

**IS702**

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M S RAMAIAH INSTITUTE OF TECHNOLOGY

(AUTONOMOUS INSTITUTE, AFFILIATED TO VTU)

BANGALORE – 560 054

SEMESTER END EXAMINATIONS – JANUARY 2015

Course & Branch	: B.E. – INFORMATION SCIENCE & ENGG.	Semester	: VII
Subject	: Parallel Programming	Max. Marks	: 100
Subject Code	: IS702	Duration	: 3 Hrs

Instructions to the Candidates:

- Answer one full question from each unit.

UNIT – I

- Illustrate the problem of false sharing and write the program to eliminate false sharing by considering count 3s computation. (10)
 - Explain the logical organization and communication networks of BlueGene/L nodes. (10)
- Compare the order of combining a sequencing of numbers (7,3,15,10,13,18,6,4) using iterative sum and pair-wise summation techniques. (10)
 - Explain the CTA parallel computer model and list the properties of CTA abstract machine. (10)

UNIT – II

- Briefly discuss different sources for performance loss in multi processor environment. (10)
 - Write the Peril-L notation program for counting 3s to achieve fixed and scalable parallelism. (10)
- Explain different types of data dependencies with an example for each and justify the statement *dependencies limit parallelism*. (10)
 - Illustrate the batcher's sort for the following sequence by considering n=24 numbers and P=8 threads.
[10,40,05,27,26,25,01,15,18,21,06,16,08,28,38,11,03,13,19,31,39,33,22,4]
Consider the input (p,d): (-,0)(0,1)(1,2)(0,2)(2,3)(1,3)(0,3) (10)

UNIT – III

- Illustrate the implementation of generalized reduce using Schwartz template for computing second smallest magnitude in an array. (10)
 - What is the drawback of cyclic distribution? Illustrate how Block-Cyclic allocation overcomes the drawback of cyclic distribution. (10)
- Enumerate the working of Schwartz algorithm and write the implementation of process induced tree for Schwartz algorithm. (10)
 - Write the code for computing the expansion factor for the Collatz Conjecture. (10)

UNIT – IV

- Explain why a signaling thread needs to be protected by a mutex and justify the statement *proper locking of the signaling code prevents race condition*. (15)
 - Discuss different section in OpenMP parallel for statement. (05)



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8. a) Explain different POSIX thread routines for waiting and signaling on a conditional variable. (10)
b) Write a OpenMP program to find prime numbers (split). (10)

UNIT - V

9. a) Give the comparison of constrained, implicit and explicit parallelism. (10)
b) Briefly discuss different implementation issues of Transactional memory. (10)
10. a) Write the MPI program to solve the count 3s problem. (14)
b) Write short notes on Unified Parallel C and Titanium Language. (06)
