SVKM

D. J. Sanghvi College of Engineering

Programme: B.Tech in Computer Engineering

Year: IV/Semester VIII (Exam Year: 2023-2024)

Subject: High Performance Computing

Date: 28 May 2024 **Time:** 09:00 am - 12:00 pm (03:00 Hrs.)

Max Marks: 75

FINAL EXAMINATION(2023-2024)

Instructions:

1. This question paper contains 2 pages
2. Answer to each new question to be started on a fresh page.
3. Figure in right hand side indicates full marks

1.		**15**
	A. .	**10**
	1. List and explain parallel computing applications.	**10**
	---------- OR ----------	
	2. Explain Array Processor and Multiprocessor Architecture.	**10**
	B. Which decomposition will be helpful in matrix multiplication, explain in detail.	**5**
2.		**15**
	A. .	**10**
	1. Illustrate the concept of Superscalar Execution and very long instruction word processor with an example.	**10**
	---------- OR ----------	
	2. Explain communication cost in shared address space machine and message passing system.	**10**

B. Short note on Condition Variables for Synchronization in Threads 5

3. 15

A. . 10

1. Explain Exploratory Decomposition and Hybrid decomposition technique with an example. 10

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2. Explain mapping technique in load balancing for parallel algorithms. 10

B. Explain the basic construct of open MP programming. 5

4. 15

A. . 10

1. Explain Amdahl's effect. How many processors are needed to achieve a speedup of 5.9 for a program with 95% of a program's execution time is executed in parallel using Amdahl's law? 10

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2. Explain Gustavson's Law. An application executing on 64 processors requires 220 seconds to run. 5 percent of the time is spent executing serial portions of the computation on a single processor. What is the speedup of the application? 10

B. Explain MPI_Recv routine with an example. 5

5. 15

1. Write a MPI program to add numbers in two arrays a and b using scatter and gather routines. Store result in array c. 10

2. Explain the relationship between speedup and number of processors. Compute speedup of an operation with 8 processors and having efficiency = 5. 5