BRAINWARE UNIVERSITY

Term End Examination 2023-2024
Programme – BCA-Hons-2023
Course Name – Digital Logic
Course Code - BCA10101
(Semester I)

Full Marks : 60 **Time : 2:30 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 15=15

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

(i) Calculate the value of the (110101) – (100101) (binary number) using 1's complement.

a) 1010 b) 10000
c) 1011 d) 10101

(ii) Choose what must be used along with synchronous control inputs to trigger change in the flipflop?

a) 0 b) 1
c) Clock d) Previous output

(iii) A digital system consists of _____ types of circuits.

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

(iv) What does minuend and subtrahend denotes in a subtractor?

a) Their corresponding bits of input(b) Its outputs
c) Borrow bits(d) Its inputs

(v) Total number of inputs in a half adder is _____

a) 2 b) 3
c) 4 d) 1

(vi) Differentiate between data and Information?

a) Data is processed, Information is raw b) Data is meaningful and information is not
c) Data is raw, information is meaningful d) Data is structured, information is unstructured

(vii) Identify the use of Boolean algebra-

a) Simplify any algebraic expression b) Solve the mathematical problem
c) Minimize the number of connection and inputs in a circuit d) Perform arithmetic calculation

(viii) Select the primary function of a Half Adder

a) Adding two binary numbers b) Adding three binary numbers

c) Adding two binary numbers and handling carry
d) Subtracting two binary numbers

(ix) Choose the maximum number of input lines in a 4:1 multiplexer.
a) 1
b) 2
c) 3
d) 4

(x) Two nibble is equal to
a) 1 byte
b) 2 bits
c) 2 byte
d) 4 bits

(xi) What is the primary characteristic that differentiates sequential circuits from combinational circuits?
a) Feedback
b) Inputs
c) Outputs
d) Gates

(xii) The OR operation performs in Boolean algebra by
a) Associative properties
b) Commutative properties
c) Distributive properties
d) all of these

(xiii) Identify which number system uses the letters A-F?
a) Octal
b) Binary
c) Decimal
d) Hexadecimal

(xiv) Tell the equivalent hexadecimal number of the decimal number 30.
a) 1F
b) 1B
c) 1D
d) 1E

(xv) The DeMorgan's theorem state that
a) (A + B)' = A' * B
b) (AB)' = A' + B\'
c) A' + B' = A'B
d) (AB)' = A' + B

Group-B
(Short Answer Type Questions) 3 x 5=15

2. Write a short note on De-Morgan's Law (3)
3. Draw a truth table for the equation: Y = ABC(C+D') (3)
4. Compare between Analog and Digital system (3)
5. Why are subtractions using 2's complement used in modern computers? (3)
6. What is the main difference between latch & flip flop? (3)

OR

Design the full subtractor circuit with using Decoder and explain the working principle. (3)

Group-C
(Long Answer Type Questions) 5 x 6=30

7. You have been given a hexadecimal number 3A7 and a binary number- 11011001. Convert both numbers into their decimal equivalents. Show your work. (5)
8. What are the fundamental properties of Boolean algebra? (5)
9. Explain the operation of a JK flip-flop. (5)
10. Distinguish between combinational and sequential switching circuits. (5)
11. Contrast the characteristics of a D flip-flop with those of an SR flip-flop (5)
12. What is NAND, NOR, X-OR, and X-NOR operations in Boolean algebra? (5)

OR

Write the Boolean algebraic laws. (5)

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