

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
Department of Computer Science and Engineering (CSE)

MID SEMESTER EXAMINATION**SUMMER SEMESTER, 2017-2018****DURATION: 1 Hour 30 Minutes****FULL MARKS: 75****CSE 4205: Digital Logic Design**

Programmable calculators are not allowed. Do not write anything on the question paper.
 There are 4 (four) questions. Question No.4 is **mandatory**. Answer any 2 (two) from the remaining questions.

Figures in the right margin indicate marks.

1. a) Design the proper switching circuit for the given Boolean expression: 6

$$F(A,B,C,D) = ABD' + ACD' + ABCD'$$
- b) Assign a binary code in some orderly manner to the 52 playing cards. Use the minimum number of bits. (The four suits of cards are Clubs, Diamonds, Hearts, and Spades.) 7
- c) Find the complement of $F = x + yz$; then show that $F.F' = 0$ and $F + F' = 1$. 12
2. a) Why is Gray Code known as 'Cyclic Code'? Is Gray code weighted or non-weighted code? Explain your answer for 3-bit Gray code. 7
- b) Determine the base of the numbers in each case for the following operations to be correct: 6
 - i. $(34 \times 2) \times 13 = 5$
 - ii. $353 - 16 = 33A$
- c) Reduce the following Boolean Expressions to a minimum number of literals using the postulates and theorems of Boolean Algebra. Then draw the logic diagrams of the circuit that implement the original and simplified expressions: 6×2
 - i. $A'B(D'+C'D) + B(A+A'CD)$
 - ii. $X' + Y' + XYZ'$
3. a) Why does replacing 0's with 1's and 1's with 0's give us the 1's complement of a binary number? 5
- b) Consider X,Y,Z as Input signals of logic gates. Draw the output signal of the following logic gates: 1.5×4
 - i. OR gate
 - ii. NAND-gate
 - iii. NOR gate
 - iv. XOR gate

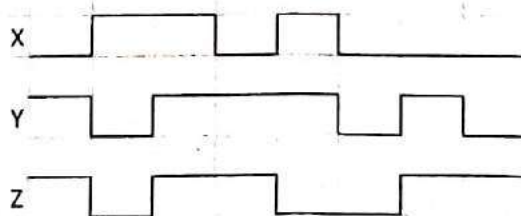


Figure 1: Figure for Question 3.(b)

- c) Obtain the truth table of the following function and express the function in canonical SOP and POS form: 4+5+5

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

[Mandatory]

4. a) Use the Quine-McCluskey tabular minimization method to minimize the function 15

$$F(A,B,C,D) = \sum m(0,3,5,6,7,10,12,13) + \sum d(2,9,15)$$
- b) Use a Karnaugh map to simplify the following Boolean function: 10

$$F(A,B,C,D) = \sum m(0,1,2,3,8,10,11,12,14)$$