Reg. No. | | | | | | | | |

G. VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS), KOVILPATTI – 628 502.

UG DEGREE END SEMESTER EXAMINATIONS - NOVEMBER 2025.
(For those admitted in June 2023 and later)

PROGRAMME AND BRANCH: B.C.A.

SEM	CATEGORY	COMPONENT	COURSE CODE	COURSE TITLE
IV	PART-III	ELECTIVE GENERIC-4	U23CA4A4	DIGITAL LOGIC FUNDAMENTALS

Date & Session:07.11.2025/FN **Time: 3 hours** **Maximum: 75 Marks**

Course Outcome	Bloom's K-level	Q. No.	**SECTION – A (10 X 1 = 10 Marks)** **Answer ALL Questions.**
CO1	K1	1.	Which of the following is a universal logic gate? a) AND b) OR c) NOR d) NOT
CO1	K2	2.	Which Boolean law states: A + 0 = A? a) Identity Law b) Complement Law c) Domination Law d) Idempotent Law
CO2	K1	3.	What is the binary equivalent of the decimal number 37? a) 100101 b) 101001 c) 110101 d) 100011
CO2	K2	4.	The Don't Care conditions in a Karnaugh Map are used to a) Make the Boolean expression more complex b) Represent undefined or unused combinations c) Increase the number of variables d) Represent binary values
CO3	K1	5.	What is the base of the hexadecimal number system? a) 8 b) 16 c) 10 d) 2
CO3	K2	6.	How is a Boolean function represented in the Product-of-Sums (POS) form? a) AND of OR terms b) OR of AND terms c) XOR of OR terms d) NOR of AND terms
CO4	K1	7.	Which of the following is a combinational circuit used for binary addition? a) Decoder b) Multiplexer c) Half Adder d) Flip-Flop
CO4	K2	8.	What is the sum of $(1011)_2 + (1101)_2$ in binary? a) 10100 b) 11000 c) 11100 d) 10000
CO5	K1	9.	Which component is responsible for performing arithmetic and logic operations in a CPU? a) Control Unit b) Register c) ALU d) Decoder
CO5	K2	10.	In an Adder-Subtractor circuit, what determines whether the circuit performs addition or subtraction? a) Control bit b) Carry bit c) Overflow bit d) Sign bit
Course Outcome	**Bloom's K-level**	**Q. No.**	**SECTION – B (5 X 5 = 25 Marks)** **Answer ALL Questions choosing either (a) or (b)**
CO1	K3	11a.	Derive the truth table for an Ex-OR gate and its Boolean expression. **(OR)**
CO1	K3	11b.	Define the significance of Boolean laws and theorems with examples.

CO2	K3	12a.	Define a "Don't Care" condition in K-map simplification and explain its role with an example. **(OR)**
CO2	K3	12b.	Simplify the Boolean expression F(A, B, C) = Σ(1, 2, 4, 5, 6) using Karnaugh map and draw the simplified circuit.
CO3	K4	13a.	Discuss the steps involved in converting a decimal number to binary. **(OR)**
CO3	K4	13b.	Convert Binary Number $(1010101)_2$ to Decimal Number and Convert Decimal Number $(98)_{10}$ into Binary.
CO4	K4	14a.	Define octal and hexadecimal numbers and explain their conversion to binary with an example **(OR)**
CO4	K4	14b.	Do addition and subtraction as followings a)101011+10101 b) $(22)_{10}$-$(23)_{10}$
CO5	K5	15a.	Explain 2's complement representation and its application in digital arithmetic operations. **(OR)**
CO5	K5	15b.	Examine the Half adder circuit with Truth table.

Course Outcome	**Bloom's K-level**	**Q. No.**	**SECTION – C (5 X 8 = 40 Marks)** **Answer ALL Questions choosing either (a) or (b)**
CO1	K3	16a.	Explain the working of NOT, OR, and AND gates with their truth tables and Boolean expressions. Discuss their practical applications. **(OR)**
CO1	K3	16b.	Briefly explain the Boolean Laws and theorems.
CO2	K4	17a.	Explain the Sum-of-Products method, the concept of pairs, quads, and octets in Karnaugh maps, and their use in simplification. **(OR)**
CO2	K4	17b.	To solve the K-Map F (P, Q, R, S) = πM (3, 5, 7, 8, 10, 11, 12, 13)
CO3	K4	18a.	Define the Product-of-Sums method and explain the process of simplifying Boolean expressions using it with an example. **(OR)**
CO3	K4	18b.	Do the following Conversions. a) Convert $(123)_8$ as a Decimal Number b) Convert $(275)_8$ to a decimal number b) Convert $(164)_{10}$ as Octal Number**.** d) Convert $(100010)_2$ to an octal number
CO4	K5	19a.	Perform the following binary arithmetic operations: a) 1011 + 1101 (Binary addition) b) 10101 - 1101 (Binary subtraction) c) 101110010 + 1101101 (Binary addition) d) $(45)_{10}$-$(10)_{10}$ (Binary subtraction) **(OR)**
CO4	K5	19b.	Illustrate the Arithmetic Circuits with advantages and disadvantages.
CO5	K5	20a.	Evaluate Addition of two numbers (in 4-bit 2's complement representation) a) -6 and -3 b) -8 and 7 c) 69 and 12 d) -25 and -15 **(OR)**
CO5	K5	20b.	Discuss the Arithmetic building blocks in detail.