HILL UNIVERSITY
Established by an Act of the State Legislature of Uttarakhand (Adhiniyam Sankhya 12 of 2011)
University under section 2(f) of UGC Act, 1956

Term Evaluation (Odd) Semester Examination September 2025

Roll no.... [redacted]

Name of the Course: Bachelor of Computer Applications
Semester: IIIrd
Name of the Paper: Digital Logic Design
Paper Code : TBC 303

Time: 1.5 hour **Maximum Marks: 50**

Note:
(i) Answer all the questions by choosing any one of the sub-questions
(ii) Each question carries 10 marks.

Q1. (10 Marks)

a. Perform following conversions (CO1)

(i) $(110101)_2 \rightarrow (\_\_\_\_)_{10}$
(ii) $(737)_8 \rightarrow (\_\_\_\_)_2$
(iii) $(CF3)_{16} \rightarrow (\_\_\_\_)_8$
(iv) $(245)_{10} \rightarrow (\_\_\_\_)_{16}$

OR

b. Perform the subtraction $(110011)_2 - (101001)_2$ using 2's complement method and verify the result using direct binary subtraction. (CO1)

Q2. (10 Marks)

a. Simplify the Boolean expression using theorems only (CO2)

Y= AB +ABCD'+ABC'+ ABC'D'

OR

b. Express the following function in canonical SOP and POS form (CO1)

Y= A+B'C

Y= (A+B) (A+C')

Q3. (10 Marks)

a. Represent the decimal number 130 in BCD and Gray code. Verify that the Gray code is known as unit distance code. (CO1)

OR

b. Minimize the following Boolean function using K-map method: (CO2)

F(A,B,C,D) = Σm (0,2,3,8,10,11,12,14)

Q4. (10 Marks)

a. Prove NAND is a universal gate by implementing all basic gates using only NAND gate. (CO2)

OR

b. Use K-map to minimize: (CO2)

F(A,B,C,D) = πM(1,2,3,7,8,9,11,15).

Q5. (10 Marks)

a. Realize the following Boolean expression using only NAND gates: (CO2)

F(A,B,C) = AB' + A'C.

OR

b. Prove Demorgan's theorem with the help of truth tables. (CO2)