Roll No. ..... Total Pages : 3

BT-3/D-21 **43133**

DIGITAL ELECTRONICS

Paper–ES-207A/ES-205A

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *five* questions in all, selecting at least *one* question from each unit.

UNIT–I

1. (a) Prove the following using boolan algebric theorems :

$$\bar{A}BC + A\bar{B}C + AB\bar{C} + ABC = AB + BC + CA$$

$$(A+B)(C+D) = \overline{\overline{(A+B)} + \overline{(C+D)}} \quad 5$$

(b) Reduce the following expressions using K-Map:

(i) $F = \Pi\, M(1, 2, 5, 6, 8, 9, 10)$

(ii) $f = \Sigma(0, 1, 4, 5, 7, 13, 14, 15)$.

Realise the obtained expressions using NAND/NOR logic. 10

2. (a) Explain the working of TTL NAND gate. Also explain Tristate logic. 9

(b) Explain how CMOS logic gates can be interfaced with TTL logic gates. 6

UNIT–II

3. (a) Design a full subtractor. 5

(b) State and explain the working of four bit BCD adder with its logic diagram. 10

4. (a) What is multiplexer? Explain working of 8 : 1 Multiplexer. How can 16:1 MUX be designed using 8 : 1 Mux and OR gate? 8

(b) Design an even parity checker. 4

(c) Design a two bit comparator. 3

UNIT–III

5. (a) Differentiate between : 3

(i) Sequential circuits and Combinational circuits.

(ii) Level Trigerring and Edge Triggering.

(b) What are flip-flops? Explain race around condition of JK flip-flop. Also describe how is it removed by master slave flipflop? 6

(c) Convert J-K flip-flop to D Flip-Flop. 6

6. (a) Design a decade synchronous counter. 9

(b) Design a bidirectional shift register. Explain its working. 6

UNIT–IV

7. (a) Write down the characteristics of D/A converters. Explain them. 6

(b) Explain the working of dual slope ADC. 9

8. (a) Write note on ROM. Explain with the help of timing diagrams the read and write operation occurring in semiconductor memory. 10

(b) Differentiate between PAL and PLA. 5