

ME / SEM II (Choice Base) / I.T / MAY 2018
High Performance Computing

Q. P. Code: 34032

(3 hours)

[80 marks]

NOTE: 1. Question No 1 is compulsory

2. Attempt any three questions from remaining.

3. Assume suitable data if necessary.

Q1 Attempt any four.

- a) Explain the CPU+GPU architecture. [05]
- b) What is CUDA? Explain CUDA processor Architecture? [05]
- c) Differentiate between Loosely coupled system and tightly coupled system. [05]
- d) Explain the concept of Shared Memory Programming? [05]
- e) Differentiate between the SIMD and MIMD architecture. [05]

- Q2
- a) Explain the Foster's design methodology and apply the same to any one sorting algorithm. [10]
 - b) Derive the expression for speedup and efficiency by Amdahl's law and comment on the same. [10]

- Q3
- a) Why process Synchronization is required? Explain different types of synchronization mechanisms in briefly? [10]
 - b) Explain the concepts of threading in OpenMP? Also explain the building blocks of OpenMP? [10]

- Q4
- a) Explain the Architecture of NVIDIA GPU? [10]
 - b) Explain in detail the Design issues and Limitations in Parallel Computing? [10]

- Q5
- a) Design parallel algorithm structure for performing Partitioning and Matrix input / Output. [10]
 - b) Explain Memory Hierarchy and Memory Transaction specific memory design using CUDA? [10]

Q6 Attempt any two.

- a) Write short note on Quantum Computing [10]
- b) Write short note on Petascale Computing? [10]
- c) Explain in brief about Performance Bottleneck, Data Race and Determinism, Data Race Avoidance and Deadlock Avoidance [10]