National Institute of Technology, Delhi

Name of the Examination: B. Tech. Mid-Semester Examination-2022

Branch	: EEE	Semester	: 4th
Title of the Course	: Digital Electronics & Logic Design	Course Code	: CSB 254

Time: 1.5 Hours   Maximum Marks: 25

Note: Attempt any complete five questions.

Q1. All questions are compulsory.

1x5=5

(a) What is Base or Radix of binary number system?
(b) What is ASCII code for D?
(c) Calculate GRAY code for decimal no. 12.
(d) Under what conditions the output of a two input AND gate is one?
(e) Name the device which can ADD, AND, SHIFT left.

Q2(a). What is the largest binary number that can be expressed with 16 bits? What are the equivalent decimal and hexadecimal numbers?   2

Q2(b). Design a full subtractor logic circuit.   3

Q3(a). Realize the following function F (A, B, C, D) = $\sum m$ (1,3,4,10,11,12,13) using (i) 4 X 1 MUX (ii) 8 X 1 MUX   3

Q3(b). Differentiate between ROM and RAM   2

Q4(a). Using Boolean algebra prove that (A + B) (A'+C) = AC +A'B.   2

Q4(b) Given X= 3810 and Y= 10510. Using 2's complement method calculate (i) X-Y (ii) Y-X 3

Q5(a). Design a combinational circuit with three inputs and one output using following condition- The output is 1 when the binary value of the input is less than 3. The output is 0 otherwise.   3

Q5(b). Minimize the Boolean expression F=AB'C'+C'D+BD'+A'C using K -map and implement the logic circuit using NAND gates only.   2

Q6. Simplify the following Boolean function F, together with the don't-care conditions d, and then express the simplified function in sum-of-minterms form:
$F(x,y,z) = \sum(0,1,4,5,6)$ $d(x,y,z) = \sum(2,3,7)$ 1x5=5