JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATIONS-2022

B.Tech-III Semester (**ECM**)

COURSE CODE (CREDITS): 20B11EM312 (3)

COURSE NAME: DIGITAL ELECTRONICS MAX. MARKS: 15

COURSE INSTRUCTORS: Dr. Harsh Sohal MAX. TIME: 1 Hour

Note: *All questions are compulsory. Marks are indicated against each question in square brackets.*

Q1. [CO1]

(a) Express the following numbers into decimal: [1.5]

i. $(10001.101)_2$ ii) $(67AC.B)_{16}$ iii) $(342.54)_8$

(b) Obtain 1's complement and 2's complement of the following binary numbers. [1]

i) 11001101 ii) 01001001

(c) Perform the subtraction on the given unsigned numbers using 10's complement of the subtrahend. [1]

i) 2390-945 ii) 224-712

(d) Given X=(1101010)2 and Y = (0101011)2, i) find X-Y ii) find X-Y using 2's complement iii) find X-Y using 1's complement. [1.5]

Q2. [CO1]

(a) Reduce the following Boolean expression to a minimum number of literals using Boolean algebra postulates and theorems. [2]

i) (yz`+x`w)(xy`+zw`) ii) xyz+x`y+xyz`

(b) Take the complement of the reduced expressions obtained in (a) and implement that using basic logic gates. (Draw suitable diagrams). [2]

Q3. [CO1, CO2]

a) Express the function F=A+B`C in to standard SOP form. [1.5]

b) Express the function F=xy+x`z as standard POS form. [1.5]

Q4. [CO2]

Minimize the expression $F(A,B,C,D) = \sum(0,1,2,4,5,6,8,9,12,13,14)$ using K-map method. Implement the reduced expression in POS form (with basic logic gates). [3]