BACHELOR OF TECHNOLOGY (CBCS) (2021-COURSE)
B. Tech. Sem - III Computer Science & Engineering : WINTER: 2025
SUBJECT: MACHINE ORGANIZATION & MICROPROCESSOR

Day : Monday
Date : 15/12/2025

W-25312-2025

Time : 10:00 AM-01:00 PM
Max. Marks : 60

N.B.

1) All questions are **COMPULSORY**.
2) Figures to the **RIGHT** indicate **FULL** marks.
3) Assume suitable data **WHEREVER** necessary.
4) Draw neat diagrams **WHEREVER** necessary.
5) Use of non-programmable **CALCULATOR** is allowed.

Q.1	With a neat diagram, explain the architecture of the 8086 microprocessor. Highlight the function of each unit.	(10)
	OR	
Q.1	Write a detailed note on the instruction set of the 8086 microprocessor. Classify instructions into various types and provide examples for each.	(10)
Q.2	Write an algorithm to perform signed multiplication using Booth's method. Simulate the multiplication of -6 × 3 using 4-bit registers.	(10)
	OR	
Q.2	Draw and explain the hardware structure of an Arithmetic Logic Unit (ALU). How does it handle integer addition, subtraction, and logic operations?	(10)
Q.3	Explain the differences between Hardwired Control Unit and Microprogrammed Control Unit. Discuss the advantages and disadvantages of each with appropriate examples.	(10)
	OR	
Q.3	Write and explain the micro-operations required to perform the execution of the instruction: ADD R1, R2. Discuss how control signals are generated and sequenced.	(10)
Q.4	What is interleaved memory? Explain how interleaving improves memory access time. Illustrate with an example of low-order and high-order interleaving.	(10)
	OR	
Q.4	Describe the MESI (Modified, Exclusive, Shared, Invalid) protocol. How does it help maintain cache coherence in a shared memory multiprocessor system?	(10)
Q.5	Explain the role of an I/O module in a computer system. What are its key functions, and how does it facilitate communication between the CPU and peripheral devices?	(10)
	OR	
Q.5	Discuss the concept of I/O device interfaces. What are the common methods of interfacing peripheral devices with a computer, and how do they affect system performance?	(10)
Q.6	Describe the organization of a Symmetric Multiprocessor (SMP) system. What are the main features of SMP, and how does it enhance processing performance? Discuss its potential limitations.	(10)
	OR	
Q.6	Define and compare UMA, NUMA, and CC-NUMA memory architectures. How does each architecture impact memory access patterns, and what are the trade-offs in terms of scalability and performance?	(10)

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