BRAINWARE UNIVERSITY

Term End Examination 2022
Programme – BCA-2022
Course Name – Computer Hardware & Digital Logic
Course Code - BCAC102
(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) 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

(ii) According to Boolean Law, A+1 match the result

a) 1
b) A
c) 0
d) A'

(iii) Convert Decimal 0.345 into an octal number results

a) 0.1605
b) 0.1945
c) 0.2605
d) 0.2404

(iv) 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

(v) Two nibble is equal to-

a) 1 byte
b) 2 bits
c) 2 byte
d) 4 bits

(vi) An inverter gate may be implemented using_____

a) Two diodes
b) A resistance and a capacitance
c) Transistors
d) An inductance and capacitance

(vii) The OR operation performs in Boolean algebra by-

a) Associative properties
b) Commutative properties

c) Distributive properties
d) all of these

(viii) According to Boolean Law, A+1 may represent as-

a) 1
b) 0
c) A'
d) A

(ix) The involution of A is equal to the

a) 1
b) 0
c) A'
d) A

(x) Which of the following flip-flop is used as a latch in digital electronics?

a) J-K flip-flop
b) R-S flip-flop
c) T flip-flop
d) D flip-flop

(xi) The logic circuits, whose outputs at any instant of time depends only on the present input but also on the past outputs are called _____.

a) Combinational circuit
b) Sequential circuits
c) Latches
d) Flip-flops

(xii) In a multiplexer the output depends on its _____

a) Data inputs
b) Select inputs
c) Select outputs
d) Machine input

(xiii) When two 16-input multiplexers drives a 2-input MUX, what is the result?

a) 2-input MUX
b) 32-input MUX
c) 24-input MUX
d) 62-input MUX

(xiv) The inputs / outputs of an analog multiplexe r/ De-multiplexer are

a) Bidirectional
b) Unidirectional
c) Even parity
d) Binary-coded decimal

(xv) Which of the following circuits come under the class of combinational logic circuits?
case1. Full adder case2. Full subtractor case3. Half adder case4. J-K flip case5. Counter

a) 1 only
b) 3 and 4
c) 4 and 5
d) 1,2 and 3

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Find the Canonical SOP Expression: Y(A,B)=A+B (3)

3. Write a short note on Exclusive gates (3)
4. Draw the circuit diagram of the D latch and explain its action. (3)
5. Design a full-subtractor using two half-subtractors, with the required circuit diagram (3)
6. Implement the Boolean function by using basic logic gates: (3)

$$F = (A + B + C) . (A' + B' + C) . (A + B' + C)$$

OR

Draw a truth table for the equation: Y = ABC(C+D') (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Explain the Double Complement Law of boolean algebra with proper examples. (5)
8. What are NAND, NOR, X-OR, and X-NOR operations in Boolean algebra? (5)
9. Define the following terms as applied to flip-flops: Set-up time, Hold time. (5)
10. Define the following terms as applied to flip-flops: Maximum clock frequency, Power dissipation (5)
11. Implement the following Boolean function with a multiplexer and external gates: F (A,B, C,D) = Π (0,2,5,6,7,8,9,10)? (5)

12. With necessary circuit diagrams, prove NAND is universal gate (5)

OR

With necessary circuit diagrams, prove NOR is a universal gate (5)

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