Register No : _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

M.E DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL-MAY 2025

Second Semester

Computer Science and Engineering

CP4292/PCST2422 - Multicore Architecture and Programming

Regulations -2021/2024

Duration : 3 Hrs ***Maximum : 100 Marks***

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

Q.No	*Questions*	*BLT*	*CO*	*Marks*
1.	What is the need for multicore architecture?	L1	1	2
2.	What is the use of parallelism in modern computing systems?	L2	1	2
3.	Justify the need for scalability in parallel computing.	L2	2	2
4.	Differentiate between deadlock and livelock.	L2	2	2
5.	List any two OpenMP directives and its advantages.	L1	3	2
6.	Illustrate how loop scheduling is handled in openMP.	L2	3	2
7.	Define the term MPI.	L1	4	2
8.	Distinguish between point to point and collective communication.	L2	4	2
9.	What are the input and output parameters of the n-body problem?	L1	5	2
10.	Distinguish between MPI_pack and MPI_unpack.	L2	5	2

PART – B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

Q.No			*Questions*	*BLT*	*CO*	*Marks*
11.	a	i	Compare SIMD and MIMD architectures with suitable examples. Explain their roles in parallel computing.	L2	1	8
		ii	Describe different types of interconnection networks and their role in parallel systems.	L2	1	8
			Or			
	b		Discuss cache coherence problems in multi-core systems. How are these issues addressed?	L2	1	16
12.	a		Apply suitable synchronization techniques to prevent data races in a multithreaded producer-consumer scenario.	L3	2	16
			Or			
	b	i	Apply various synchronization primitives (mutex, semaphore, barrier) to coordinate thread operations in a parallel sorting algorithm.	L3	2	10

	i i	Design a communication model for threads using message queues and pipes.	L3	2	6
13.	a	Analyze the OpenMP execution and memory model. How do they influence thread communication and synchronization?	L4	3	16
		Or			
	b	Analyze how OpenMP handles data and functional parallelism. Give examples for each and compare their advantages.	L4	3	16
14.	a	Critically assess the MPI constructs designed for distributed memory systems. How do they influence data sharing, performance, and scalability in high-performance computing applications?	L5	4	16
		Or			
	b	Compare and evaluate the behavior of MPI_Send and MPI_Recv in different communication modes (blocking, non-blocking, synchronous).	L5	4	16
15.	a	Critically evaluate the effectiveness of different techniques for assessing the performance of OpenMP codes.	L5	5	16
		Or			
	b	Evaluate the effectiveness of static and dynamic partitioning in tree search algorithms. Discuss the advantages and challenges of each approach in terms of load balancing, performance, and scalability.	L5	5	16