P4–Exam.–Oct.–10–69

Digital Logic Design & Application

Con. 5680–10. **GT–6240**

(3 Hours) **[Total Marks : 100**

Digital Logic Design & Applications

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions out of remaining **six** questions.
(3) Assume **suitable** data and it **clearly**. S.E. /Com / Sem-III

1. (a) Convert $(1234{\cdot}56)_{10}$ to Octal, Hexadecimal. **4**
   (b) Perform following operation without converting to any other base. **8**
   (i) $(ABC)_H - (FEDC)_H$
   (ii) $(234{\cdot}12)_5 + (432{\cdot}34)_5$
   (iii) $(76)_8 * (67)_8$
   (iv) $(10101011)_2 \div (101)_2$
   (c) Represent $(29)_{10}$ into Excess–3 code and Gray code. **4**
   (d) Design (1 : 16) Demultiplexer using (1 : 4) **4**

2. (a) (i) Subtract using 1's and 2's complement method $(73)_{10} - (49)_{10}$ **2**
   (ii) Perform BCD addition for number 56 and 65 **2**
   (iii) Perform $(11010)_2 \div (101)_2$ **2**
   (iv) Write Hamming code for number 0111 **2**
   (b) Simplify using Boolean Theorms and Draw Logic Diagram for the following :– **12**
   (i) $\overline{A}\,B\,C + A\,\overline{B}\,C + A\,B\,\overline{C} + A\,B\,C$
   (ii) $A\,[\,B + C\,(\overline{AC + AB})\,]$
   (iii) $\overline{AB}\,(B + C) + AB\,(\overline{B + C})$.

3. (a) Minimize the following logic function and realize using NAND gates **10**
   $f(A, B, C, D) = \Sigma m(1, 3, 5, 8, 9, 11, 15) + d(2, 13)$
   (b) Simplify using Quine-McCluskey method. Realize the equation using any universal gate. **10**
   $F(A, B, C, D) = \Pi m\ (0, 2, 3, 6, 7, 8, 9, 12, 13)$

4. (a) Design a MOD-6 synchronous Up counter and explain its working. **10**
   (b) What is shift register ? Explain 4 bit bi-directional shift register. **10**

5. (a) Implement the following Boolean function using 4 : 1 MUX **10**
   $F(A, B, C, D) = \Sigma m(1, 2, 4, 6, 9, 12, 14)$
   (b) Convert SR flip flop to D and T flip flop and draw the circuit. **10**

6. (a) Draw 2-input TTL NAND gate and explain its operation. **10**
   (b) Prove that NAND and NOR gates as universal gate. **10**

7. Write notes on following :– **20**
   (a) ALU
   (b) PLA and PAL
   (c) Multiplexer and Demultiplexer
   (d) Race around condition in JK flip flop.