Reg. No …… Name ……..

BCA DEGREE END SEMESTER EXAMINATION - NOVEMBER 2025

UGP (HONS.) SEMESTER 1 – DISCIPLINE SPECIFIC COURSE

COURSE: 24UBCADCC101 – DIGITAL ELECTRONICS & COMPUTER ORGANIZATION

(For Regular 2025 & Improvement/Supplementary 2024 Admission)

Time: 2 Hours **Max. Marks: 70**

PART - A

Answer any 5 Questions. Each question carries 2 marks

1. Identify minterms and maxterms in Boolean Algebra (R, CO1)
2. State the associative property of Boolean operations (R, CO1)
3. State Demorgan's Law . (R, CO1)
4. Recall two differences between latch and flip-flop (U, CO3)
5. Enumerate two examples of combinational circuit (R, CO2)
6. Differentiate between hardwired and micro programmed control organization. (U, CO4)
7. Define DMA. (R, CO5)

(2 x 5 = 10)

PART - B

Answer any 6 questions. Each question carries 5 marks

8. Explain different types of computer registers present in the CPU. (U, CO4)
9. Implement the Boolean function F(A,B,C)=Σ(1,2,5,7) with simplified expression Using 3 variable K –Map (U, CO1)
10. Apply demultiplexers to implement a two-variable function. (U, CO2)
11. Explain the working of a T flip-flop with a truth table (U, CO3)
12. Analyze and simplify F(A,B,C)=Σ(1,3,5,6,7) using a K-map (U, CO1)
13. Illustrate and explain the memory hierarchy. (U, CO5)

14. Convert $(736)_8$ to binary, subtract $(1F)_{16}$ from it in binary form, and finally express the result in decimal. (U, CO1)

15. Illustrate the Commutative Law and the Distributive Law of Boolean algebra (U, CO1)

(5 x 6 = 30)

PART C

Answer any 3 questions. Each question carries 10 Marks

16. Discuss, with a neat diagram, the general architecture of a computer. (U, CO4)

17. Illustrate the seven logic gates by drawing their standard symbols, writing their Boolean expressions, and constructing their truth tables. (U, CO2)

18. Evaluate the performance of synchronous counters compared to asynchronous (U, CO3)

19. Construct both SOP and POS forms for F (A, B, C) =Σ(2,3,5,7), simplify them, and verify equivalence with a truth table (U,CO1)

(10 x 3 = 30)

OBE: Questions to Course Outcome Mapping

CO	Course Outcome Description	CL	Questions	Marks
CO1	Apply digital number systems and binary arithmetic operations, including complements and conversions.	U	2, 4, 15, 16	11
CO2	Understand and simplify Boolean Algebra expressions using canonical forms, K-maps, and logic gate implementations	A	7, 9, 11, 14, 17	14
CO3	Analyze and design combinational and sequential circuits using logic gates, flip-flops, registers, and counters.	A	3,6,8,12,18	14
CO4	Explain basic computer organization, instruction formats, addressing modes, and pipelining.	U	5,13,19	9
CO5	Evaluate memory hierarchy, cache performance, and I/O organization techniques.	U	1,10	6

Cognitive Level (CL): Cr - CREATE; E - EVALUATE; An - ANALYZE; A - APPLY; U - UNDERSTAND; R - REMEMBER;