Sub Code: R2321052 **R23** **Set No. 1**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY-GURUJADA VIZINAGARAM
II B. Tech I Semester Regular Examinations, November – 2024
DIGITAL LOGIC AND COMPUTER ORGANIZATION
(CSE)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part A, Part B.
Part A is compulsory, Answer all questions.
In Part B, Answer any one question from each unit.

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PART-A **(20 Marks)**

1	a)	Convert $(10110)_2$ to Gray code and $(110101)_G$ to binary number.	[2]
	b)	Differentiate multiplexer and de-multiplexer.	[2]
	c)	Draw the logic diagram of a master slave J-K flip-flop.	[2]
	d)	Write about the bus structure used in computer.	[2]
	e)	What is micro-operation?	[2]
	f)	What is Divide overflow? Discuss.	[2]
	g)	Define page fault and page replacement?	[2]
	h)	What is Cache memory? Mention its advantages?	[2]
	i)	What is Direct Memory Access?	[2]
	j)	Differentiate between Synchronous and Asynchronous modes of data transfer?	[2]

PART-B **(50 Marks)**

Unit-1

2	a)	Design a combinational circuit which converts BCD to Excess-3 code.	[5]
	b)	Obtain the simplified expression in SOP form of F(a,b,c,d,e)=Σ(1,2,4,7,12,14,15,24,27,29,30,31)using K-maps.	[5]

(OR)

3	a)	Find the output binary number after performing the subtraction using 1's complement and 2's complement i) 10001 - 1100 ii) 111.01 - 010.11	[5]
	b)	What are the various logic gates, give the representation along with the truth table.	[5]

Unit-2

4	a)	Design 4-bit shift register using D flip-flops and explain its working with the help of timing diagrams.	[5]
	b)	What are the basic operational concepts of a computer? Explain with a diagram.	[5]

(OR)

5	a)	Draw the circuit diagram of a 4-bit binary counter with parallel load and explain its working with its function table.	[5]
	b)	With the help of a diagram explain about Von Neumann Machine.	[5]

Unit-3

6	a)	Multiply each of the following pairs of signed 2's complement numbers using booth algorithm and bit pairing of the multiplier (Assume A is the Multiplicand and B is the Multiplier). A=010111 B=110110 A=110011 B=101100	[5]
	b)	Differentiate Hardwired and Micro programmed control Units.	[5]

(OR)

7	a)	Discuss Hardware for signed 2's complement addition and subtraction.	[5]
	b)	List and explain the steps involved in the execution of a complete instruction.	[5]

Unit-4

8	a)	Discuss about the virtual memory? Discuss about the mapping of virtual address to memory table.	[5]
	b)	Compare and contrast between Asynchronous DRAM and Synchronous DRAM.	[5]

(OR)

9	a)	Explain different types of mapping functions in cache memory	[10]

Unit-5

10	a)	Explain the difference between Isolated I/O and memory-mapped I/O? What are advantages and disadvantages of each?	[5]
	b)	Discuss briefly about peripheral component interconnect (PCI) Bus.	[5]

(OR)

11	a)	What is interrupt? Explain different types of interrupts.	[10]

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