Date: 15-11-2024   Dept. No.   Max. : 100 Marks

Time: 09:00 am-12:00 pm

	SECTION A - K1 (CO1)
	Answer ALL the Questions - **(10 x 1 = 10)**
1.	**Fill in the blanks**
a)	The equivalent decimal value of this binary $(111011)_2$ is_____.
b)	When one of the input is high and another input is, low the output of the XOR gate is_____.
c)	The output of a logic gate is "1" when all its inputs are at logic "0". The gate is either_____.
d)	SOP stands for_____.
e)	Flip flop is a bistable device with one or more inputs and _____ outputs.
2.	**Answer the following**
a)	Convert $(1101011)_2$ to its equivalent decimal number.
b)	How many types of number system are there?
c)	What is a logic gate?
d)	What is meant by K-Map or Karnaugh Map?
e)	What are the applications of Flip-Flops?
	SECTION A - K2 (CO1)
	Answer ALL the Questions **(10 x 1 = 10)**
3.	**MCQ**
a)	Convert $(312)_8$ into decimal A. $(201)_{10}$ B. $(202)_{10}$ C. $(203)_{10}$ D. $(204)_{10}$
b)	Which of the logic gates are known as basic gates? A. XOR, NAND B. AND, NAND C. NAND, NOR D. OR, AND
c)	In the toggle mode, a JK flip-flop has A. J = 0, K = 1 B. J = 1, K = 1 C. J = 0, K = 0 D. J = 1, K = 0
d)	The number of Minterms for four variables A. 8 B. 16 C. 2 D. 1
e)	The AND operation is equivalent to A. Union B. Multiplication C. Division D. Addition
4.	**True or False**
a)	With an OR gate, the output is HIGH only when both inputs are HIGH.

| b) | Binary means having two states or values. |

c)	An inverter performs a NOT operation.
d)	$(568)_8$ equivalent decimal value is $(202)_{10}$.
e)	Another term used to describe up/down counters is *bidirectional*.

SECTION B - K3 (CO2)

Answer any TWO of the following (2 x 10 = 20)

5.	Convert the following hexadecimal numbers to decimal. A. $(E9)_{16}$ B. $(3FC.8)_{16}$ C. $(FFFF)_{16}$ D. $(D5)_{16}$
6.	Explain the logic gates (AND, OR, NOT, NAND, and NOR) with their truth tables.
7.	Explain the operation of shift left register.
8.	Discuss the working of a JK flip-flop using NAND gates with truth tables.

SECTION C – K4 (CO3)

Answer any TWO of the following (2 x 10 = 20)

9.	Show that NAND and NOR gates are Universal gates.
10.	Explain the basic laws of Boolean algebra with truth tables.
11.	Draw a circuit for DOWN counter using IC 7476 and discuss its truth table.
12.	Minimize the function using K-map: $F = \sum m (1, 2, 3, 5, 6, 7)$.

SECTION D – K5 (CO4)

Answer any ONE of the following (1 x 20 = 20)

| 13. | (a) Convert 110111.1001_2 into decimal.

 (b) Convert 0.85_{10} into binary.

 (c) Convert 0.122_{10} into hexadecimal.

 (d) Convert $6DE_{16}$ into decimal.

 (e) Convert 0.23_{10} into octal. |
| 14. | Draw a circuit for UP counter using IC 7476 and discuss its truth table. |

SECTION E – K6 (CO5)

Answer any ONE of the following (1 x 20 = 20)

| 15. | Design and explain with truth tables the working of synchronous mod-4 and mod-8 counter. |
| 16. | Evaluate using K map $Y = F (A, B, C, D) = \sum m (0,1,3,5,7,9,11,12,13,14,15)$. |

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