

Enrollment No.: _____ Name: _____
 Department/School: _____

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. Attempt all the questions.

(1 * 5 = 5 Marks)

- 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 $(213)_{10}$.

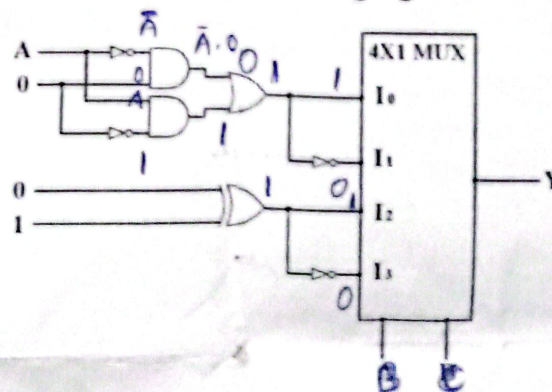
- e. Convert the decimal number $(51)_{10}$ into corresponding Gray code representation.

2. Attempt all the questions.

(2*2 = 4 Marks)

- 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. Attempt all the questions.

(3*2 = 6 Marks)

- 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:

$$F(A,B,C,D) = \sum m(3,4,7,9,13,14) + \sum d(5,15)$$