



United International University
Department of Computer Science and Engineering
CSE 225 / CSE 1325: Digital Logic Design, Mid Exam, Summer 2021

Total Marks: 20

Time: 1 hour + 15 minutes (For uploading)

“Any examinee found adopting unfair means will be expelled from the trimester / program as per UIU disciplinary rules.”

Answer all of the questions from 1 to 6

1. The number given below is represented in BCD.

101110110.01011

→ (B0.7)-

Convert the number to hexadecimal(base 16) representation.

[2]

2. For the following function: i) Find all the Prime Implicants, ii) Find all the Essential Prime Implicants and iii) Find a simplified expression in Sum of Products using selection rule. [5]

$$F(A, B, C, D) = \prod M(5, 9, 10, 12, 15) + \sum d(0, 1, 2, 3, 8)$$

3. For the following function find the minimized Product of Sums expression using K-map with don't care conditions: $\sum d(0, 1, 6)$. [4]

$$F(P, Q, R, S) = (P + \overline{Q} + R)(\overline{P} + \overline{Q} + \overline{R})(\overline{Q} + \overline{S})$$

4. You have to design a digital system with 3-bit binary number as input. This system displays the total number of 1's present in the input. So if input is 111, output will be 3 and if input is 000, then output will be 0. Draw the truth table and represent the output functions in Product Of Maxterms(POM) format. [3]

5. Determine whether the following function is self-dual or not. [3]

$$F(A, B, C) = \sum_m(0, 1, 2, 4)$$

[Hint: Find the dual of the function and then use boolean algebra to convert it to original function]

6. Simplify the following function to a minimum number of literals using boolean algebra [3]

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