Graphic Era HILL UNIVERSITY

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University under section 2(f) of UGC Act, 1956

Term Evaluation (Odd) Semester Examination September 2025

Roll no. 2419052

Name of the Course: B.Tech(CSE)
Semester: III[rd]
Name of the Paper: Logic Design & Computer Organization
Paper Code: TCS 308
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. *Minimize the 5-variable function* $F(A,B,C,D,E)=\Sigma m(1,3,7,11,15,16,17,19,23,27,31) + d=\Sigma m(2,6,10,14)$ *using K-maps.* (CO1)

OR

b. *Design a 4 bit binary adder- subtractor.* (CO1)

Q2. (10 Marks)

a. *Realize the function* $F(A,B,C) = AB + \bar{C}$ using NAND and NOR gates. (CO1)

OR

b. *Design the Boolean expression* $F(A,B,C)=\Sigma m(1,3,6,7)$ by using 4X1 MUX and 2X1MUX. (CO1)

Q3. (10 Marks)

a. Implement 2bit X 2bit binary Multiplier. (CO1)

OR

b. Using a 3×8 decoder, implement the two functions: $F1(A,B,C)=\Sigma m(1,2,5,7)$ and $F2(A,B,C)=\Sigma m(0,3,4,6)$. (CO1)

Q4. (10 Marks)

a. Explain the difference between a) Latch and Flip flop b) combinational and sequential circuits. (CO2)

OR

b. Design a T flip-flop using a JK flip-flop. Derive the logic equation and draw the circuit diagram. (CO2)

Q5. (10 Marks)

a. *Derive the characteristic equation and truth table of a D flip-flop. Show how it avoids the invalid state of an SR flip-flop.* (CO2)

OR

b. Derive the characteristic equations of SR, JK, D, and T flip-flops from their truth tables. (CO2)