

Roll No.

Total Pages : 03

MCAQ/D-23

24026

COMPUTER ARCHITECTURE AND
PARALLEL PROCESSING
MCA-20-31

Time : Three Hours]

[Maximum Marks : 75

Note : Attempt *Five* questions in all. Q. No. **1** is compulsory.
Attempt four more questions selecting *one* question
from each Unit.

- 1.** Answer the following questions in brief : **5×3=15**
- (a) Distinguish between write-update and write-invalidate cache coherence policies.
 - (b) What is Parallelism ? Discuss levels of parallelism.
 - (c) What is superscalar processor ? Discuss emergence of superscalar processors.
 - (d) What is Hypercube ? Explain.
 - (e) Explain the working of daisy chain bus arbiter logic with a suitable diagram.

Unit I

- 2.** (a) What is computational model ? Discuss applicative computational model in detail. **8**

(7-19/8) L-24026

P.T.O.

(b) What is computer architecture ? Discuss the classification of parallel architectures. 7

3. (a) What is instruction pipeline ? How do data dependencies among instructions affect pipeline processing ? Explain with suitable examples. 8

(b) What is code scheduling ? Explain global scheduling with a suitable example. 7

Unit II

4. (a) What is shelved issue used in superscalar processors ? Explain with a suitable diagram. 8

(b) Compare and contrast superscalar processor with VLIW processor. 7

5. (a) What are branch penalties ? Discuss schemes to reduce branch penalties. 8

(b) What is branch problem ? Discuss early branch detection schemes. 7

Unit III

6. (a) What is distributed memory MIMD architecture ? Explain its working with a suitable diagram. Also discuss its characteristics. 8

(b) What is CC-NUMA model ? Explain its working with a suitable diagram. 7

7. Define node degree, network diameter, bisection width and cost metrics. Explain and compare the following interconnection networks in terms of these metrics by taking network size 16 : chordal ring of degree 4 and barrel shifter. 15

Unit IV

8. (a) What are locked bus, pended bus and split transaction bus used in multiprocessor systems ? Compare the read and write bandwidths of these buses. 8

(b) What is Butterfly Network ? Explain construction and working of Butterfly Network with a suitable diagram. 7

9. (a) State cache coherence problem. Explain snoopy cache coherence protocol to solve this problem. 8

(b) Explain memory requirements in three types of directory scheme based cache coherence protocols. 7