

**Third Semester B. E. (Computer Science and Engineering)
Examination**

DIGITAL CIRCUITS AND FUNDAMENTALS OF MICROPROCESSOR

Time : 3 Hours]

[Max. Marks : 60

Instructions to Candidates :—

- (1) Assume suitable data wherever necessary.
- (2) Due credit will be given to neatness and adequate dimensions.
- (3) Illustrate your answers wherever necessary with the help of neat sketches.

1. (a) Simplify the following expression using k-map.

$$F = \pi M(0, 2, 3, 8, 9, 11, 13, 16, 18, 21, 25, 27, 29, 31) \cdot d(10, 15, 24, 26)$$

4 (CO 1)

OR

- (b) Perform the following binary operations :

(i) $27.125 + 35.625$

(ii) $11.75 - 26.25$ (using 2's complement method) 4 (CO 1)

- (c) Implement the following Boolean expression using NAND and NOR gate (without reducing function)

$$F = (A + BC)(B + CA) \quad 6(\text{CO } 1)$$

2. (a) Describe the design and implementation of BCD subtractor using 9's complement method. Also give one example of it. 6 (CO 2)

- (b) Explain the concept of decoder. Design full adder using decoder. 4 (CO 2)

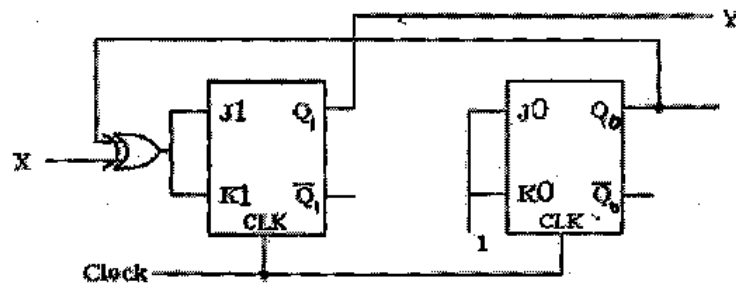
OR

- (c) Design a combinational circuit where input is 4 bit binary number and output is its 2's complement. 4 (CO 2)

3. (a) Elaborate the concept of Race around condition. 4 (CO 3)
- (b) Design the overlapping sequence detector which takes input as stream of 0s and 1s and gives output as one when sequences "111" or "000" are detected with one bit overlapping. 6 (CO 3)

OR

- (c) Draw the state diagram for the following circuit.



6 (CO 3)

4. (a) Design and implement synchronous 3 bit up/down counter using T flip-flop. 6 (CO 3)
- (b) What are shift registers ? Also give its types. 4 (CO 3)
5. (a) Explain types of RAM. Design 128K×8 size RAM using 64K×8 RAM. 5 (CO 4)
- (b) What do mean by PLD ? Explain any one in detail with example. 5 (CO 4)

OR

- (c) Design BCD to seven segment code convertor using ROM. Specify the size of ROM. 5 (CO 4)
5. (a) Explain the following terms :—
- (i) ALE
 - (ii) RST 6.5
 - (iii) TRAP

(iv) RRC

(v) DAD.

5 (CO 4)

- (b) Find the negative numbers in a block of data. The length of block is stored in memory location 2200H and the block itself begins in memory location 2201H. Store the count of total number of negative numbers in memory location 2300H.

5 (CO 4)