



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-3
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) $193 + 37$
 - b) 2's complement of 129
 - c) $(-158) - (119)$ [Consider both the numbers as 2's complement signed number]
 - d) $(-99) + (-74)$ [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]

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

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

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

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

$$F(A, B, C, D) = \sum (3, 9, 11, 12) + \sum_{d.c.} (1, 2, 4, 5, 7, 14, 15)$$

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

$$F(A, B, C, D) = \prod (0, 6, 8, 10, 13) \cdot \prod_{d.c.} (1, 2, 4, 5, 7, 14, 15)$$