

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 :
 $F = \prod M(1, 2, 5, 6, 8, 9, 10) \cdot d(3, 7, 15)$.
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

