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GSE/M-20 **1457**

COMPUTER SCIENCE

(Logical Organisation of Computer)

Paper–II

Time : Three Hours] [Maximum Marks : 25

Note : Attempt *five* questions in all. Question No. 1 is compulsory.

Select *one* question from each section.

Compulsory Question

1. Answer in short :

(i) Abbreviate ASCII, BCD. (1)

(ii) Define Duality principle. (1)

(iii) Discuss Half Adder. (1)

(iv) Make table for self-complementing code. (1)

(v) Explain Race-around problem. (1)

SECTION–I

2. Convert the following :

(i) $(7.3)_{10} = (.....)_2$ (1)

(ii) $(1101110110)_2 = (.....)_8$ (1)

(iii) $(10.625)_{10} = (.....)_{16}$ (1)

(iv) $(10.3)_{10} = (.....)_{8}$ (2)

3. Write notes on the following :

(i) Error detection and correction. (2½)

(ii) Floating point representation. (2½)

SECTION–II

4. (i) Define Boolean Algebra and write its postulates. (2)

(ii) Solve using Boolean Algebra :

$XY + \overline{X}\,Z + YZ = XY + \overline{X}\,Z.$ (1½)

$ABC + A\,\overline{B}\,C + AB\,\overline{C} + A\,\overline{B}\,\overline{C} = A.$ (1½)

5. (i) Solve using *k*-map :

$Z = \Sigma(0, 2, 3, 7, 9) + \sum_{\phi}(1, 4, 5, 11)$ (2½)

(ii) Draw and label 4-variable *k*-map. (2½)

SECTION–III

6. (i) Prove that NAND, NOR are universal gates. (2½)

(ii) Draw the circuits for following :

$X = (\overline{A}B + A\overline{B})CD + \overline{XYZ}$. (2½)

7. (i) Design 4 : 1 multiplexer. (2½)

(ii) Design 10 to 4 line encoder. (2½)

SECTION–IV

8. Draw the logic diagram of *RS* flip flop and explain its working and find its equation. (5)

9. Explain the working of Serial Input Serial Output (SISO) and Serial Input parallel Output Register. (5)