BRAINWARE UNIVERSITY

Term End Examination 2024-2025
Programme – BCA-Hons-2024
Course Name – Digital Logic
Course Code - BCA17101 (T)
(Semester I)

Full Marks : 40 **Time : 2:0 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A
(Multiple Choice Type Question) 1 x 10=10

1. *Choose the correct alternative from the following :*

(i) Which of the following is the signed 8-bit binary representation for the decimal value -20?

a) 10100 b) 11101110
c) 11101111 d) 11101100

(ii) When the output of two input AND gate is high?

a) all inputs are high b) all inputs are low
c) at least one input is high d) None of these

(iii) Identify for which of the following binary code two subsequent values only differ in one bit.

a) BCD b) Excess-3 code
c) Gray Code d) None of these

(iv) Identify the proper form of a logical expression Y=(A+B)(B+C')(A'+C).

a) SOP b) POS
c) Both of these d) None of these

(v) What is the equivalent binary number of the octal number (753) ?

a) 1011000001 b) 101101100
c) 111101011 d) 10101100011

(vi) In an SR flip-flop, if both S and R inputs are 0, what will be the output state?

a) Set b) Reset
c) No Change d) Invalid State

(vii) What is the primary function of the clock input in a flip-flop?

a) It sets the output to high. b) It synchronizes the flip-flop's state changes.
c) It toggles the output state. d) It resets the flip-flop to its initial state.

(viii) On subtracting 001100 from 101001 using 2's complement, select we get _____.

a) 11101 b) 1101100

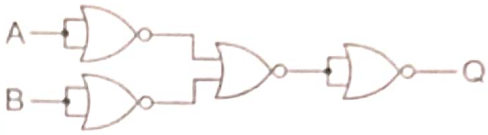
c) 11100 d) 11011

(ix) Choose the expression (A ⊕ B)' is equal to:

a) A ⊕ B. b) A + B.

c) A' ⊕ B. d) A' + B.

(x)



Choose the output of the given logic circuit:

a) OR b) NOR

c) AND d) NAND

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Describe the main difference between a combinational circuit and a sequential circuit. (3)
3. What is an SR flip-flop? (3)
4. Write a short note on De-Morgan's Law. (3)
5. Generalize the following expressions using K-map: (i) F= Σm(0,1,3,5,6,11,15). (ii) F= Σm(0,1,2,5,6). (3)
6. Assess consensus theorem in Boolean algebra. (3)

OR

Determine the concept of hazard in digital circuits. (3)

Group-C

(Long Answer Type Questions) 5 x 3=15

7. Enumerate the Boolean expression using K-MAP F(A, B, C, D) = Σm(0, 1, 2, 5, 7, 8, 9, 10, 13, 15). (5)
8. Show the truth table and logic diagram of a Full Adder. How does it differ from a Half Adder? (5)
9. Evaluate the significance of select lines in a Multiplexer and how they determine the output. (5)

OR

Explain the operation of a 1-to-8 Demultiplexer. Conclude with its truth table and logic diagram. (5)

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