16444

BRAINWARE UNIVERSITY

Term End Examination 2025-2026
Programme – BCA-Hons-2024/BCA-Hons-2025
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) Construct the decimal number 597 into excess-3 code, showing each step of the process.

a) 1000101101010 . b) 10101001010
c) 100011111010 . d) 100011001010 .

(ii) Translation of BCD 0001 0010 0110 to binary will be-

a) 1111100 b) 1001110
c) 1011110 d) 1111110

(iii) Select how the sum output is calculated in a half-adder when the inputs are A and B.

a) A EXNOR B b) A EXOR B
c) A OR B d) A AND B

(iv) How many inputs are required for a 4-to-16 decoder?

a) 5 b) 4
c) 3 d) 2

(v) Show the output of a binary decoder.

a) The output lines reflect the binary input value b) All output lines are set to 1
c) All output lines are set to 0 d) One output line is set to 1, the rest are 0

(vi) Identify the condition of a two input XOR gate, where the output is high.

a) both inputs are high b) both inputs are low
c) one input is high, other is low d) All of these

(vii) Outline the procedure to create a NAND gate.

a) AND gate followed by a OR gate b) AND gate followed by a NOT gate
c) Both of these d) None of these

(viii) Select the correct option : The term BCD stands for -

a) Biased Coded Decimal, which represents each of the digits of an unsigned decimal as the biased decimal equivalent.
b) Binary calculated Decimal, which represents each of the digits of a signed decimal as binary byte.
c) Binary Coded Decimal, that represents each of the digits of an unsigned decimal as the 4-bit binary equivalents.
d) Binary Coded Decimal, that represents decimal number as the binary equivalents.

(ix) Which flip-flop is known as a "simple" flip-flop?

a) D flip-flop
b) JK flip-flop
c) SR flip-flop
d) T flip-flop

(x) Which situation causes a race condition in a JK flip-flop?

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

Group-B

(Short Answer Type Questions) 3 x 5=15

2. What is the Boolean expression for an AND gate with inputs A and B? Provide the truth table for the Boolean expression A+B. (3)
3. What is a combinational circuit? (3)
4. Explain the function of a demultiplexer? (3)
5. Convert the following logic circuit to a Boolean expression: AND gate with inputs A and B, OR gate with inputs C and D, connected to a final OR gate. (3)
6. Compile the concept of metastability affect the design of sequential circuits. (3)

OR

Elaborate clock skew, and it's impact sequential circuits. (3)

Group-C

(Long Answer Type Questions) 5 x 3=15

7. Find the eight-bit result for two eight-bit strings A = 10110001 and B = 10101100 after performing the following logical operations : (a)AND, (b)OR, (c)XOR, (d)NOT A, (e)NOT B (5)
8. Explain how priority encoding is achieved in Encoders. What is its significance? Develop an example to illustrate. (5)
9. Determine a simple circuit using AND, OR, and NOT gates to satisfy the given truth table: A=1, B=0, output = 0. (5)

OR

Explain what universal gates are, and justify why NAND and NOR gates are called universal gates. (5)

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