the correct answer from the following:

1×20=20

- How many states do a binary variable has?
a) 2 b) 3 c) 4
- The NAND function is complement of which function?
a) OR b) XOR c) AND
- A computer system is sometimes divided into 2 functional entities, they are:
a) Hardware & Software b) OS & Software c) CPU & OS
- A function of 'n' variables will have how many minterms?
a) 2^n b) $2n$ c) 2
- A combinational circuit that performs the arithmetic addition of 2 bits is called:
a) Half adder b) Full adder c) JK Flip Flop
- The input variables of a half adder is called:
a) Augend & addend b) Sum & carry c) Bits
- Base of decimal number system is:
a) 2 b) 8 c) 10
- Binary equivalent of $(C6)_{16}$ is:
a) 11000110 b) 11110000 c) 00010011
- An illustration that is used to visualise the relationships among the variables of a Boolean expression is:
a) Venn Diagram b) Logic circuit c) K-map
- Symbol '+' stands for:
a) ORing of terms b) ANDing of terms c) XORing of terms
- How many clock pulses will be required to completely load serially a 5-bit shift register?
a) 2 b) 5 c) 4 d) 1
- Decimal value of $(127662)_8$ is:
a) $(12345)_{10}$ b) $(7654)_{10}$ c) $(44567)_{10}$ d) $(44978)_{10}$

13. How is a J-K flip-flop made to toggle?

- a) J = 0, K = 0 b) J = 1, K = 0
c) J = 0, K = 1 d) J = 1, K = 1

14. Which of the following is correct for a gated D flip-flop?

- a) The output toggles if one of the inputs is held HIGH.
b) Q output follows the input D when the enable is HIGH.
c) The output complement follows the input when enabled.
d) Only one of the inputs can be HIGH at a time.

15. If both inputs of an S-R flip-flop are LOW, what will happen when the clock goes high?

- a) The output will reset b) The output will set
c) No change will occur in the output d) None of the above

16. Full form of EBCDIC is:

- a) Extended Binary Coded Decimal Interchange Code.
b) Extended Binary Character Decimal Interchange Code.
c) Extended Binary character dotted Interchange Code.
d) Exchanged Binary Coded Decimal Interchange Code.

17. Full form of ASCII is:

- a) American Style Code for Information Interchange.
b) American Standard Code for Information Interchange.
c) Asian Standard Code for Information Interchange.
d) None of above.

18. In RS flip flop indeterminate state occurs when:

- a) S=R=1 b) S=R=0 c) S=0, R=1 d) S=1, R=0

19. Which of the following gate is known as universal gate?

- a) OR b) X-OR c) NAND d) AND

20. An S-R flip-flop is known as:

- a) 1-bit memory b) 2-bit memory
c) 3-bit memory d) 4-bit memory

(PART B : Descriptive)

Time: 2 hrs. 40 min.

Marks: 50

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

1. What is shift register? Explain 4-bit bidirectional shift register with parallel load. (2+8=10)

2. a) Obtain the truth table for: (5)

$$F = xy + xy' + y'z$$

$$F = xy + x'y' + y'z$$

b) Simplify the following function using K-map: (5)

$$F = A'B'CD' + A'B'CD + AB'CD' + AB'CD + A'BCD + A'BC'D$$

3. a) Briefly explain decoders with the help of a diagram. (5)

b) Explain design of a simple computer with block diagram. (5)

4. What are the two properties of Boolean algebra? Simplify the following

Boolean function in product of sum form using K-map method.

$$F = \Sigma(0,1,2,5,8,9,10)$$

Express the Boolean function $F = AB + A'C$ in a product of maxterm form.

(2+3+5=10)

5. What do you mean by overflow and underflow? Convert the decimal number (44978)₁₀ to binary, octal, and hexadecimal. Explain the floating point representation of number. (2+3+5=10)

6. What is synchronous counter? How does it differ from an asynchronous counter? Explain a 4-bit binary up ripple counter with example. (2+3+5=10)

7. What do you mean by triggering, edge triggering and level triggering? Explain a D-type positive edge triggered flip flop. (5+5=10)

8. Write some application example of multiplexer and demultiplexer. Implement the following Boolean function using 4x1 MUX (5+5=10)

$$F(w,x,y,z) = x'z' + w'x' + wx + xyz$$
