VIT
Vellore Institute of Technology

SCHOOL OF ELECTRONICS ENGINEERING

Fall Semester 2019-2020

CAT- I

Course: ECE2003 Digital Logic Design B.Tech (ECE)

Time: 90 mins Slot: B1 Max.Marks:50

Answer **ALL** Questions

1. a) Perform the following using 2's complement method [5 marks]

   i) $(18)_{10} - (35)_{10}$

   ii) $(42)_{10} - (27)_{10}$

   b) Perform the following number system conversions [5 marks]

   i) Convert $(63.547)_{10}$ to binary

   ii) Convert $(47.356)_8$ to hexadecimal

2. a) Simplify the following expression to minimum literals using Boolean algebra [5 marks]

$$Y(A,B,C) = (A' + B)(A + B + C)C'$$

   b) Write the following Boolean expression in canonical POS form [5 marks]

$$F(A,B,C,D) = (A + B')(C + D)(B + C')$$

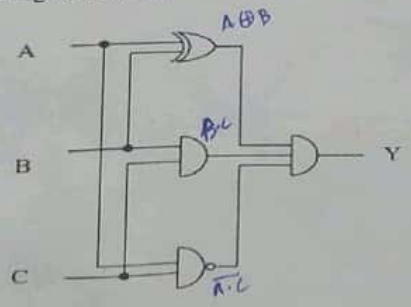
3. Minimize the following expression using K-map and implement the circuit. Write the truth table and draw the circuit diagram. [10 marks]

$$Y(A,B,C,D) = \sum_m (0,1,3,5,6,7,11,13,14) + \sum_d (2,4,8,10)$$

4. a) Implement the full subtractor circuit using minimum number of two input NOR gates alone. Write the truth table, logic expression and draw the circuit diagram. [5 marks]

   b) A bulb in a staircase has two switches, one switch being at the ground floor and the other one at the first floor. The bulb can be turned ON and also can be turned OFF by any one of the switches irrespective of the state of the other switch. Write the truth table and implement the circuit [5 marks]

5. Analyze the circuit given below. [10 marks]



   i) Write the Boolean expression for the given circuit

   ii) Write the truth table to represent the output function.

   iii) Implement the circuit using only two input NAND gates