

**SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
(AUTONOMOUS)
CHITTOOR**

MCA DEPARTMENT



QUESTION BANK

COMPUTER ORGANIZATION AND ARCHITECTURE(20MCA113)

Regulation – 2020

Academic Year 2020 – 21

Prepared by

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S. No	QUESTIONS	Blooms Taxonomy Level	POs
UNIT -I			
Digital Logic Circuits and Digital Components			
Digital Logic Circuits: Logic gates - Boolean Algebra - Map Simplification - Combinations Circuits - Flip flops - Sequential Circuits. Digital Components: Integrated circuits – Decoders – Multiplexers – Registers - Shift Registers - Binary Counters - Memory unit.			
Part -A			
1	Draw the functional units of a general computer?	Analysis	PO1,PO3
2	Draw X-OR gate diagram with Truth table.	Analysis	PO1,PO3
3	Draw two symbols of NAND gate.		
4	List out the Boolean Algebra identities.	Remember	PO1
5	Explain briefly about K-Maps.	Understand	PO1
6	What is don't care condition in Map Simplification?	Remember	PO1
7	Define Combinational Circuits.	Analysis	PO1,PO3
8	Draw J-K Flip Flop block diagram & characteristic table	Remember	PO1
9	Define Sequential Circuits.	Understand	PO1
10	Explain briefly about types of Integrated Circuits	Understand	PO1,PO3
11	Explain Multiplexer functionality.	Understand	PO1,PO3
12	Define Encoder and Decoder	Remember	PO1
13	Define Computer Organization	Remember	PO1
14	Define Computer Architecture	Remember	PO1,PO3
15	What is full adder and half adder?	Remember	PO1,PO3
16	Distinguish between RAM & ROM.	Analysis	PO1,PO3
Part- B			
1	Explain briefly about Logic gates with neat diagrams	Understand	PO1,PO3
2	Discuss Boolean Algebra in detail	Understand	PO1
3	Explain Map simplification technique and Simplify the following Boolean expression using SOP and POS with neat diagram. $\Sigma(X,Y,Z) = \Sigma(1,3,5,6,8,9)$	Understand	PO1
4	Describe Full Adder and Half Adder and draw the circuit and Truth table.	Analysis	PO1,PO2, PO3
5	Differentiate various types of Flip Flops	Analysis	PO1,PO3
6	Draw Decoder circuit and its Characteristic table	Understand	PO1,PO3
	Explain the working of shift register with parallel load	Understand	PO1,PO3
7	Explain in detail about binary counters		
8	Explain in detail about Multiplexers.	Understand	PO1,PO3



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9	Explain i) ROM ii) PROM iii) EPROM iv) EEPROM.	Remember	PO1, PO2, PO3
UNIT- II			
Data Representation, Basic Computer Organization			
Data Representation: Data types – Complements - Fixed point representation - Floating point representation - Error detection coders. Basic Computer Organization: Instruction codes - Computer registers - Computer instructions - Timing and control - Instruction cycle – Memory reference instruction, Input output and interrupt.			
Part - A			
1	Apply conversion on Decimal code to find Binary code (i) 3426 (ii) 798	Evaluate	PO1, PO2, PO3
2	Evaluate 2' Complement of the following binary code (i) 10011010 (ii) 10101011	Evaluate	PO1, PO2, PO3
3	Represent the number (+46.5) ₁₀ as floating point binary number with 24 bits.	Evaluate	PO1, PO2, PO3
4	Define Fixed point representation.	Remember	PO1
5	Define Floating point representation.	Remember	PO1
6	Define Overflow.	Remember	PO1
7	Evaluate the following using 2's complement 11001010 - 01001101	Evaluate	PO1, PO2, PO3
8	What is Normalization?	Remember	PO1
9	Explain Parity check error detection	Understand	PO1, PO2, PO3
10	List out the different computer instruction formats?	Remember	PO1, PO2, PO3
11	List out the types of Addressing Modes.	Remember	PO1, PO2, PO3
12	Differentiate hardwired control unit and micro programmed control unit.	Analysis	PO1, PO2, PO3
13	List out the steps involved in Instruction Cycle.	Remember	PO1
14	Define Interrupt	Remember	PO1
15	List out registers used in basic computer	Remember	PO1
16	List memory reference instructions	Remember	PO1
Part - B			
1	Explain signed representation of integers	Understand	PO1
2	Distinguish between Fixed point and Floating point representation	Analysis	PO1, PO2, PO3
3	Explain parity bit error detection technique and draw parity checker circuit.	Understand	PO1
4	Discuss hardwired control unit and micro programmed control unit?	Understand	PO1, PO2, PO3
5	Explain Addressing modes in detail.	Remember	PO1, PO3
6	Define an instruction format? Explain different types of instruction formats in detail.	Remember	PO1



