

Day & Date: *Monday 11/08/2025*Time: *3:45 To 4:45*

Max Marks- 25

- Instructions: 1) All Questions are Compulsory
 2) The figures to the right indicate the maximum marks, Course Outcomes (COs), and Bloom's Taxonomy (BT) levels, respectively.
 3) Assume suitable data if not given
 4) Use of non-programmable calculator is allowed

		Marks	COs	BTL
Q.1 A	Analyze the operation of any two of the following logic family gate circuits, with suitable diagrams and waveforms where applicable: i. DTL NAND (4 marks) ii. TTL NAND (4 marks) iii. CMOS NOR (4 marks)	8	2	2,3
B	Explain, with a suitable example and diagram, any two of the following parameters of digital ICs in detail: i. Fan-out (2 marks) ii. Power dissipation (2 marks) iii. Noise Margin (2 marks)	4	1	1,2
Q.2 A	Implement the following Boolean function using: i) Basic Gates (2 marks) ii) NAND gates (4 marks) $F = BC + AC'$	6	3	3
Q.2 B	Simplify the following expressions using Boolean algebra techniques: i) $F = [A + (BC')' + CD]' + [(BC)']'$ (4 marks) ii) $F = AB + (AC)' + AB'C(AB + C)$ (3 marks)	7	4	4

OR

Using a Karnaugh map, obtain (i) the minimum Sum-of-Products expression and (ii) the minimum Product-of-Sums expression for the function given below. Also, implement the minimized expressions using logic gates.

$$F(A, B, C, D) = \sum_m (0, 1, 2, 8, 9, 10, 11, 14, 15)$$

