



**EAST WEST UNIVERSITY**  
**Department of Computer Science and Engineering**  
**B.Sc. in Computer Science and Engineering Program**  
**Mid Term I Examination, Fall 2021 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.

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1. **Perform** the following operations using binary arithmetic: [CO1,C2, Mark: 8]
  - a)  $149 + 67$
  - b) 2's complement of 153
  - c)  $(10111101) - (01001110)$  [Consider both the numbers as 2's complement signed number]
  - d)  $(010101101) + (111001111)$  [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]
 
$$F(A, B, C, D) = (D' + AC)(AB' + C')B + BD'(A' + D) + C'$$
  
3. **Use** algebraic method to determine CPOS and CSOP expression for the following non-standard expression: [CO1,C3, Mark: 4+4=8]
 
$$F(A, B, C, D) = (B'C + A'D)(A' + B' + D')C'$$
  
4. **Use** K-map method to simplify the following Boolean function as POS expression: [CO1,C3,EP1 Mark: 6]
 
$$F(A, B, C, D) = \sum (0,1,3,5,7,8,14) + \sum_{d.c.} (4,9,10,11,15)$$
  
5. **Use** K-map method to simplify the following Boolean function as SOP expression: [CO1,C3,EP1 Mark: 6]
 
$$F(A, B, C, D) = \prod (2,6,12,13) \cdot \prod_{d.c.} (4,9,10,11,15)$$