Air University
Mid Semester Examination Spring-2023

Student Id: _____

Subject:- Digital Logic Design
Course Code:- EE-223
Class:- BSCYS
Semester:- Spring-2023
Section(s):- BSCYS-2 A,B

Total Marks:- 100
Date:- 03/04/23
Time: 11:30 -13:30 p.m.
Max Time Allowed: 2 hrs.
FM(s) Name:- Hussain Asif
FM Signature:

Special Instructions: Calculators are allowed. Attempt all questions.

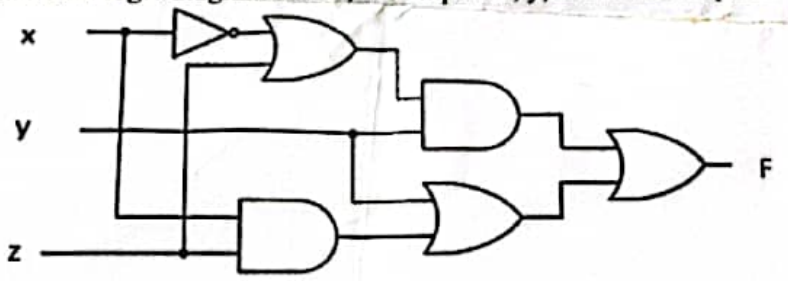
Question: 1 (CLO1) **(25 Marks)**

Answer the following questions

1. Convert $(0.6875)_{10}$ to binary. (5)
2. Given the two binary numbers X = 1010100 and Y = 1000011, perform the subtraction, (a) X - Y & (b) Y - X , by using 2's complements. (5+5)
3. Convert the following:
   a. 1010 gray to binary
   b. 1000 binary to gray (5+5)

Question: 2 (CLO 2) **(30 Marks)**

Given the combinational logic diagram below, with inputs x, y, and z and output F



a. Construct the truth table for this logic diagram
b. Find the most simplified Boolean function using K map and draw the combinational logic diagram for the simplified Boolean function.

Question: 3 (CLO 3) **(20 Marks)**

Implement a 3x8 Decoder circuit diagram using NAND gates only.
Your design should include Truth Table and logic equations.

Question: 4 (CLO 4) **(25 Marks)**

Design a logic circuit that has 4 different inputs, (W, X, Y, Z) and 2 outputs (A, B). The circuit works as follows:

- Output A will only be 1 if the input (WXYZ) value is greater than 7, otherwise it is 0.
- Output B will only be 0 if the input is equal to 8, otherwise it is 1.

Your design should include; Truth Table, K-maps, logic equations. Make sure the Logic Diagram you propose for the outputs is the MOST OPTIMISED, with least number of components.