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BCA / D-18
LOGICAL ORG.
Paper-BCA-114
Logical Organisation of Computer-I

Time allowed : 3 hours]   *[Maximum marks : 80*

Note : *Attempt* **five** *questions. Select* **one** *from each unit.*
Question No. 1 is compulsory.

1.   (a)   Make T.T. for self complimenting code.   2

    (b)   Prove that NOR is universal gate.   2

    (c)   State Duality Principle.   2

    (d)   What is parity bit ? Define odd and even parity.   2

    (e)   Prove using Induction (T.T.) $a \oplus (b \oplus c) = (a \oplus b) \oplus c$.   4

    (f)   Draw and label 3 variable K – map.   4

Unit–I

2.   Perform conversions as :

    (a)   (i) $(17.3)_{10} \rightarrow ( )_2$ 2

                    $\rightarrow ( )_{16}$ 2

      (ii) $(X)_5 = (234)_{10}$

      (iii) A register stores High, low, low, High. Find number in Decimal, Octal, Binary and Hexadecimal.   4

    (b)   Write note on Cyclic and 8421 code.   4

    (c)   Make Half Adder for adding Two numbers.   4

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3. (a) Explain floating point representation. 10

    (b) Solve using 2's Compliment : 6

$$\begin{array}{ccc} -9 & -32 & -6 \\ \underline{-7} & \underline{+10} & \underline{-9} \end{array}$$

Unit-II

4. (a) Define Boolean algebra, its postulates, how it differs from ordinary algebra. 8

    (b) Solve using Boolean Algebra. 8

    (i) $(a + b)(ac + c)\overline{(\overline{b + ac})} = \overline{a}bc$

    (ii) $ab + bc + ca$

5. (a) Draw and label 4 variable K – Map. 4

    (b) Solve using K– Map.

    $z = \pi\ 0, 2, 4, 6$

    $z = \sum 0, 1, 9, 10, 11 + \underset{\varphi}{\Sigma}\ 2, 3, 8, 12$ 8

    (c) Solve using T.T.

    $\overline{a + b + c} = \overline{a}.\overline{b}.\overline{c}$ 4

Unit-III

6. (a) Make T.T. and explain :

    NAND, XOR, NOT 6

    (b) Make T.T. for 3 variables and explain :

    OR, AND, NOR 6

    (c) Make circuit diagram :

    $ab\ (\overline{c}\,d + c\,\overline{d}) + \overline{a\,b\,c}$ 4

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7. What is combinational logic ? Explain analysis and design procedures. 16

Unit-IV

8. (a) Make 4 to 10 Line Decoder

   (b) Make code convertor from 8421 to cyclic. 16

9. (a) Design Comparator for 2 bits

   (b) Make full-adder 16