TE/Sem V / C-scheme/ May-23

Paper / Subject Code: 37465 / Department Level Optional Course - 2 High Performance Computing

CSE

18 MAY 2023

Duration: 3hrs [Max Marks: 80]

N.B. : (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

1 a What are the principles of Message Passing Programming? [20]
b What are the applications of parallel computing?.
c Explain Partitioning, Agglomeration with respect to Parallel algorithm.
d Compare the principles of data flow computers and control flow computers [10]

2 a Explain blocking and non-blocking communication using MPI. [10]
b State Amdahl's Law? Suppose a serial program reads n data from a file, performs some computation, and then writes n data back out to another file. The I/O time is measured and found to be 4500 + n μsec. If the computation portion takes n 2/200 μsec, what is the maximum speedup we can expect when n=10,000 and N processors are used? [10]

3 a Write a MPI program to find the sum of N Numbers. [10]
b Explain in detail various programmatic levels of parallel processing [10]

4 a Short note on SIMD matrix multiplication [10]
b Explain Granularity, Concurrency and Dependency Path. [10]

5 a What are the different network topologies? Explain in detail. [10]
b Explain Flynn's classification in details [10]

6 a What is OpenCL? Explain features of OpenCL [10]
b Explain interprocess communication with suitable example.

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