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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY SIXTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), MAY 2019

Course Code: CS372

Course Name: High performance computing

Max. Marks: 100

Duration: 3 Hours

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PART A

Answer all questions, each carries3 marks.	Marks
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Name:

1	With a neat diagram explain the concept of Stored Program Architecture.	(3)
2	Discuss the role of compilers in optimization.	(3)
3	Suggest any two possible methods for placing a block in the cache from main	(3)
4	Differentiate aliasing and inlining with a suitable example.	(3)

PART B

Answer any two full questions, each carries9 marks.

5	a)	Discuss the technical motivation behind multicore processors.	(4)
	b)	With suitable diagram explain how quad core processors are performing better than	(5)
		dual core processors .	
6	a)	How prefetching solves the problem of latency on first miss?	(2)
	b)	What are the basic performance metrics that can quantify the speed of a CPU?	(5)
	c)	What is the role of mask register in supporting branches in vectorised loops?	(2)
7	a)	What are the different common sense guidelines for avoiding performance pitfalls?	(4)
	b)	What are the general optimization options offered by a compiler?	(4)
	c)	Write the equation for computing machine balance (Bm) of a processor chip.	(1)

PART C

Answer all questions, each carries3 marks.

8	Differentiate UMA and ccNUMA.								(3)		
9	Explain Gustafson's law.								(3)		
10	List	the	difference	between	point	to	point	blocking	and	non-blocking	(3)
communication in MPI environment.											
11 What is the reason for using MPL Ssend () to avoid deadlock?								(3)			

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PART D

Answer any two full questions, each carries9 marks.

12	a)	With the help of a neat diagram illustrate the concept of distributed memory	(4)
		multicomputer.	
	b)	Discuss about the factors that limit parallel execution.	(3)
	c)	Differentiate MPI_Send() and MPI_Ssend() in MPI Programming.	(2)
13	a)	Differentiate data parallelism and functional parallelism.	(3)
	b)	Explain cache coherence problem?	(2)
	c)	With the help of a neat diagram discuss the concept of MESI protocol.	(4)
14	a)	With a suitable example explain how point to point blocking communication is	(5)
		implemented in MPI Programming.	
	b)	How global reduction is performed in MPI environment?	(4)
		PART E	
		Answer any four full questions, each carries10 marks.	
15	a)	With an example show how scheduling is implemented in OpenMP.	(7)
	b)	What is the relevance of Profiling in OpenMP programs?	(3)
16	a)	Write an efficient parallel program using OpenMP to implement matrix multiplication.(Program can be in C C++ or Fortran)	(8)
	b)	Demonstrate the use of named critical regions to prevent deadlock.	(2)
17	a)	With a suitable example demonstrate how sharing of for loop is implemented in OpenMP.	(5)
	b)	Illustrate the concept of false sharing in OpenMP.	(5)
18	a)	How synchronization and serialization implemented in MPI?	(5)
	b)	Describe collective communication in MPI.	(5)
19	a)	How communication overhead is reduced in MPI?	(5)
	b)	Differentiate eager protocol and rendezvous protocol.	(5)
20		Discus about load balancing and domain decomposition in MPI.	(10)
