Code: A-C223115-M

I SEMESTER EXAM - 2024-25

2 x 205

Std.: XI | Sub: CS-II | Marks: 50

Date: 26/10/2024 | Roll No.: _____ | Time: 2½ hrs

1) All questions are compulsory.
2) Draw a neat and labeled diagram wherever necessary.
3) Figure to the right indicates full

Q.1 A) SELECT CORRECT ALTERNATIVE AND REWRITE THE SENTENCES. (4)

1) The symbol + in Boolean is also known as the _____ operator.
   a) AND b) OR c) Ex-OR d) NOR
2) A gate gives the output as 1 only if all the inputs signals are I.
   a) AND b) OR c) Ex-OR d) NOR
3) A + B = B +A; A.B = B.A represent which laws?
   a) Commutative b) Associative c) Distributive d) Idempotence
4) The gate which is used to reverse the output obtained is _____
   a) NOR b) NAND c) Ex-OR d) NOT

B) ANSWER ANY TWO OF THE FOLLOWING : (6)

1) What are logic gates ? Name the universal gates.
2) How is a number in binary number system converted into its equivalent decimal system? Explain with example.
3) Convert following binary to its octal and hexadecimal using shortcut technique.
   a) $(0110101110111111)_2$ b) $(11011010100010)_2$
   c) $(01011010110101011010)_2$

Q.2 A) ANSWER ANY TWO OF THE FOLLOWING : (6)

1) Convert each binary number to its decimal equivalent.
   a) 10110 b) 110011001 c) 100101110110
2) State both distributive law in Boolean algebra. Prove any one of these laws using truth table.
3) Draw the Logic diagram using gates for the Boolean expression given below :
   $(A+B+\overline{C})\ (A+C)\ (\overline{B}+C)\ (\overline{A}+C)$

B) ANSWER ANY ONE OF THE FOLLOWING : (4)

1) Convert the following hexadecimal to binary using shortcut technique.
   1) C0FFEE 2) FACE 3) 2FAD 4) BED
2) Explain with definition, diagram and truth table the AND gate and NANI gate.

Q.3 A) ANSWER ANY TWO OF THE FOLLOWING : (6)

1) Convert the binary number (100110)2 to it's Hexadecimal, Decimal and Octal equivalent.
2) Perform the following binary addition,
   a) $(11101 + 10000111 + 1010111011)_2$
   b) $(1111 + 1001 + 0011)_2$
   c) $(10101 + 11001 + 01111)_2$
3) Explain and prove the Idempotent Law in Boolean algebra.

B) ANSWER ANY ONE OF THE FOLLOWING : (4)

1) Convert the following decimal number to binary and perform binary addition:
   a) $(54)_{10}$ b) $(648)_{10}$ c) $(1465)_{10}$
2) Define EX-OR logic and draw its logic diagram and write and prove its logical equation with help of truth table.

P.T.O

Q.4 A) ANSWER ANY TWO OF THE FOLLOWING : **(6)**

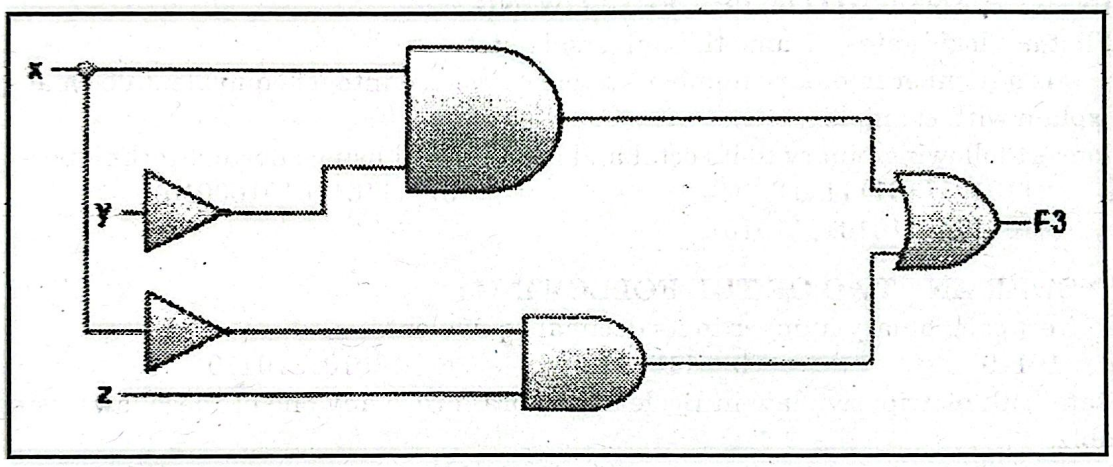
1) How is the dual of a Boolean expression obtained?
2) Write in tabular form values of decimal numbers 20 to 40 and their equivalents in binary, Octal and Hexadecimal.
3) What are Universal gates? Give two examples.

B) ANSWER ANY ONE OF THE FOLLOWING : **(4)**

1) Add 3-digit max number in Hexadecimal with 2-digit Max number in Octal with 4-digit max Number in Binary. Express the sum in decimal.
2) Consider (A) = 5 AH, (B) = C3H, show with working, the result of NANDing and EXORing operation on A and B.

Q.5 A) ANSWER ANY TWO OF THE FOLLOWING : **(10)**

1) Explain the method of converting hexadecimal number $(548)_{10}$ to its binary equivalent using traditional method.
2) Subtract $(110110)_2$ from $(1101)_2$ using two's compliment method.
3) Give the Boolean expression for the logic diagram given below. Name the gates used and also write its truth table.



OR

B) ANSWER ANY TWO OF THE FOLLOWING. **(10)**

1) Solve the following a) $(10010)_2 = (?)_8 = (?)_{16} = (?)_{10}$ b) $(75)_8 = (?)_{10} = (?)_{16}$
2) Consider (A) = AA_H, (B) = BB_H, show with working, the result of ANDing, NORing and ORing operation A and B.
3) State De Morgan's theorems and prove using truth table.