**PRASAD V POTLURI SIDDARTHA INSTITUTE OF TECHNOLOGY**

**(AUTONOMOUS)**

**COMPUTER SCIENCE & ENGINEERING**

**B.Tech II Year Sem-I**

**(CS3T4) COMPUTER ORGANIZATION**

**(Common to CSE/IT)**

**Time: 3Hours Model Paper MAX Marks: 70**

1. a) Explain about tri-state buffers. Explain the construction of bus with tri-state buffers.

b) Discuss in detail about various types of shift micro operations. [7+7]

2. a) Explain any four register reference instructions along with their purpose.

b) Explain any four memory reference instructions along with their purpose. [7+7]

3. a) Explain about the functioning of a control unit .

b) Explain how X= (A+B)/(A-B) is evaluated in a stack based computer. [7+7]

4 .a) Draw a flow chart which explains multiplication of two signed magnitude fixed point

numbers.

b) Multiply 10111 with 10011 with the Booth multiplication algorithm. [7+7]

5. a)Explain the following:

i) ROM ii) PROM

b) Explain in detail the about any two types of mapping techniques used in the usage of cache memory. [7+7]

6. a) What is Direct Memory Access? Explain the working of DMA.

b) Explain Asynchronous Serial Transfer [7+7]

7. a)Explain the concept of pipeline.

b) Compare RISC and CISC pipeline [8+6]

8. a)Explain with neat sketch different kinds of Multi stage switching networks?

b) What are the different interconnection structures used in multiprocessors? [7+7]

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**(AUTONOMOUS)**

**INFORMATION TECHNOLOGY**

**B.Tech II Year Sem-I**

**COMPUTER ORGANIZATION IT3T2 (Common to CSE/IT)**

**COURSE OVERVIEW:** This course covers the basic organization, design, and programming of a simple digital computer, then explores the separate functional units in detail.

**COURSE OBJECTIVES**:

• To have a thorough understanding of the basic structure and operation of a digital computer.

• To design the control unit in detail including hardware for the micro programmed sequencer.

• To have a thorough understanding of the central processing unit and various instructions formats together with a variety of addressing modes.

• To discuss in detail the operation of the arithmetic unit including the algorithms &

Implementation of fixed-point and floating-point addition, subtraction, multiplication & division.

• To study the hierarchical memory system including cache memories and virtual memory

• To study the different ways of communicating with I/O devices and standard I/O interfaces.

• To study the concept of pipelining and the way it can speed up the processing, Instruction pipelining and RISC pipelining.

• To study the basic characteristics of Multiprocessors and Interconnection structures and interprocessor communication.

**COURSE OUTCOMES**:

Students will have thorough knowledge about

• Basic structure of a digital computer

• Designing the control unit in detail including hardware for the micro programmed sequencer.

• The central processing unit and various instruction formats together with a variety of addressing modes.

• Arithmetic operations of binary number system

• The organization of the Control unit, Arithmetic and Logical unit, Memory unit and the I/O

Unit.

• Pipelining and the way it can speed up the processing. Instruction pipelining and RISC pipelining together with the delayed load and delayed branch techniques.

• The basic characteristics of Multiprocessors and Interconnection structures and the need of interprocessor communication.

**SYLLABUS**

**UNIT-I**

REGISTER TRANSFER AND MICRO-OPERATIONS: Register Transfer Language, Register Transfer, Bus and memory Transfers, Arithmetic Micro-operations, Logic Micro-operations, Shift Micro-operations, Arithmetic Logic Shift Unit.

**UNIT-II**

BASIC COMPUTER ORGANIZATION AND DESIGN: Instruction codes, Computer Registers, Computer Instructions, Timing and Control, Instruction cycle, Memory-Reference Instructions, Input-Output and Interrupt, Design of Basic Computer.

**UNIT-III**

MICRO PROGRAMMED CONTROL: Control Memory, Address Sequencing, Micro-Program example, Design of Control Unit.

CENTRAL PROCESSING UNIT: General register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC).

**UNIT-IV**

COMPUTER ARITHMETIC: Addition and Subtraction, Multiplication Algorithms, Division Algorithms ,Floating-point Arithmetic operations.

**UNIT-V**

MEMORY ORGANIZATION: Memory Hierarchy, Main Memory, Auxiliary memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management hardware.

**UNIT-VI**

INPUT-OUTPUT ORGANIZATION: Peripheral Devices, Input-output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA),Input-Output Processor, Serial Communication.

**UNIT-VII**

PIPELINE AND VECTOR PROCESSING: Parallel processing, Pipelining, Arithmetic pipeline, Instruction pipeline, Risc pipeline.

**UNIT-VIII**

MULTIPROCESSORS: Characteristics of multiprocessors, Interconnection structures, Inter processor arbitration, Interprocessor communication and synchronization.

**TEXTBOOK:**

1. ‘Computer System Architecture’, Morris M. Mano, 3rd edition,Prentice Hall India.

**REFERENCE BOOKS:**

1. Computer Organization and Achitecture, William Stallings ,8th edition,PHI

2. Computer Organization, Carl Hamachar, Vranesic, McGraw Hill.