Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA - SEMESTER–III • EXAMINATION – WINTER 2013

Subject Code: 650005 **Date: 29-11-2013**

Subject Name: Parallel Programming

Time: 02.30 am - 05.00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Define: SIMD, MIMD	**02**
	(b)	What is difference between parallel computing and distributed computing?	**02**
	(c)	List parallel processing technique used in uniprocessor	**02**
	(d)	Comment: “Parallelism and performance are related, but they are not the same”	**02**
	(e)	Define: Control dependency and resource dependency	**02**
	(f)	What is pthread?	**02**
	(g)	What is message passing model?	**02**
Q.2	**(a)**	What is shared memory programming? What are the basic constraint behind shared memory programming	**07**
	(b)	Write parallel algorithm for histogram computation	**07**
		OR	
	(b)	Explain general model of shared memory programming	**07**
Q.3	**(a)**	Write short note on interconnection networks	**07**
	(b)	Write short note on symmetric multiprocessor architecture	**05**
	(c)	List set of problems identified as the grand challenges for computing	**02**
		OR	
Q.3	**(a)**	What is P-RAM? Explain assumptions and constraints of it.	**07**
	(b)	Explain two main goals of parallel processing	**05**
	(c)	Differentiate: tightly coupled and loosely coupled processors	**02**
Q.4	**(a)**	Explain sources of performance loss in parallelism	**04**
	(b)	Define: Speedup, Super-linear Speedup and efficiency	**03**
	(c)	Explain program transformation techniques to avoid data dependency	**07**
		OR	
Q.4	**(a)**	Check whether following statements can be executed in parallel and find out dependencies if any. 1) S1: A = B + C, S2: D = 2*A 2) S1: A = B + C, S2: A = A – D	**04**
	(b)	Explain with suitable example that dependency is not transitive.	**03**
	(c)	Write parallel program to sum an array, named A, of N numbers using UNIX shared memory programming model.	**07**
Q.5	**(a)**	Explain routines for creating, terminating, joining and setting thread attributes for POSIX threads (pthread)	**07**
	(b)	Explain groups and communicators and types of communications in message passing interface	**07**
		OR	
Q.5	**(a)**	What is conditional variable in pthread? Explain routines for waiting and signaling on conditional variable	**07**
	(b)	Write short note on parallel virtual machine	**07**

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