



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) $133 + 75$
 - b) 2's complement of 148
 - c) $(10111101) - (01110101)$ [Consider both the numbers as 2's complement signed number]
 - d) $(001111011) + (111110111)$ [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]

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

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

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

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

$$F(A, B, C, D) = \sum (5,6,8,12,15) + \sum_{d.c.} (0,2,7,10,13,14)$$

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

$$F(A, B, C, D) = \prod (1,3,4,9,11) \cdot \prod_{d.c.} (0,2,7,10,13,14)$$