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

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

B.Tech. Summer 2023 - 24 Examination

Semester: 6 **Date: 02/05/2024**
Subject Code: 203105428 **Time: 10:30 am to 01:00 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** - (Fill in the blanks, one word answer, MCQ-not more than Five in case of MCQ) (All are compulsory) (Each of one mark)	**(15)**	**CO**	**PO**	**Bloom's Taxonomy**
	1. Which one of these is not a level of parallelism? a. Data b.Task c. Hardware d. Instruction		**CO1**	**1**	**KNOWLEDGE**
	2. VLIW stands for a.Very Long Instruction word b.Very Long Instruction width c.Very Large Instruction word d.None Of above		**CO1**	**2**	**KNOWLEDGE**
	3. CUDA supports programming in …. a. c or c++ only b.java, python, and more c. c, c++, third party wrappers for java, python, and more d.pascal		**CO5**	**2**	**KNOWLEDGE**
	4. Which is known as Broadcast? a. one-to-one b.one-to-all c.all-to-all d.all-to-one		**CO3**	**1**	**KNOWLEDGE**
	5. Which MPI routine used to determine the number of process a. MPI_init() b.MPI_finalize() c. MPI_Comm_RANK() d. MPI_Comm_Size ()		**CO3**	**1**	**KNOWLEDGE**
	6. _____ is use to copy the data from host to device in CUDA.		**CO5**	**4**	**UNDERSTAND**
	7. The length of the longest path in a task dependency graph is called the _____.		**CO2**	**2**	**UNDERSTAND**
	8. The _____ API allows a programmer to change the default attributes of entities using attributes objects		**CO4**	**1**	**UNDERSTAND**
	9. pthread_attr_init to create an/a _____.		**CO4**	**3**	**UNDERSTAND**
	10. Write applications of HPC.		**CO1**	**1**	**APPLY**
	11. Explain Moore's Law		**CO1**	**2**	**UNDERSTAND**
	12. What is profiler. Name any two profilers.		**CO6**	**5**	**KNOWLEDGE**
	13. Write the formula for Speedup and Efficiency		**CO6**	**2**	**APPLY**
	14. Define Granularity and its types.		**CO2**	**1**	**KNOWLEDGE**
	15. State Amdahl's Law.		**CO6**	**1**	**KNOWLEDGE**
Q.2	**Answer the following questions**. (Attempt any three)	**(15)**			
	A)Write Short Note on GPGPU.		**CO5**	**5**	**APPLY**
	B) Discuss Instruction Level Parallelism		**CO1**	**2**	**UNDERSTAND**
	C)Write steps to analyse the code using Gprof.		**CO5**	**4**	**APPLY**
	D)What is the purpose of a CUDA kernel?		**CO1**	**2**	**UNDERSTAND**
Q.3	A) Define decompostion. Also state different types of decomposition techniques.	**(07)**	**CO2**	**2**	**KNOWLEDGE**

	B) Compare between: 1. Explicit Paralellism and Implicit Parallelism 2. CPU and GPU.	**(08)**	**CO1**	**2**	**ANALYZE**
	OR				
	B) Write steps to add two numbers using CUDA program	**(08)**	**CO5**	**4**	**KNOWLEDGE**
Q.4	A) Write short note on : 1. MPI 2. DGX architecture	**(07)**	**CO3**	**1**	**ANALYZE**
	OR				
	A) Differentiate between: 1. Parallelism and Concurrency 2. Differentiate between Multi core and Multi thread processing techniques.	**(07)**		**3**	**ANALYZE**
	B) Explain different types of Parallel Algorithm Models	**(08)**		**2**	**UNDERSTAND**