

## Model Question

### Bachelor of Computer Applications (BCA)

Year / Semester: First / I

Subject: Digital Logic (CACCS105)

Time: 3 Hrs. (Group A, 20 Minutes and Group B & C, 2:40 Hrs.)

FM: 60

Group – A

Attempt all the questions

[10 x 1]

Circle (○) the correct answer in the following questions.

- Which one of the following is binary equivalent of  $(9C)_{16}$ ?
  - 10101100
  - 10011010
  - 10011100
  - 10011000
- Which one of the following is 2's complement of  $(10001001)_2$ ?
  - 01101110
  - 01110111
  - 01110110
  - 01011110
- Which one of the following gate's output is 0 only when there is at least one 0 at the input?
  - NAND
  - AND
  - OR
  - XNOR
- What is the value of  $x + yz$  using distributive law of Boolean algebra?
  - $(x+y)(x+z)$
  - $x(y+z)$
  - $xy+xz$
  - $y(x+z)$
- Which one of the following is correct solution of  $F(A, B) = \Sigma(m2, m3)$ ?
  - A
  - B
  - A'
  - B'
- How many select lines will be required for an 8-line-to-1-line multiplexer?
  - 1
  - 2
  - 3
  - 4
- What are the excitation values of J and K when  $Q(t) = 0$  and  $Q(t+1) = 1$  in JK flip-flop?
  - 0 and X
  - X and 1
  - 1 and X
  - X and 0
- How many clock pulse it takes to store 4 bit of binary information in a shift register in serial mode?
  - 1
  - 2
  - 3
  - 4
- How many flip-flops are required to make a MOD –8 counter?
  - 4
  - 3
  - 2
  - 5
- How many inputs will a decimal – to – BCD encoder have?
  - 4
  - 8
  - 10
  - 16

### Group – B

Attempt any SIX questions.

[6 x 5 = 30]

1. Define Digital signal. Explain the Digital Logic and Operations. [1 + 4]
2. What are Logic gates? Write the functional expression, digital symbol, truth table and Venn diagram for NOR and XOR gate. [1 + 4]
3. State and prove the Demorgan's Theorem using truth table.
4. Simplify following expression using K-map method: [5]  
 $F(A, B, C, D) = \sum m(3, 4, 6, 8, 10, 15) + D(0, 2, 7, 14)$ .
5. Define combinational circuit. Explain the operation of BCD – to – Decimal decoder with Circuit diagram and Truth table. [1 + 4]
6. Define sequential circuit. Draw a logic diagram, graphic symbol, characteristic table, and characteristic equation of clocked JK flip-flop. [1 + 1 + 1 + 1 + 1]
7. Define register. Explain the working principle of Serial In Serial Out (SISO) register. [1 + 4]

### Group – C

Attempt any TWO questions.

[2 x 10 = 20]

1. a) What is Multiplexer? Design 8 to 1 mux using 4 to 1 mux. [1 + 4]  
b) Write the Functional expression, Logic symbol and truth table for Full Adder. [1 + 2 + 2]
2. Define Canonical and standard forms. Realize the Basic gates using NAND and NOR gate. [2 + 4 + 4]
3. What is counter? Design the MOD – 10 synchronous counter showing its circuit, state and timing diagram. [1 + 3 + 3 + 3]