09 December, 2021

EAST WEST UNIVERSITY
Department of Computer Science and Engineering
B.Sc. in Computer Science and Engineering Program
Mid Term II 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 SIX questions, answer ALL of them. Course Outcome (CO), Cognitive Level and Mark of each question are mentioned at the right margin.

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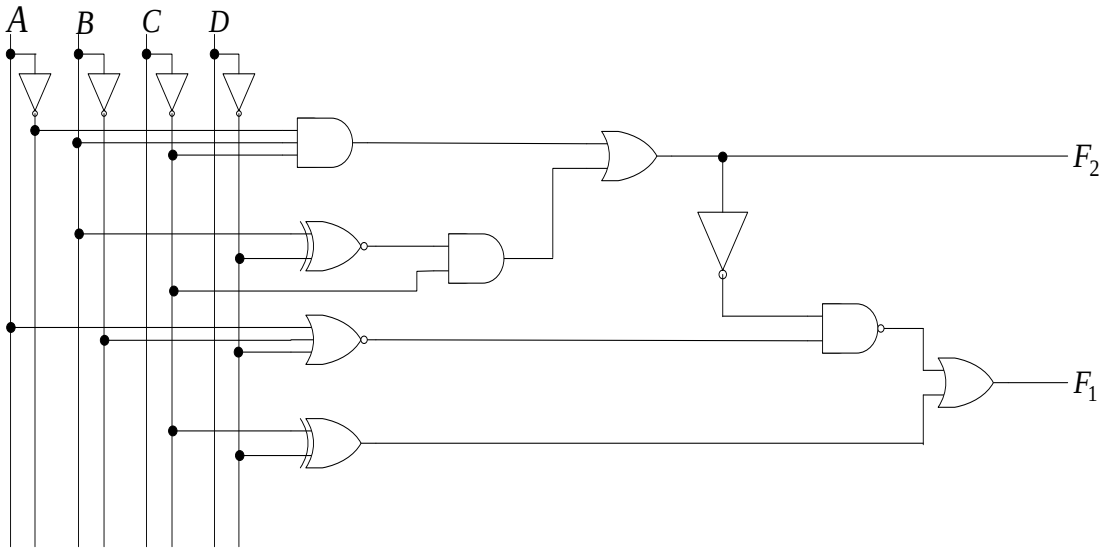
1. Consider that $ABCD$ are 4-bit inputs and X is 1-bit output of a combinational circuit. The output is $X = 1$ if the sum of the four inputs is greater than or equal to 2; otherwise $X = 0$. **Design** the combinational circuit. [CO3,C3, EP1,EP2, Mark: 6]

2. **Analyze** the following circuit by writing the Boolean expression of the outputs. [CO2,C4, EP1, Mark: 8]



3. **Design** a full-adder using only AND, EXOR, and OR gates. [Draw block diagram, construct truth table, determine Boolean equations of outputs, and draw logic diagram] [CO3,C3, Mark: 6]

4. **Design** a 4 × 16 Decoder for active-LOW outputs. [Draw block diagram, construct truth table, determine Boolean equations of outputs, and draw logic diagram] [CO3,C6, Mark: 6]

5. **Construct** a combinational circuit using an 8×1 MUX for implementing the following Boolean function. [Properly label all the inputs and outputs] [CO3,C6, EP1,EP2, Mark: 6]

$$F(A, B, C, D) = \prod(1,4,6,7,10,12,15)$$

6. **Write** a behavioral Verilog code to design the following Boolean function using Procedural technique using case statement. [CO3,C6, EP1,EP2, Mark: 8]

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