BENNETT UNIVERSITY

Enrollment No.: E22CSEU0827 Name: MADHAV GUPTA

Department/School: SCSET

Mid Semester Examination, Even Semester 2022-23

Course Code: CSET-105 **Max. Time Duration:** 1 hour

Course Name: Digital Design **Max. Marks:** 15

WRITE YOUR BATCH NUMBER ON THE TOP OF FRONT PAGE OF YOUR ANSWERSHEET

Instructions:

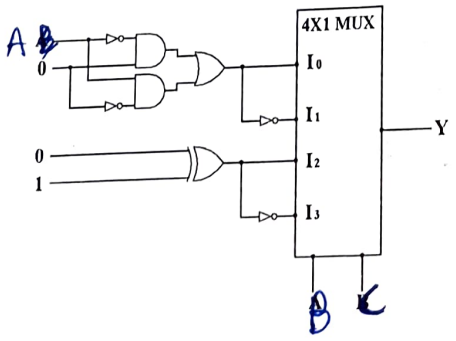
1. Do not write anything on the question paper except name, enrolment number and school.
2. Carrying mobile phone, smart watch and any other non-permissible materials in the examination hall is an act of UFM.

(1 * 5 = 5 Marks)

1. **Attempt all the questions.**
   a. Calculate the values of '*a*' and '*b*' in the below equality:
   $(1011101.10101)_2=(a)_8=(b)_{16}$
   b. Find the value of '*x*' in the below equation:
   $(47)_8 = (103)_x$
   c. Write the sign magnitude 1's complement representation of $(-13)_{10}$ and $(+15)_{10}$ in **8-bits** binary format.
   d. Evaluate the Excess-3 equivalent code of the decimal number $(213)_{10}$.
   e. Convert the decimal number $(51)_{10}$ into corresponding Gray code representation.

(2*2 = 4 Marks)

2. **Attempt all the questions.**
   a. Calculate $(11111)_2 - (1000)_2$ using 2's complement method.
   b. Find the output function Y(A,B,C) of digital design given below:



(3*2 = 6 Marks)

3. **Attempt all the questions.**
   a. A student wanted to develop a circuit using XOR gate. He went to a shop to purchase XOR gates. By any mistake the student carried NAND gates with him instead of XOR. Can you suggest a method to realize XOR gate using NAND gates? Design a 'Full Subtractor' using XOR and fundamental gates with the help of its truth table. (Marks distribution: 1+2)

   b. Using K-map simplification method, obtain the minimal SOP of the following function:
   $F(A,B,C,D) = \Sigma m\,(3,4,7,9,13,14) + \Sigma d\,(5,15)$