Seat No: _____ **Enrollment No: _____**

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

B.Tech. Winter 2023 - 24 Examination

Semester: 7th **Date: 27.10.2023**
Subject Code: 203105428 **Time: 10:30 am to 1:00 pm**
Subject Name: High Performance Computing **Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1	**Objective Type Questions** - (All are compulsory) (Each of one mark)	(15)	CO	PO	Bloom's Taxonomy
	1. Which of the following is NOT a commonly used parallel computing architecture in HPC? a) Shared Memory b) Distributed Memory c) Symmetric Multiprocessing (SMP) d) Centralized Processing Unit (CPU)		1	1	Remember
	2. Which programming language is commonly used for GPU programming? a) Java b) Python c) CUDA d) HTML		2	1	Remember
	3. Which company is known for manufacturing high-performance GPUs used in various fields, including gaming and scientific computing? a) Intel b) AMD c) NVIDIA d) Qualcomm		1	2	Remember
	4. What does CUDA stand for? a) Central Unified Device Architecture b) Compute Unified Device Architecture c) Computer Unified Data Architecture d) Centralized Universal Device Acceleration		3	2	Remember
	5. What is the primary goal of High-Performance Computing (HPC)? a) Maximizing energy efficiency b) Minimizing hardware costs c) Achieving high computational performance d) Enhancing data storage capacity		3	2	Remember
	6. State Amdahl's law.		1	1	Remember
	7. Quick Sort is an example of a sorting algorithm that employs the _____ strategy to sort a list of numbers.		2	3	Understand
	8. The lowest level of unit of execution on GPU is called _____.		2	1	Understand
	9. What is GPGPU?		3	2	Remember
	10. What is multithreading?		2	3	Remember
	11. What is block in CUDA programming?		4	1	Apply
	12. Differentiate: Parallelism & Concurrency.		1	1	Apply

	13. What is the purpose of using a profiler?		**4**	**2**	**Remember**
	14. What is a multi-node System?		**5**	**1**	**Remember**
	15. What is Granularity? Which are the two types of granularity?		**5**	**4**	**Remember**
Q.2	**Answer the following questions**. (Attempt any three)	**(15)**			
	A) Explain Flynn's Taxonomy.		**1**	**2**	**Understand**
	B) Compare CPU and GPU.		**2**	**3**	**Analyze**
	C) Which are the characteristics of task?		**3**	**4**	**Understand**
	D) Explain the terms and write the formula: Speedup, Efficiency		**1**	**1**	**Understand**
Q.3	A) Compare Implicit and Explicit Parallelism.	**(07)**	**4**	**2**	**Apply**
	B) What is pipelining? Give example.	**(08)**	**3**	**2**	**Analyze**
	OR				
	B) Explain the general program structure of Open MP Program along with the compilation and the execution steps.	**(08)**	**3**	**4**	**Create**
Q.4	A) Write a CUDA Program to print "Hello World".	**(07)**	**3**	**4**	**Create**
	OR				
	A) Explain the use of pthred_Create() and pthread_join() with the help of an example.	**(07)**	**3**	**4**	**Evaluate**
	B) Explain in detail the types of the memory used by GPU.	**(08)**	**1**	**3**	**Understand**