(OLD COURSE)   Q.P. Code : **4605**

(3 Hours)   [Total Marks : 100

N.B. (1)   Question No. 1 is compulsory.
  (2)   Attempt any four out of remaining Q.2 to Q.7.\
  (3)   Assume suitable data if required.

1. (a) Subtract $(10)_{10} - (33)_{10}$ using 2's complement number system.   5
   (b) Convert JK FlipFlop to T FlipFlop.   5
   (c) What are error detecting and error correcting codes.   5
   (d) Compare Asynchronous and synchronous counters.   5

2. (a) Simplify the logic function using k-map and implement it using AND-OR   10
       gates.
       $F(A, B, C, D) = \Sigma m (0, 1, 2, 4, 8, 9, 12) + d (11,15)$
   (b) Design 2 bit asynchronous up/down counter using T-Flip Flop.   10

3. (a) Explain any one shift register using Jk Flip Flops   10
   (b) Design full adder using AND-OR gates.   10

4. (a) Implement the following function using single 8:1 multiplexers.   10
       $f(A,B,C,D) = \Sigma m(0, 1, 4, 5, 9) + d(11)$
   (b) Perform without conversion.   10
       (i) $(44B)_H - (1AD)_H$ (ii) $(77)_8 * (32)_8$

5. (a) Reduce using Boolean Algebra   10
       (i) $AB + \overline{AC} + ABC(AB + C)$ (ii) $(A + \bar{B} + AB)(A + \bar{B})(\overline{AB})$
   (b) Design full subtracter using universal gates NAND.   10

6. (a) Using Quine Mc-cluskey method, simplify the following function and   10
       design using NOR gates.
       $F(A,B,C,D) = \pi M(0,1,4,5,10,11,12,14)$
   (b) Explain the transfer characteristics of TTL NAND gate.   10

7. Write short notes on :   20
       (a)   Arithmatic Logic Uit
       (b)   Universal gates
       (c)   Applications of Flip Flops
       (d)   Weighted codes.

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