

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SECOND SEMESTER M.TECH DEGREE EXAMINATION, MAY 2017

Computer Science and Engineering

(Computer Science and Engineering)

(07CS 6104 ADVANCED PARALLEL COMPUTING)

Max. Marks: 60

Duration: 3 Hours

Answer all six questions. Part 'a' of each question is compulsory.

Answer either part 'b' or part 'c' of each question

Q.no.	Module 1	Marks
1a	Discuss about Pipelining and Superscalar Execution with example.	4
	Answer b or c	
b	Compute the total cost of communicating a message between two nodes in the case of store-and forward routing and cut-through routing.	5
c	Illustrate with example, the parallel program execution with the simple three-state coherence protocol and the implementation of coherence protocols using hardware mechanisms.	5
Q.no.	Module 2	Marks
2a	Explain the Scatter and Gather operation with suitable example.	4
	Answer b or c	
b	Discuss about One-to-all broadcast and all-to-one reduction in different interconnection topologies. Use One-to-all broadcast and all-to-one reduction for the multiplication of a 4 x 4 matrix with a 4 x 1 vector.	5
c	Design a simple algorithm for all-to-all broadcast on a d-dimensional hypercube and show all-to-all broadcast on an eight-node hypercube.	5
Q.no.	Module 3	Marks
3a	Write down the important characteristics of Tasks and Inter task interactions	4
	Answer b or c	
b	With the help of suitable examples, compare recursive decomposition and data decomposition techniques.	5
c	Categorize the schemes for static mapping of tasks onto processes for load	5

balancing. Show examples.

Q.no.	Module 4	Marks
4a	Write a note on Sources of Overhead in Parallel Programs.	4
Answer b or c		
b	Analyse different algorithm models for structuring parallel algorithms.	5
c	Reducing the interaction overhead among concurrent tasks is important for an efficient parallel program. Suggest some techniques for reducing the interaction overhead.	5

Q.no.	Module 5	Marks
5a	Briefly describe the history of GPU computing.	5
Answer b or c		
b	Write a CUDA program for implementing multiplication of two matrices.	7
c	Describe various Synchronization Constructs in OpenMP. Compute the cumulative sum of a list using the ordered directive.	7

Q.no.	Module 6	Marks
6a	Explain the concept of Parallel Random Number Generators.	5
Answer b or c		
b	Relate the sorting networks with bitonic merging networks. Illustrate the procedure with example.	7
c	Illustrate the Parallel Formulation of Prim's algorithm with example?	7