CBCS SCHEME

USN

BCS702

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Parallel Computing

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

			M	L	C
		Module – 1			
Q.1	a.	Explain in detail the classification of parallel computers according to Flynn's taxonomy. Compare SIMD and MIMD systems.	10	L1	CO1
	b.	Discuss shared memory and distributed memory architectures. Explain their working principle advantages and disadvantages.	10	L2	CO1
		OR			
Q.2	a.	What is cache coherence? Explain snooping and directory based coherence mechanisms with suitable example.	10	L3	CO1
	b.	Explain non-determinism and race conditions in shared memory programs. How can they be avoided?	10	L3	CO1
		Module – 2			
Q.3	a.	Explain GPU programming in detail.	10	L2	CO2
	b.	Describe input and output handling in MIMD and GPU systems.	10	L2	CO2
		OR			
Q.4	a.	Explain Amdahl's law with example and discuss it significance.	10	L3	CO2
	b.	Write a short note on timing and performance measurement of parallel programs.	10	L3	CO2
		Module – 3			
Q.5	a.	Define and explain the following MPI functions with syntax and purpose : i) MPI_Init( ) ii) MPI_Finalize( ) iii) MPI_Comm_Size( ) iv) MPI_Comm_rank( )	10	L3	CO3
	b.	Explain the concept of point to point communication in MPI with suitable example.	10	L2	CO3
		OR			
Q.6	a.	Explain the working of trapezoidal rule program in MPI.	10	L3	CO3
	b.	Compare the traditional global sum using process 0 as collector with tree structured global sum.	10	L3	CO3

		Module – 4			
Q.7	a.	Explain the structure and working of an OpenMP "Hello world" program.	6	L2	CO4
	b.	Explain the purpose of the reduction clause in OpenMP with example.	6	L2	CO4
	c.	Write a OpenMP program to calculate n-Fibonacci using tasks.	8	L2	CO4
		OR			
Q.8	a.	Define OpenMP. Explain the key features of OpenMP and its advantages over Pthreads.	6	L1	CO4
	b.	Explain the concept of variable scope in OpenMP with suitable example.	6	L2	CO4
	c.	Estimate the value of π.	8	L3	CO4
		Module – 5			
Q.9	a.	Define GPU and GPGPU. Explain the need for GPGPU.	6	L1	CO5
	b.	Explain thread, block and grid in CUDA.	6	L2	CO5
	c.	Explain CUDA vector addition program with suitable example.	8	L3	CO5
		OR			
Q.10	a.	Compare CUDA and OpenCL.	6	L1	CO5
	b.	Explain Kernel with shared memory.	6	L2	CO5
	c.	Explain Heterogeneous computing in detail.	8	L3	CO5

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