P4-RT-Exam.-Oct.-12-333

Con. 7376-12.

KR–3410

(3 Hours)

| Total Marks : 100

N.B. : (1) Question No. 1 is **compulsory**.

(2) **Solve** any **four** out of the remaining **six** questions.

(3) Draw **neat** diagram wherever **necessary**.

1. (a) Using Quine Mc Cluskey method, determine the minimal SoP form for –   **10**
   $F(A, B, C, D) = \Sigma m(4, 5, 8, 9, 11, 12, 13, 15)$

   (b) Obtain the hamming code for 1010. Prove that hamming code is an error detecting and   **10**
   correcting code.

2. (a) Implement the following using 8 : 1 MUX   **10**
   $F(A, B, C, D) = \Sigma m(0, 1, 2, 4, 6, 7, 8, 10, 14, 15)$

   (b) Draw a 4 bit ring counter. Draw the timing diagram and explain the working of counter.   **10**

3. (a) Design a sequence generator using T flip flop for the given sequence. Also identify   **10**
   and check for lock-out condition (if any) –
   $0 \longrightarrow 2 \longrightarrow 4 \longrightarrow 5 \longrightarrow 0$

   (b) Using k-map method of minimization technique simplify   **10**
   $F(A, B, C, D) = \pi m(1, 2, 3, 8, 9, 10, 11, 14) + d(7, 15)$

4. (a) Explain the operation of a 4 bit universal shift register.   **10**

   (b) Design a full adder circuit using half adders and some gates.   **10**

5. (a) Convert :   SR to JK flip flop   **10**
                     SR to D flip flop

   (b) Compare the different logic families with respect to the following parameters –   **10**
   Fan in, Fan out, Noise margin, speed and power dissipation.

6. (a) Convert $(243.63)_8$ to decimal, binary $(210.2)_4 + (312.2)_4$ **10**

   (b) Draw and design a combinational circuit that multiplies two 2-bit numbers A1 A2 and   **10**
   B1 B2 to produce a 4 bit product C3 C2 C1 C0.

7. Write short notes on :–   **20**
   (a) De Morgans Theorem .
   (b) Decade Counters
   (c) Race around condition in JK flip flop
   (d) PLA and PAL.