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7	Explain conditional branch instructions?	Understand	PO1
8	Compare different instruction formats?	Analysis	PO1,PO2, PO3
9	Describe memory reference instructions in detail.	Understand	PO1,PO2, PO3
10	Explain Instruction cycle in detail.	Understand	PO1,PO2, PO3
11	Explain Common Bus System with neat diagram.	Understand	PO1,PO2, PO3
12	Define program interrupt? Explain Interrupt cycle in detail.	Remember	PO1
13	Explain different types of computer registers with common bus system with a neat sketch.	Remember	PO1
UNIT- III			
Pipeline and Vector Processing			
Parallel Processing – Pipelining - Arithmetic Pipeline - Instruction Pipeline - RISC Pipeline - Vector Processing - Array Processors.			
Part - A			
1	Explain the advantage of parallel processing	Understand	PO1
2	Define Pipelining	Remember	PO1
3	Explain the performance consideration in pipeline format?	Understand	PO1,PO2, PO3
3	Explain Arithmetic Pipelining	Understand	PO1
4	Explain Instruction Pipelining	Understand	PO1
5	List Vector processing applications	Remember	PO1
6	Discuss RISC pipelining	Understand	PO1,PO2, PO3
7	Define Memory Interleaving	Remember	PO1,PO2, PO3
8	Explain Array processing	Understand	PO1
9	What do you mean by branch penalty?	Remember	PO1
10	What do you mean by delayed branching?	Remember	PO1
11	What are the major characteristics of a pipeline?	Remember	PO1
Part - B			
1	Explain Pipelining technique and its advantages in detail with suitable example.	Understand	PO1
2	Explain Arithmetic Pipelining with a suitable example	Understand	PO1
3	Explain Instruction Pipelining with a suitable example	Understand	PO1
4	Discuss Vector processing applications	Understand	PO1
5	Discuss RISC pipelining	Understand	PO1,PO2, PO3
6	Explain Memory Interleaving methods	Remember	PO1,PO2, PO3
7	Explain Array processing	Understand	PO1



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8	Distinguish between normal processing and parallel processing	Analyze	PO1,PO2, PO3
9	Define parallel processing and explain the flynn's classification of computer with suitable diagram.	Remember	PO1,PO2, PO3
UNIT-IV			
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), Complex Instruction Set Computer (CISC).			
Part- A			
1	Define Control Memory?	Remember	PO1,PO2
2	Define Microprogram?	Remember	PO1,PO2
3	Write the symbolic microprogram for fetch routine.	Remember	PO1,PO2
4	Draw a diagram which shows microprogrammed control organization.	Apply	PO1,PO4
5	Describe microinstruction format.	Understand	PO1
6	Define control word?	Remember	PO1,PO2
7	List out types of addressing modes.	Remember	PO1,PO2
8	Convert the following equation into reverse polish notation: $A * B + A(B * D + C * E)$	Apply	PO1,PO4
9	Define Program interrupt. List types of Interrupts	Remember	PO1,PO2
10	List out types of CPU organizations	Remember	PO1,PO2
11	Describe RISC characteristics.	Understand	PO1
12	Describe CISC characteristics	Understand	PO1
Part – B			
1	Explain Microprogrammed control in detail.	Understand	PO1
2	Describe Address sequencing with a neat diagram.	Remember	PO1,PO2
3	Illustrate Microprogramme Example.	Analyze	PO1,PO2, PO3
4	Explain the design of control unit.	Understand	PO1
5	Explain general register organization in the CPU.	Understand	PO1
6	Explain stack organization in the CPU.	Understand	PO1
7	Discuss various instruction formats of the computer.	Remember	PO1,PO2
8	Explain different types of Instructions with examples.	Understand	PO1
9	Differentiate between the RISC and CISC computers.	Analyze	PO1,PO2, PO3
10	Explain in detail about addressing modes	Understand	PO1
UNIT- V			



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The Memory			
Some Basic Concepts - Semiconductor Ram Memories - Read-Only Memories - Speed, Size and Cost - Cache Memories - Performance Considerations - Virtual Memories.			
Part - A			
1	List the various types of semiconductor RAMs?	Remember	PO1
2	Define Random Access Memory and types of RAMs present?	Remember	PO1
3	Explain the necessary for memory hierarchy?	Understand	PO1
4	Define HIT and MISS ratio in memory with an example?	Remember	PO1
5	Differentiate SRAM and DRAM?	Analyze	PO1,PO2, PO3
6	State the differences between static and dynamic memories?	Remember	PO1,PO2, PO3
7	Define virtual or logical address?	Remember	PO1
8	Define cache memory? Explain how it is used to reduce the execution time?	Remember	PO1
9	Explain the mapping procedures adopted in the organization of a Cache Memory?	Understand	PO1
10	Discuss the function of a TLB? (Translation Look-aside Buffer)	Understand	PO1
11	Differentiate volatile and non volatile memory organization?	Analyze	PO1,PO2, PO3
12	Discuss the multilevel hierarchy of storage devices?	Understand	PO1
13	Explain memory management unit (MMU)?	Understand	PO1
14	Discuss the enhancements used in the memory management?	Understand	PO1
15	Explain basic concept of virtual memory technique?	Understand	PO1
16	Define Memory Access Time?	Remember	PO1
17	Distinguish between the write-through and write-back policies pointing out their merits and demerits?	Analyze	PO1,PO2, PO3
18	Define the virtual memory organization and explain briefly?	Remember	PO1
19	Explain cache memory to reduce the execution time?	Understand	PO1
20	Define CPU registers, Main memory, Secondary memory and cache memory?	Remember	PO1,PO2, PO3
Part - B			
1	Explain briefly about memory hierarchy?	Understand	PO1
2	Discuss RAM and ROM chips with diagrams?	Understand	PO1,PO2, PO3
3	State and Explain virtual memory organization technique?	Remember	PO1
4	Describe in detail about associative memory?	Understand	PO1
5	Define cache memory? Explain Associative mapping technique?.	Remember	PO1
6	Define a mapping function? Explain Set-Associative mapping technique?	Remember	PO1
7	Define virtual memory? Discuss Address mapping using pages in virtual memory?	Remember	PO1
8	Criticize i) Write through policy ii) write back policy iii) Hit and Miss ratio.	Analysis	PO1



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9	Explain virtual memory Address translation?	Understand	PO1
10	Explain briefly about Memory connection to CPU?	Understand	PO1,PO2, PO3