

Code: 23ES1304

**II B.Tech - I Semester – Regular / Supplementary Examinations
NOVEMBER 2025**

**DIGITAL LOGIC AND COMPUTER ORGANIZATION
(Common for CSE, IT)**

Duration: 3 hours

Max. Marks: 70

 Note: 1. This question paper contains two Parts A and B.

2. Part-A contains 10 short answer questions. Each Question carries 2 Marks.

3. Part-B contains 5 essay questions with an internal choice from each unit. Each Question carries 10 marks.

4. All parts of Question paper must be answered in one place.

BL – Blooms Level

CO – Course Outcome

PART – A

		BL	CO
1.a)	Represent $(-13)_{10}$ in 8-bit 2's complement form.	L2	CO1
1.b)	Prove the theorem $X \cdot X = X$	L3	CO3
1.c)	Describe four-bit half-adder circuit.	L2	CO1
1.d)	Draw SR latch with control input logic diagram and truth table.	L2	CO4
1.e)	What is a stack pointer?	L2	CO2
1.f)	What happens when sum of two decimal numbers in BCD exceed 9?	L1	CO1
1.g)	Define the term “volatile memory.”	L1	CO1
1.h)	What is the role of page table in virtual memory?	L1	CO1
1.i)	Differentiate between input and output devices.	L2	CO2
1.j)	What is a priority interrupt?	L1	CO2

PART – B

			BL	CO	Max. Marks
UNIT-I					
2	a)	What is the use of Complements? Explain 9's and 10's Complements with examples.	L2	CO1	5 M
	b)	Explain boolean algebra theorems with proofs.	L2	CO3	5 M
OR					
3	a)	Describe the signed binary numbers in digital design.	L2	CO1	5 M
	b)	What is meant by Sum of Minterms? Express the Boolean function $F = A + \bar{B}C$ in Sum of Minterms.	L3	CO3	5 M
UNIT-II					
4	a)	What are the steps to be followed obtain the output Boolean functions of a combinational circuit from its logic diagram?	L2	CO1	5 M
	b)	Describe the universal shift register.	L2	CO4	5 M
OR					
5	a)	What is the use of Decoder in digital system? Construct 3X8 decoder using its truth table.	L3	CO1	5 M
	b)	Explain the working of a 4-bit asynchronous ripple counter using T flip-flops with timing diagrams.	L2	CO4	5 M

UNIT-III					
6	a)	Explain memory stack with suitable example.	L2	CO2	5 M
	b)	Explain Booth's multiplication algorithm with step-by-step example.	L3	CO1	5 M
OR					
7	a)	Explain addressing modes in brief.	L2	CO2	5 M
	b)	Discuss decimal subtraction using 9's and 10's complements with examples.	L2	CO1	5 M
UNIT-IV					
8	a)	Describe the read and write operations of associative memory.	L2	CO1	5 M
	b)	Explain the concept of virtual memory and its need in modern systems.	L2	CO1	5 M
OR					
9	a)	Explain the need for auxiliary memory in computer systems.	L2	CO1	5 M
	b)	Explain the working of write-through and write-back policies in cache memory.	L2	CO1	5 M
UNIT-V					
10	a)	Describe the functional block diagram of an I/O module and explain its operation.	L2	CO2	5 M
	b)	Explain asynchronous data transfer with a neat diagram.	L2	CO2	5 M

OR					
11	a)	Discuss daisy-chaining priority interrupt with a neat diagram.	L2	CO2	5 M
	b)	Describe the working of a DMA controller with neat diagram.	L2	CO2	5 M