Logical Organization of Computer - 1

Time : Three Hours] [Maximum Marks : 90

1. (a) Represent the Decimal number 492 in BCD code.
   (b) Write short note on ASCII code.
   (c) Find the dual of expression : a + $(\bar{a}.b)$
   (d) State and prove Demorgan's law.
   (e) Why NAND is termed as universal gate?
   (f) Represent the Boolean expression x + $Y.\bar{Z}$ with the help of NOR gate only.
   (g) Design truth table for full-adder.
   (h) What is Multiplexer? 20

UNIT - I

2. (a) Explain fixed and floating - point representation of numbers with the help of examples. 10
   (b) Perform the following algorithm operation using 2's complement representation for negative numbers.
   $(58)_{10} - (33)_{10} + (14)_{10} + (-45)_{10}$ 5
   (c) Determine the value of base b if (16)10 = (100)b. 5

3. (a) Determine which bit, if any, is in error in the even parity. Hamming coded character is 1100111. Decode the message. 10

(b) Represent the decimal number 678.7 in
(i) binary (ii) Excess - 3 code
(iii) Gray code (iv) ASCII Code 10

UNIT - II

4. (a) Convert the SOP equation, F = $A\bar{B}C + \bar{A}B\bar{C}$ into its POS form. 10

(b) Prove that $xy + \bar{x}\,\bar{y} + \bar{x}yz = xy\bar{z} + \bar{x}\,\bar{y} + +yz$ with the help of truth table. 10

5. (a) Simplify ABC + $\bar{A}BC + AB\bar{C} + \bar{A}BC + \bar{A}\bar{B}\bar{C}$ using K-map. 10

(b) Simplify the following three variable expression using Boolean algebra F = IIM (1,3,5,7). 10

UNIT - III

6. (a) Simplify the following Boolean equation and realize the same using logic gates

$$F = \left(\bar{A} + B\right)\left(A + \bar{C}\right)\left(\bar{B} + \bar{C}\right)$$ 10

(b) Simplify the following logic expression and realize it using NAND gates.

$$F = A\bar{B} + AB\bar{C} + ABCD + ABC\bar{D}$$ 10

7. (a) Write and explain design procedure of combinational circuits with the help of an example. Implement the function using.
(i) NAND gates and 10
(ii) NOR gates only 10

(b) F=A.B+ $\bar{C} + D.E.$ 10

UNIT - IV

8. Explain Full-Substractor in detail. 20
9. Explain 2-bit magnitude comparator in detail. 20

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