Roll No. ....   Total Pages : 03

BT-3/D-22   43146
DIGITAL ELECTRONICS
Paper : II
ES-205A

Time : Three Hours]   [Maximum Marks : 75

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. (a) Express the following decimal numbers in binary form :   2
    (i) 37
    (ii) 255.

    (b) Perform the following operations using 2's complement :   4
    (i) 48 – 23
    (ii) 23 – (– 67).

    (c) Convert into POS term :   4
    $$AB + AC' + BC.$$

    (d) Design a BCD to excess 3 code converter.   5

2. (a) What are parity check codes ? Explain Hamming codes in detail.   5

(b) Minimize the expression using Q-M method :

$$Y = \Sigma m(0, 3, 6, 7, 10, 12, 15) + d(1, 2, 9, 11).$$

Also realize the obtained expression using AOI logic.

10

Unit II

3. (a) Explain the working of TTL NAND gate. also describe the totem pole output driver circuit. **10**

(b) Explain how CMOS logic families can be interfaces with TTL families. **5**

4. (a) Draw the diagram of 2-Input CMOS NAND and NOR gates. **8**

(b) Design an octal to binary encoder. **7**

Unit III

5. (a) Explain in detail the working of JK flip-flop. Mention the problem associated with it. **8**

(b) Convert SR flip-flop to T flip-flop. **7**

6. (a) Design a synchronous mod 10 up counter. **10**

(b) Draw and explain the working of Johnson counter. Draw the output waveforms for it. **5**

Unit IV

7. (a) Write a short note on ROM. Also draw diagram showing working of ROM array. **7**

(b)   With the help of waveforms, explain how read and write operation occur in semiconductor memory. **8**

8.   Write a note on PLDs. Mention advantages of PLD. Discuss PLA and PAL. Implement the following function using PAL :

$Y = f_1 + f_2 + f_3$, where $f_1 = \Sigma m\,(0, 1, 2)$; $f_2 = \Sigma m\,(1, 2, 4)$ and $f_3 = \Sigma m\,(0, 3, 5)$.   **15**