

**BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE
(AUTONOMOUS)**

I - M. Tech II-Semester Supplementary Examinations (BR23), July/Aug - 2025

**HIGH PERFORMANCE COMPUTING
COMPUTER SCIENCE & ENGINEERING (58)**

Time: 3 hours

Max. Marks: 75

*Answer any Five Questions One Question for One UNIT
ALL the Question Carry Equal Marks*

UNIT-I		Marks	CO	BL
1.a)	Describe CUDA architecture in details with neat?	7M	CO1	BL2
b)	Demonstrate the Challenges and Solutions in Programming for Heterogeneous Parallel Systems?	8M	CO1	BL2
OR				
2.a)	Compare and contrast of the Thread Hierarchy in different parallel computing models?	7M	CO1	BL2
b)	Explain the structure and significance of the GPU memory hierarchy?	8M	CO1	BL2
UNIT-II		Marks	CO	BL
3.a)	Demonstrate the algorithm for matrix multiplication?	7M	CO2	BL3
b)	Compare and contrast 1D, 2D, and 3D stencil operations in GPU programming?	8M	CO2	BL3
OR				
4.a)	Explain the various Image processing algorithms?	7M	CO2	BL2
b)	Discuss the fundamental principles of Reduction techniques in GPU programming?	8M	CO2	BL3
UNIT-III		Marks	CO	BL
5.a)	Explore the applications of MIC architectures in high-performance computing environments?	7M	CO3	BL4
b)	Draw and describe the microarchitecture of the Intel Xeon Phi core?	8M	CO3	BL4
OR				
6.a)	Examine how thread hierarchy in Intel Xeon Phi processors integrates with emerging technologies?	7M	CO3	BL4
b)	Demonstrate the Intel Xeon Phi's performance metrics?	8M	CO3	BL3
UNIT-IV		Marks	CO	BL
7.a)	Describe the fundamental concepts of distributed and symmetric architectures?	7M	CO4	BL3
b)	Illustrate how parallel regions are created and managed using OpenMP?	8M	CO4	BL2
OR				
8.a)	Explore performance considerations in thread creation for parallel programming?	7M	CO4	BL4
b)	Describe the different synchronization mechanisms and constructs available in shared memory programming?	8M	CO4	BL3

UNIT-V

	Marks	CO	BL
9.a) Explain key concepts associated with message passing interface?	7M	CO5	BL5
b) Illustrate the various challenges associated with MPI programming?	8M	CO5	BL2
OR			
10.a) Describe the various types of collective communication operations provided by MPI?	7M	CO5	BL3
b) Explore the impact of data grouping on MPI performance?	8M	CO5	BL4
