U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

December 2023 Supplementary Examinations

Programme: B.E. **Semester: III**
Branch: Artificial Intelligence and Machine Learning **Duration: 3 hrs.**
Course Code: 22AM3ESLDA **Max Marks: 100**
Course: Logic Design and Computer Architecture

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

UNIT - I

1 a) Simplify the following Boolean function using Quine McCluskey method to find the prime implicants and Essential prime implicants. **10**

f(a,b,c,d)= Σm(0,2,3,4,8,10,12,13,14)

b) Find the prime implicants and essential prime implicants for the given function using K-map. **5**

f(a,b,c,d)= π M (0,3,4,5,6,7,11,15) . π d(2,14)

c) Illustrate the working of Even Parity Generator with a diagram. **5**

UNIT - II

2 a) Illustrate the working of SR Flipflop with the help of a circuit diagram and a truth table. **6**

b) Design Mod-8 synchronous UP Counter Using JK Flipflop. **10**

c) Consider a 3-bit Johnson counter with input data word as 001, determine all definite states of Johnson counter. **4**

OR

3 a) Find the characteristic equations of:
i) SR flip-flop
ii) D flip-flop
iii) JK flip-flop
iv) T flip-flop **8**

b) Design a 4-bit PISO shift register using D Flip Flop. **6**

	c)	Realize JK master slave flip-flop with a neat circuit, truth table and timing diagram.	**6**

UNIT - III

4	a)	Illustrate the Top-Level View of various Computer Components with a diagram.	**6**
	b)	Explain the Instruction Cycle State Diagram.	**6**
	c)	Describe the Bus Interconnection Scheme.	**8**

UNIT - IV

5	a)	Describe Direct- Mapping Cache Organization with a neat diagram.	**4**
	b)	Given multiplicand A= -9, and multiplier B= -13, perform the multiplication of A and B using Booth's Multiplication Algorithm.	**6**
	c)	Show with a neat flow diagram the programed I/O and interrupt driven I/O as part of techniques for input of a block of data.	**10**

OR

6	a)	Illustrate simple interrupt processing techniques with a neat diagram.	**6**
	b)	Describe Memory hierarchy with a diagram.	**6**
	c)	Illustrate the flowchart for addition and subtraction and explain how an overflow occurs with an example.	**8**

UNIT - V

7	a)	Differentiate between a hardwired implementation and a micro programmed implementation of a control unit.	**6**
	b)	Illustrate the following addressing modes with an example. i. Immediate Addressing ii. Direct Addressing iii. Indirect Addressing iv. Register Addressing v. Register Indirect Addressing	**10**
	c)	Mention the advantages and disadvantages of using a variable- length instruction format.	**4**

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