## 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**