



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) $159 + 74$
 - b) 2's complement of 195
 - c) $(-158) - (114)$ [Consider both the numbers as 2's complement signed number]
 - d) $(-78) + (-97)$ [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]

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

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

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

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

$$F(A, B, C, D) = \sum (2, 6, 11, 12) + \sum_{d.c.} (3, 4, 10, 14)$$

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

$$F(A, B, C, D) = \prod (0, 1, 5, 7, 8, 9, 13, 15) \cdot \prod_{d.c.} (3, 4, 10, 14)$$