(3 Hours) Marks : 80

NB : (1) Q. **No. 1** is **Compulory.** Attempt **any three** questions.
(2) **Figures** to the **right** indicate full **marks.**
(3) Assume suitable data if necessory

1. Answer the following **(Any Four)** **20**
   (a) Convert : (i) $(FFFA)_{16} = (?)_8$
   (ii) $(101.1101)_2 = (?)_{10}$
   (b) Explain carry look ahead adder.
   (c) Compare combinational and sequential logic circuits.
   (d) Explain Race around condition and how it can be eliminated.
   (e) What are ROM and RAM. Compare these two memories.

2. (a) (i) Construct Hamming code for BCD 0110 use even parity **10**
   (ii) Prove that : (i) $A\left[B + C\,\overline{(AB + AC)}\right] = AB$
   (ii) $\overline{AB.\overline{(C+D)}.AB} = \overline{A} + \overline{B} + C + D$

   (b) Implement the following Boolean equation using single 8:1 MUX and few logic gates. $F(A,B,C,D) = \Sigma M(0,1,3,4,8,9,15)$ **10**

3. (a) Design Decade ripple counter and draw timing diagram. **10**
   (b) Convert JK Flip-Flop to T Flip-Flop and D Flip-Flop. **10**

4. (a) Minimize the following function using K-Map and implement using only universal gates. $F = \Sigma m(5,6,7,13,14,15)$ **10**
   (b) What is shift register ? Explain the working of 4 bit universal shift register. **10**

5. (a) Explain programmable Logic Devices. **10**
   (b) What is a function Hazard ? How will you prevent Hazard. Explain. **10**

6. Write a short note on : **(Any Four)** **20**
   (a) Basic dynamic RAM cell
   (b) ECL family
   (c) Johnson Counter
   (d) EEPROM
   (e) Noise Margin, Fan-In, Fan Out, Propagation Delay time of IC's

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