Roll No…… Total Pages: 3

10012

MCA/M-17

ADVANCED COMPUTER ARCHITECTURE

Paper: MCA-14-42

Time: Three Hours Maximum Marks: 80

Note: Attempt five questions including No. 1 which is compulsory. All questions carry equal marks.

Compulsory Question

1. Answer the following questions in brief :
   (a) What is applicative computational model?
   (b) What is functional parallelism? What are different levels of functional parallelism?
   (c) What is the use of pre-decode unit in superscalar processor?
   (d) What is look-ahead branch detection scheme?
   (e) Differentiate between static and dynamic interconnection networks.
   (f) What are limitations of COMA model?
   (g) Distinguish between write-invalidate and write update cache coherence policies.
   (h) What is critical section selective invalidation scheme?

Unit-I

2. (a) What is multilevel hierarchical framework of computer architecture ? Explain
   (b) Discuss the relationship between programming languages and parallel architectures.
3. (a) What is code scheduling ? Explain software pipelining technique of code scheduling.
   (b) Explain the structure of pipeline for Boolean, load and store instructions

Unit-II

4. (a) What is rename buffer? Discuss different types of rename buffers.
   (b) Explain aligned, unaligned, in-order and out-of-order instruction issue.
5. (a) What are static prediction schemes for branches ? Explain.
   (b) Discuss techniques to recover from mispredictions of branches.

Unit-III

6 What is UMA model? What are its limitations? How are these limitations Overcome by NUMA model? Explain with the help of suitable diagrams.

7. (a) Draw the diagram for chordal ring of degree 4 with network size of 16 and Find network diameter, bisection width and number of links.

(b) Compare barrel shifter, 2D mesh and 2D torus for network size of 16.

Unit-IV

8 (a) What are three generations of buses used in multiprocessors ? Compare their Read and write bandwidths with the help of suitable diagrams.

(b) What is MIN ? Explain the working of Omega network with suitable diagram.

9. What are directory-based cache-coherence protocols? Discuss them in brief and compare their memory requirements to store directory.