Roll No. ..... Total Pages : 03

BT-3/D-22 43140

COMPUTER SCIENCE AND ENGINEERING

Digital Electronics

ES-207-A

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) Convert the following decimal numbers in binary : 2

   (i) 28.6

   (ii) 31.567.

   (b) Perform the following operations using 2's complement : 5

   (i) 48 – 23

   (ii) 23 – (– 67).

   (c) Explain the conversion of AND operation into OR operation with the help of De-Morgan theorem. 5

   (d) Simplify (A + B)(A′ + C) to minimum number of literals. 3

2. (a) Explain the different properties of logic families. Explain the working of TTL NAND gate. 7

(b) Minimize the expression using K-Map $F = \Pi M(1, 2, 5, 6, 8, 9, 10) . d(3, 7, 15)$. Also realize the obtained expression using AOI logic. **8**

Unit II

3. (a) State and explain the working of BCD adder with its logic diagram. **10**

(b) Design a 3-to-8 decoder. **5**

4. (a) Design a 3 bit odd parity generator. **5**

(b) What do you mean by multiplexer ? Explain the working of n : 1 mux. Design a multiplexer tree for 32 1 mux using 8 : 1 and 2 : 1 mux. **10**

Unit III

5. (a) Explain the working of J-K flip-flop. What is race around condition in J-K flip-flop ? How can it be solved by master slave flip-flop ? **8**

(b) Convert S-R flip-flop in D flip-flop. **7**

6. (a) Design a synchronous mod-6 counter. Use J-K flip-flop for designing the counter. **8**

(b) What do you mean by register ? Draw and explain the logic diagram of serial in serial out shift right register. **7**

Unit IV

7. (a) Explain the working of R-2R ladder Digital to Analog Converter. 8

   (b) Describe the working of successive approximation type ADC. 7

8. (a) Draw the diagram of basic RAM cell. Explain SRAM and DRAM memories. Also describe, how read and write operations occur in RAM. 8

   (b) Draw the block diagram of memory device. Mention the working of ROM. Also draw diagram showing ROM array. 7