

B.C.A. DEGREE EXAMINATION, NOVEMBER 2024
FIRST SEMESTER

COURSE : MAJOR CORE
PAPER : DIGITAL LOGIC FNDAMENTALS
SUBJECT CODE: 23CS/MC/DL13
TIME : 3 HOURS **MAX. MARKS: 100**

Q. No.	SECTION A (20 x 1 = 20)	CO	KL
1.	_____ is a weighted code. A) Gray Code B) ASCII C) 8421 Code D) EBCDIC	CO1	K1
2.	_____ is the 2's complement of the binary number 1011. A) 0101 B) 1101 C) 0110 D) 0100	CO1	K1
3.	_____ boolean expression represents the Exclusive-OR (XOR) function. A) $A \cdot B$ B) $A+B$ C) $A \oplus B$ D) $(A+B)'$	CO1	K1
4.	_____ number of cells are there in four-variable K-map. A) 4 B) 8 C) 16 D) 32	CO1	K1
5.	_____ is a combinational circuit that can perform both addition and subtraction of binary numbers. A) Decoder B) Multiplexer C) Binary Adder-Subtractor D) Encoder	CO1	K1
6.	_____ output lines are present in a 4-to-2 binary encoder. A) 2 B) 4 C) 6 D) 8	CO2	K2
7.	_____ is a type of digital counter where all the flip-flops that make up the counter are driven by the same clock signal. A) Ripple Counter B) Asynchronous Counter C) Synchronous Counter D) Decade Counter	CO2	K2
8.	A shift register is primarily used for _____. A) arithmetic operations B) storing multiple bits of data C) shifting data bits serially D) counting clock pulses	CO2	K2
9.	_____ type of memory is non-volatile and used to store firmware. A) RAM B) ROM C) Cache D) Register	CO2	K2
10.	_____ can be used for error detection and correction in memory systems. A) Decoder B) Parity Bits C) Multiplexer D) Shift Register	CO2	K2
11.	_____ is a digital circuit that implements the arithmetic sum of two binary numbers.	CO1	K1

12.	Storage elements that operate with signal levels and said to be level sensitive devices are _____.	CO1	K1
13.	_____ is a type of Asynchronous counter in which the flip-flop output transition serves as a source for triggering other flip-flops.	CO1	K1
14.	RAM stands for _____.	CO1	K1
15.	A _____ is a device that acts as a building block and perform basic logical functions that are fundamental to digital circuits.	CO1	K1
16.	The gray code for the binary number 1011 is _____.	CO2	K2
17.	_____ is a small and temporary storage unit inside a computer CPU.	CO2	K2
18.	_____ is a programming language that's made up of binary numbers that directly instruct a computer's hardware.	CO2	K2
19.	A combinational circuit that converts binary information from n input lines to a maximum of 2^n unique output lines is _____.	CO2	K2
20.	The _____ condition in a K-Map that allows cells to contain either 0s, 1s, or an '*'.	CO2	K2
Q. No.	SECTION B (4 x 5 =20)	CO	KL
21.	a) Given two binary numbers X = 1010100 and Y = 1000011, Solve (X - Y) and (Y - X) using 2's complement. (OR) b) (i) Convert the hexadecimal number 64CD to binary, and then convert it from binary to octal. (ii) Express the following numbers in decimal: $(10110.0101)_2$ $(16.5)_{16}$	CO3	K3
22.	a) What is duality principle? Write De Morgan's theorem and its duality. Prove both using truth tables. (OR) b) What is a canonical form? Express the Boolean function $F = A + B' C$ as a sum of minterms.	CO3	K3
23.	a) Examine the full adder with its implementation and truth table. (OR) b) Explicate on binary multiplier with its diagrams.	CO4	K4
24.	a) How does the RS flip-flop work in a digital circuit? (OR) b) Discover the relationship between the CPU and main memory and explain how they work together in a computer system.	CO4	K4

	SECTION C	(5 x 12 =60)	CO	KL
25.	a) (i) Explain Binary Coded Decimal (BCD) representation. (ii) Perform the addition of 68 and 27 using BCD. (iii) Perform the subtraction of 47 from 95 using BCD. (OR) b) Recall Binary storage and registers.		CO1	K1
26.	a) Explain Two-Variable and Three-Variable K-Map and Simplify the Boolean function, $F(x, y, z) = \sum(2, 3, 4, 5)$ using K-Map. (OR) b) Discuss why digital circuits are often constructed using NAND or NOR gates instead of AND - OR gates, and explain their implementations.		CO2	K2
27.	a) Make use of encoders to explain their functioning in digital systems. (OR) b) Identify and explain the functions of multiplexer in digital circuits.		CO3	K3
28.	a) Compare the master-slave JK flip-flop with a simple JK flip-flop. How do they differ in operation? (OR) b) Sequence the steps involved in the counting process of a 3-bit ripple counter.		CO4	K4
29.	a) Elucidate the functioning of Programmable Logic Array. (OR) b) Examine the input and output devices and their importance in computer systems.		CO5	K5
