Course Code: 25MC9102 **R25**

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY::PUTTUR
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QUESTION BANK (DESCRIPTIVE)

Subject with Code: COMPUTER ORGANIZATION & ARCHITECTURE (25MC9102) **Course & Branch: MCA**

Year & Sem: I-MCA & I-Sem **Regulation: R25**

UNIT –I
Basic Structure of Computer, Machine Instructions and Programs

1	**a)**	Explain the functional units of a computer with a neat diagram.	**[L2][CO1]**	**[6M]**
	b)	Differentiate between single processor systems and multiprocessor systems.	**[L4][CO1]**	**[6M]**
2		What is bus structure? Explain the types of buses with examples.	**[L1][CO1]**	**[12M]**
3	**a)**	Represent the following decimal numbers in binary, octal, and hexadecimal (i)125 (ii)587.	**[L2][CO1]**	**[6M]**
	b)	Write short notes on instruction sequencing with an example.	**[L3][CO1]**	**[6M]**
4	**a)**	Explain different addressing modes with examples.	**[L2][CO1]**	**[6M]**
	b)	Create an algorithm for performing multiplication of two numbers and represent the process graphically with a flowchart	**[L6][CO1]**	**[6M]**
5	**a)**	Explain basic input/output operations with suitable diagrams.	**[L2][CO1]**	**[6M]**
	b)	What is the difference between CPU and I/O buses?	**[L1][CO1]**	**[6M]**
6		Discuss different types of addressing modes in 8086 with examples.	**[L2][CO1]**	**[12M]**
7	**a)**	Compare zero, one, two, and three-address instructions with examples.	**[L2][CO1]**	**[6M]**
	b)	Develop an 8086 program to add two 16-bit numbers.	**[L6][CO1]**	**[6M]**
8		Define Data transfer instructions and Input/output instructions.	**[L1][CO1]**	**[12M]**
9		Explain conditional and unconditional transfer instructions with suitable examples.	**[L2][CO1]**	**[12M]**
10	**a)**	List two advantages of multiprocessors.	**[L1][CO1]**	**[6M]**
	b)	Draw and explain the architecture of Intel 8086 microprocessor.	**[L1][CO1]**	**[6M]**

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UNIT –II

Arithmetic, Basic Processing Unit

1	**a)**	Define signed numbers. Give an example of addition of two signed numbers.	**[L1][CO2]**	**[6M]**
	b)	Divide the binary number `101101` by `110` using the restoring division method.	**[L4][CO2]**	**[6M]**
2	**a)**	What is a fast adder? Why is it required in computer systems?	**[L1][CO2]**	**[6M]**
	b)	Distinguish between hardwired control and microprogrammed control.	**[L4][CO2]**	**[6M]**
3	**a)**	Write two differences between integer division and floating-point division.	**[L3][CO2]**	**[6M]**
	b)	What is the role of the bus in a multiple-bus organization?	**[L1][CO2]**	**[6M]**
4	**a)**	Explain the design of a carry-lookahead adder with a neat diagram.	**[L2][CO2]**	**[6M]**
	b)	What are the basic steps in the execution of a complete instruction within a CPU?	**[L1][CO2]**	**[6M]**
5	Discuss signed-operand multiplication with an example. Compare it with unsigned multiplication.		**[L2][CO2]**	**[12M]**
6	**a)**	With a diagram, explain the execution of a complete instruction in a basic processing unit.	**[L2][CO2]**	**[6M]**
	b)	Evaluate the following operations using signed numbers (i) (+45) + (–25) (ii) (–65) + (–20).	**[L5][CO2]**	**[6M]**
7	Describe the structure and working of a multiple-bus organization.		**[L2][CO2]**	**[12M]**
8	**a)**	Differentiate between hardwired control and microprogrammed control with advantages and disadvantages.	**[L2][CO2]**	**[6M]**
	b)	Compare the following positive numbers using the shift-and-add algorithm: (i) 1101 × 1011 (ii) 1010 × 0111	**[L2][CO2]**	**[6M]**
9	Discuss the multiple-bus organization in a basic processing unit. Why is it preferred over single-bus architecture?		**[L2][CO2]**	**[12M]**
10	Describe floating-point representation. What is the role of mantissa and exponent?		**[L2][CO2]**	**[12M]**

