Register No : _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

M.E DEGREE END SEMESTER THEORY EXAMINATIONS, NOV /DEC 2024

Second Semester

Computer Science and Engineering

CP4292 - Multicore Architecture and Programming

Regulations - 2021

Duration : 3 Hrs *Maximum : 100 Marks*

*PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)*

Q.No	*Questions*	*BLT*	*CO*	*Marks*
1.	Explain multi-core architectures.	UN	1	2
2.	List the performance issues in multicore architecture.	RE	1	2
3.	Define synchronization primitives and give two examples.	RE	2	2
4.	Compare the conditions required for deadlock and livelock to occur.	UN	2	2
5.	Outline the OpenMP directives.	UN	3	2
6.	Organize the handling loops.	AP	3	2
7.	Classify MPI derived datatypes.	UN	4	2
8.	Infer MPI send and receive.	UN	4	2
9.	Where n-body solvers are used?	RE	5	2
10.	Explain tree search.	UN	5	2

*PART – B (ANSWER ALL QUESTIONS) (Marks 5*13 = 65)*

Q.No		*Questions*	*BLT*	*CO*	*Marks*
11.	a	Summarize the concept of cache coherence in multiprocessor systems.	UN	1	13
		Or			
	b	Compare the symmetric and distributed shared memory architectures in detail.	UN	1	13
12.	a	Apply the concept of locks and semaphores to a scenario where multiple processes need controlled access to a shared resource.	AP	2	13
		Or			
	b	Utilize condition variables and mutex locks to solve a synchronization problem where one thread must wait for a resource to be released by another thread before proceeding.	AP	2	13
13.	a	Choose a method for distributing data across multiple processing units in a parallel computation.	AP	3	13
		Or			
	b	Organize the stages of the information processing model of memory and illustrate how information is encoded, stored, and retrieved.	AP	3	13

14.	a	i	Construct an MPI program that demonstrates how to perform parallel reduction of an array of numbers. Explain the steps involved in your implementation.	AP	4	8
		ii	Identify the appropriate MPI function to send data from one process to another and explain how it handles different data types.	AP	4	5
			Or			
	b	i	Select an appropriate MPI performance metric to evaluate the efficiency of a parallel algorithm implemented on a distributed memory architecture.	AP	4	8
		ii	Organize Point-to-point and Collective communication.	AP	4	5
15.	a		Develop a parallel algorithm using a case study of sorting large datasets.	AP	5	13
			Or			
	b		Choose a testing framework to evaluate the performance of an algorithm implemented in both OpenMP and MPI.	AP	5	13

*PART – C (Marks 1*15 = 15)*

Q.No			*Questions*	*BLT*	*CO*	*Marks*
16.	a		Analyze the role of communication overhead in the performance of distributed parallel systems. How does this overhead affect the scalability of applications in different network configurations?	AN	2	15
			Or			
	b		Contrast the benefits and drawbacks of using shared memory versus message passing for data handling in functional parallelism. How do these approaches impact data integrity and synchronization?	AN	3	15