Exam.Code:0915
Sub. Code: 6379

1078

B.E. (Computer Science and Engineering)
Third Semester
CS-316: Digital Electronics

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Part.

x-x-x

1. (a) Perform the required operations on following decimal numbers using 2's complement method in binary form: 18-25, 32-14
   (b) Simplify the following expressions using Boolean theorems:
   $$F = (A + BC) + (DE + F)(A + BC)'$$
   (c) For an 8-bit counter type A/D converter, driven by a 500-KHz clock, find the maximum conversion time, and maximum conversion rate.
   (d) Discuss the propagation delay and noise margin characteristics of logic families.
   (e) Discuss operation of EEPROM memory. (5×2=10)

Part-A

2. (a) Find a minimized POS form for the expression: (5)
   $$F = \sum m(4,5,8,9,12,13,18,20,21,22,25,28,30,31)$$
   (b) Design a 3-bit binary code comparator using XOR and other basic gates. (5)

3. (a) Describe the operation of error correction with the help of hamming code by taking an example. (5)
   (b) Use 4-to-1 multiplexer and external gates to realize the function: (5)
   $$F(w, x, y, z) = \sum m(3,4,5,7,10,14) + \sum d(1,6,15)$$

4. (a) Design a Modulo-12 ripple counter using JK flip-flops. (5)
   (b) Design a Successive approximation type A/D converter using block diagram. Compare the conversion time of this converter with other converters. (5)

Part-B

5. (a) Describe the operation of ECL OR/NOR gate with the help of circuit diagram. (5)
   (b) Discuss level-translation in ECL and TTL. (5)

6. (a) Describe the reading and writing operation of Dynamic RAM cell with the help of circuit diagram. (5)

(b) Implement the following equations using a PLA: (5)

$$X = AB'D + A'C' + BC + C'D'$$

$$Y = A'C' + AC + C'D'$$

$$Z = CD + A'C' + AB'D$$

7. Describe the following:
   a. Tristate logic and applications
   b. FPGA (5,5)

x-x-x