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GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN
(Autonomous)

(Affiliated to Andhra University, Visakhapatnam)

M.Tech. - II Semester Regular Examinations, August – 2026

[Computer Science & Engineering (Data Science)]

HIGH-PERFORMANCE COMPUTING

1. All questions carry equal marks
2. Must answer all parts of the question at one place

Time: 3Hrs.

Max Marks: 70

UNIT-I

1. a. Explain how GPUs act as parallel computers compared to CPUs. [7M]
b. Describe the need for more speed and parallelism in computing. [7M]
- OR
2. a. Discuss the concept of Unified Graphics and Computing Processors. [7M]
b. Explain the parallel programming languages and models in GPU computing. [7M]

UNIT-II

3. a. Explain the UMA and ccNUMA shared memory architectures. [7M]
b. Describe the basic steps of parallelization with an example. [7M]
- OR
4. a. Illustrate the architecture of Distributed Memory Computers. [7M]
b. Explain Hierarchical (hybrid) parallel systems with a diagram. [7M]

UNIT-III

5. a. Explain the concept of Data Parallelism in CUDA with an example. [7M]
b. Describe the device memories and host-device data transfer in CUDA. [7M]
- OR
6. a. Explain the CUDA thread organization with a neat diagram. [7M]
b. Discuss how kernel functions are defined and launched in CUDA. [7M]

UNIT-IV

7. a. Explain data scoping in OpenMP with suitable examples. [7M]
b. Describe the reduction operations in OpenMP with an example. [7M]
- OR
8. a. Explain the OpenMP parallel execution model with a diagram. [7M]
b. Discuss the various loop scheduling techniques in OpenMP. [7M]

UNIT-V

9. a. Explain the Message Passing Model and its characteristics. [7M]
b. Describe point-to-point communication in MPI with an example. [7M]
- OR
10. a. Explain the collective communication operations in MPI. [7M]
b. Compare blocking and nonblocking communication in MPI. [7M]