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UNIT –III

The Memory System

1	**a)**	What is Semiconductor RAM? Explain its meaning, types, and working principle with examples.	**[L1][CO3]**	**[6M]**
	b)	Explain ROM and describe one of its applications in computer systems.	**[L2][CO3]**	**[6M]**
2	**a)**	List two differences between cache and virtual memory.	**[L1][CO3]**	**[6M]**
	b)	What factors determine memory speed?	**[L2][CO3]**	**[6M]**
3	**a)**	What is secondary storage? Give examples.	**[L1][CO3]**	**[6M]**
	b)	Explain SRAM and DRAM with diagrams.	**[L2][CO3]**	**[6M]**
4	What are the different types of ROM? Explain their working principles and applications..		**[L1][CO3]**	**[12M]**
5	**a)**	Discuss the relationship between speed, size, and cost of memory.	**[L2][CO3]**	**[6M]**
	b)	Explain cache memory mapping techniques.	**[L2][CO3]**	**[6M]**
6	**a)**	Write short notes on: (i) Page fault (ii) Hit ratio.	**[L3][CO3]**	**[6M]**
	b)	Define cache hit and cache miss.	**[L1][CO3]**	**[6M]**
7	**a)**	Compare and contrast SRAM and DRAM in terms of speed, cost, and usage.	**[L2][CO3]**	**[6M]**
	b)	Define EEPROM. Explain its full form, working principle, and applications.	**[L1][CO3]**	**[6M]**
8	Explain the concept of virtual memory with a neat diagram. How is address translation done?		**[L2][CO3]**	**[12M]**
9	**a)**	Explain the internal organization of DRAM with a diagram.	**[L2][CO3]**	**[6M]**
	b)	Differentiate between static and dynamic RAM.	**[L2][CO3]**	**[6M]**
10	Discuss memory management requirements in multiprogramming environments.		**[L2][CO3]**	**[12M]**

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UNIT –IV

Input/output Organization

1	**a)**	What is an interrupt? Give one example.	**[L1][CO4]**	**[6M]**
	b)	Write two advantages of Direct Memory Access.	**[L3][CO4]**	**[6M]**
2	**a)**	What is the role of an interface circuit in I/O organization?	**[L1][CO4]**	**[6M]**
	b)	Write short notes on: (i) Programmed I/O (ii) Isolated I/O	**[L3][CO4]**	**[6M]**
3	**a)**	Explain different ways of accessing I/O devices.	**[L2][CO4]**	**[6M]**
	b)	What is the role of device controller?	**[L1][CO4]**	**[6M]**
4	Explain the organization and working of a DMA controller. Discuss its advantages in high-speed data transfer.		**[L2][CO4]**	**[12M]**
5	Discuss various types of buses in detail. Explain bus arbitration methods.		**[L2][CO4]**	**[12M]**
6	**a)**	Write an essay on standard I/O interfaces.	**[L3][CO4]**	**[6M]**
	b)	Compare speed and application areas of different I/O Interfaces.	**[L2][CO4]**	**[6M]**
7	**a)**	Distinguish between synchronous and asynchronous data transfer with examples.	**[L2][CO4]**	**[6M]**
	b)	What is meant by Polling in I/O operations?	**[L1][CO4]**	**[6M]**
8	**a)**	State the function of a status register in accessing an I/O device.	**[L1][CO4]**	**[6M]**
	b)	List three types of data transfer methods between CPU and I/O devices. Briefly describe each.	**[L1][CO4]**	**[6M]**
9	Explain the various steps involved in handling an external interrupt by a processor. Illustrate with a timing diagram.		**[L2][CO4]**	**[12M]**
10	Discuss the functions of system buses in data transfer with neat diagram.		**[L2][CO4]**	**[12M]**

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UNIT –V

Pipelining, Large Computer Systems

1	**a)**	Define instruction pipelining.	**[L1][CO5]**	**[6M]**
	b)	What is a data hazard? Give an example.	**[L3][CO5]**	**[6M]**
2	**a)**	List two forms of parallel processing.	**[L1][CO5]**	**[6M]**
	b)	What is an interconnection network in multiprocessors?	**[L3][CO5]**	**[6M]**
3	**a)**	Describe two advantages of array processors.	**[L2][CO5]**	**[6M]**
	b)	Explain the basic concepts of pipelining with a neat diagram.	**[L2][CO6]**	**[6M]**
4	**a)**	Discuss different types of data hazards. How can they be resolved?	**[L2][CO6]**	**[6M]**
	b)	What is an instruction hazard? Explain with examples.	**[L1][CO6]**	**[6M]**
5	**a)**	Describe the structure of a general-purpose multiprocessor.	**[L2][CO6]**	**[6M]**
	b)	Explain the organization and working of array processors with neat diagrams.	**[L2][CO5]**	**[6M]**
6	Explain the role of interconnection networks in large computer systems.		**[L2][CO6]**	**[12M]**
7	With diagrams, explain the performance benefits and limitations of instruction pipelining.		**[L2][CO6]**	**[12M]**
8	Explain the concepts of branch hazards and branch prediction. How do delayed branch and branch predictor designs mitigate control hazards?		**[L2][CO6]**	**[12M]**
9	Classify in detail the different types of interconnection networks. Compare their performance.		**[L4][CO6]**	**[12M]**
10	**a)**	Write an essay on different forms of parallel processing.	**[L3][CO6]**	**[6M]**
	b)	Compare SIMD and MIMD architectures.	**[L2][CO6]**	**[6M]**

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