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GSE/M-20 **1498**

COMPUTER SCIENCE–II

(Logical Organization of Computers)

Paper–II

Time : Three Hours] [Maximum Marks : 40

Note : Attempt *five* questions in all. Question No. 1 is compulsory. Attempt *four* more questions selecting *one* question from each unit.

1. Answer the following questions in brief :

(a) What is Half subtractor? Draw truth table and its diagram.

(b) Distinguish between Synchronous and Asynchronous counters.

(c) Convert A + B'C into POS and SOP forms.

(d) Represent '13' in ASCII and EBCDIC codes. (4×2=8)

UNIT–I

2. (a) What is Cyclic BCD code? What are its applications? Represent 869 in this code. (3)

(b) Design single error detecting and single error correcting Hamming code for 1100 code, and explain its usage with an example. (5)

3. (a) Convert $(4F2.3)_{16}$ into binary, ternary and octal number systems. (4)

(b) Perform $(28)_{10} + (-43)_{10}$ in 1's complement form and verify your answer. (4)

UNIT–II

4. (a) Explain the following laws of Boolean algebra :

Identity law, Distributive law, Complement law and Associative law. (4)

(b) Simplify F(A, B, C) = A.B + A.B' + B.C' using Boolean theorems. (4)

5. (a) Simplify the following Boolean functions using K-maps : (4)

$F(A, B, C, D) = \pi(0, 1, 2, 3, 5, 8, 9, 10, 11, 12, 13, 14)$.

(b) Simplify the following Boolean function F and the don't care conditions *d* in SOP form : (4)

$F = w'\,(x'.y + x'.y' + x.y.z) + x'.z'(y + w)$,

$d = w'.x(y'.z + y.z') + w.y.z$.

UNIT–III

6. (a) What are NOR and NXOR gates? Draw truth tables for these gates with 3-inputs. (4)

(b) What is Encoder? Design octal to binary encoder. (4)

7. (a) What is Comparator circuit? Design 4-bit comparator circuit. (4)

(b) Design BCD to 7-segment display converter. (4)

UNIT–IV

8. (a) What is T-type filp-flop? How is it constructed? Explain its working. Draw excitation table for it. (4)

(b) What is Shift register? Design 4-bit shift register with parallel load. (4)

9. (a) Design a 4-bit binary synchronous counter. (4)

(b) What is Counter? Design a modulo-9 counter. (4)