EAST WEST UNIVERSITY
Department of Computer Science and Engineering
B.Sc. in Computer Science and Engineering Program
Mid Term I Examination, Spring 2022 Semester

Course:	**CSE 345 Digital Logic Design, Section-2**
Instructor:	**Musharrat Khan, Senior Lecturer, CSE Department**
Full Marks:	**40 (20 will be counted for final grading)**
Time:	**1 Hour and 25 Minutes (Including Submission)**

Note: There are FIVE questions, solve ALL of them. Course Outcome (CO), Cognitive Level and Mark of each question are mentioned at the right margin.

---

1. **Perform** the following operations using binary arithmetic: [CO1,C2, Mark: 8]

a) $146 + 76$
b) 2's complement of 153
c) $(10111101) - (01111110)$ [Consider both the numbers as 2's complement signed number]
d) $(010101101) + (111110011)$ [Consider both the numbers as 2's complement signed number]

2. **Prepare** truth table for the following Boolean function and also **determine** the complement of the Boolean function [Do not change the form of the given expression]: [CO1,C2, Mark:6+6=12]

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

3. **Use** algebraic method to determine CPOS and CSOP expression for the following non-standard expression: [CO1,C3, Mark: 4+4=8]

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

4. **Use** K-map method to simplify the following Boolean function as SOP expression: [CO1,C3,EP1 Mark: 6]

$$F(A,B,C,D) = \sum(0,3,4,12,14) + \sum_{d.c.}(1,6,7,8,9,11)$$

5. **Use** K-map method to simplify the following Boolean function as POS expression: [CO1,C3,EP1 Mark: 6]

$$F(A,B,C,D) = \prod(2,5,10,13,15) \cdot \prod_{d.c.}(1,6,7,8,9,11)$$