

**BACHELOR OF TECHNOLOGY (CBCS - 2023)**  
**B. Tech. Sem-IV INFORMATION TECHNOLOGY : SUMMER : 2025**  
**SUBJECT: COMPUTER ORGANIZATION & ARCHITECTURE**

Day : Thursday  
Date : 29/05/2025

**S-29318-2025**

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

NB :

1. Assume suitable data, if necessary.
2. Draw neat labelled diagrams WHEREVER necessary.
3. Figures to the right indicate FULL marks for the question.
4. All questions are COMPULSORY.

- Q. 1 Write short notes on the following: (10)  
1) Cluster Computing 2) Cloud Computing 3) Nano Computing  
**OR**
- Q. 1 What is a GPU and TPU? Differentiate between them. Also explain in brief the multicore architecture (10)
- Q. 2 Write VHDL code for half adder using structural description and dataflow description. Draw block diagram and truth table of half adder. Write important comments in the code. (10)  
**OR**
- Q. 2 Write VHDL code for 3:8 Decoder using behavioral description and dataflow description. Draw block diagram and truth table of the circuit. Write important comments in the code. (10)
- Q. 3 What is microprogramming? Explain in detail. Also differentiate between hardwired and microprogrammed control unit. (10)  
**OR**
- Q. 3 Write and briefly explain a complete microprogram for the following instruction: SUB DL, [DI] (10)
- Q. 4 Explain the concept of cache coherency with example. What are the ways to achieve it? Explain (10)  
**OR**
- Q. 4 Explain the different cache memory replacement algorithms. Also explain the advantage and disadvantage of each. (10)
- Q. 5 Differentiate between distributed memory and shared memory multiprocessor architecture with neat figures, wherever necessary. (10)  
**OR**
- Q. 5 Explain in detail the supercomputer architecture with suitable diagram. Also explain the various application areas of a supercomputer. (10)

Q. 6 What is pipelining? What is pipeline stall? How it affects the performance of a pipeline? (10)  
What are the ways to overcome the stall? Explain with example.

OR

Q. 6 What is out-of-order execution? How it enhances the performance of a CPU? Explain with (10)  
example.

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