

Total No. of Questions: 8]

SEAT No. :

**PB2256**

**[6263]-94**

[Total No. of Pages :2

**B.E. (Computer Engineering)  
HIGH PERFORMANCE COMPUTING  
(2019 Pattern) (Semester-VIII) (410250)**

*Time : 2½ Hours]*

*[Max. Marks : 70*

*Instructions to the candidates:*

- 1) Answer Q.1 or Q.2, Q.3 or Q.4, Q5 or Q6, Q7 or Q8.
- 2) Figures to the right indicate full marks.
- 3) Neat diagrams must be drawn wherever necessary.
- 4) Make suitable assumptions whenever necessary.

- Q1)** a) What is one-to-all broadcast? Explain it with the help of algorithm for one-to-all broadcast on hypercube. Comment on cost calculation. [7]
- b) Explain scatter and gather communication operation. [6]
- c) Explain circular shift operation. [4]

OR

- Q2)** a) Explain all to all broadcast and all to all reduction communication operation with example? Discuss cost analysis. [7]
- b) Explain in detail Blocking and Non-Blocking Communication Using MPI. [6]
- c) Comment on “Improving the Speed of Communication Operations.” [4]

- Q3)** a) Explain various sources of overhead in parallel systems [7]
- b) Show effect of granularity on performance with addition of n numbers on p processing elements. [6]
- c) Explain amdahl’s and gustafson’s law. [4]

OR

- Q4)** a) Explain different performance Metrics for Parallel Systems. [7]
- b) Explain parallel Matrix-Matrix multiplication algorithm with example. [6]
- c) Comment on “Scalability of Parallel Systems”. [4]

*P.T.O.*

- Q5)** a) Draw and explain CUDA architecture in details. [8]  
b) Describe processing flow of cuda along with cuda c functions. [6]  
c) Write advantages and limitations of CUDA. [4]

OR

- Q6)** a) Explain how the CUDA C program executes at the kernel level with example. [8]  
b) Explain cuda memory model in brief. [6]  
c) Write applications of cuda. [4]

- Q7)** a) What are the issues in sorting on parallel computers, explain with example? [8]  
b) Explain BFS for parallel execution & analyze its complexity. [6]  
c) Write short note on Kubernets. [4]

OR

- Q8)** a) Compare an algorithm for sequential and parallel Merge sort. Analyze the complexity for the same. [8]  
b) Explain Parallel Depth First Search algorithm in detail. [6]  
c) Write short note on GPU Applications. [4]