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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**

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(b) Minimize the expression using K-Map : F = II 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