Graphic Era
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

End Term (Odd) Semester Examination November 2025

Roll no.

Name of the Course: B.Tech(CSE)
Semester: IIIrd
Name of the Paper: Logic Design & Computer Organization
Paper Code: TCS 308

Time: 3 hour

Maximum Marks: 100

Note:
(i) All the questions are compulsory.
(ii) Answer any two sub questions from a, b and c in each main question.
(iii) Total marks for each question is 20 (twenty).
(iv) Each sub-question carries 10 marks.

Q1. (2X10=20 Marks)
a. Minimize the 5-variable function F(A,B,C,D,E)=Σm(1,3,7,11,15,16,17,19,23,27,31) + d=Σm(2,6,10,14) using K-maps. (CO1)
b. Design a BCD adder. (CO1)
c. Design the Boolean expression F(A,B,C)=Σm(1,3,6,7) by using 4X1 MUX and 2X1MUX. (CO1)

Q2. (2X10=20 Marks)
a. Determine the characteristics equation and excitation table of JK and SR Flipflop. (CO2)
b. Draw and explain the circuit of 5 bit SISO. (CO3)
c. Convert JK flip-flop into D flip-flop. (CO2)

Q3. (2X10=20 Marks)
a. Draw and explain the circuit of MOD12 asynchronous counter using T flip flop. (CO3)
b. Analyze the sequential circuit whose excitation equations are shown below (assume two D flip-flops, Q_1 and Q_0):

$$D1=Q_0', D0=Q_1$$

- Derive the **state table** and **state diagram**.

- Verify by showing the sequence of outputs for clock pulses. (CO3)

c. Design a synchronous counter (using T flip flop) for a count sequence of 1, 3,6,7,1. (CO3)

Q4. (2X10=20 Marks)
a. Draw the flowchart of booth's algorithm. Perform following signed number multiplication operation:

-6 x4 (CO4)

b. Explain Amdahl's Law and Little's Law with suitable examples. (CO4)

c. Explain the difference between Von-Neumann and Non Von-Neumann architecture. (CO4)

Q5. (2X10=20 Marks)
a. Discuss the various Cache Mapping techniques. (CO5)
b. Explain Flynn's taxonomy with suitable examples. (CO6)
c. Describe memory hierarchy based on parameters like speed, size, complexity, and cost. (CO5)