(3 Hours) **Total Marks:80**

N.B. : Question **No. 1 is Compulsory**.
1. Solve any **THREE** from Question No. 2 to 6.
2. Draw neat well labeled diagram wherever necessary

1.	(a)	Explain Non-Blocking Communication using MPI.	5
	(b)	Define Network Topology and its types.	5
	(c)	Discuss the categories of computers based on Flynn's classification.	5
	(d)	Difference between Virtualization and Containerization	5
2.	(a)	Write a MPI program for Prime Number Generation.	10
	(b)	Explain Granularity, Concurrency and Dependency Path.	10
3.	(a)	Define CUDA? Explain in CUDA processor architecture?	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
4.	(a)	Explain different Decomposition techniques of parallel algorithm.	10
	(b)	What is OpenMP? Explain OpenMP compiler directives? What are the Pros and Cons of OpenMP.	10
5.	(a)	State and explain different parallel algorithm models.	10
	(b)	Explain the use of HPC in Cloud Platform?	10
6.	(a)	What are the different Performance metrics?	10
	(b)	Explain Mapping techniques for Load Balancing.	10

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