

**ITCS 4/5/8145 Parallel Programming**  
**Mid Term Test**  
**Tuesday March 12th, 2002, 4:30 pm - 5:50 pm**

Name: .....  
(Please write your last name first as given in UNC-Charlotte records.)

THREE pages plus one blank page. DO **NOT** USE ADDITIONAL PAPER. Attempt all questions in the spaces provided. You may refer to the attached Appendix A “Basic PVM routines”, and Appendix B “Basic MPI routines.” **Do not refer to any other materials.**

Mark/30

Qu. 1 Answer each of the following briefly:

(a) What is a shared memory multiprocessor? 2

(b) Define speedup factor as applied to multiprocessors. 2

(c) What is meant by the term single program multiple data (SPMD) structure for a parallel program? 2

(d) What is the essential difference between a synchronous message passing routine and an asynchronous message passing routine? 2

- (e) When is a computation **not** embarrassingly parallel? 2
- (f) When does a barrier routine return? 2
- (g) What is meant by a “Jacobi” iteration? 2
- (h) When all processes send their messages first and then receive all their messages is called “unsafe.” Why? 2
- (i) What is meant by the phrase “asynchronous iterative method” and what is its advantage over a synchronous iterative method? 2

Qu. 2 In the sieve of Eratosthenes method of extracting prime numbers, a consecutive series of all integers is generated from 2. The first number, 2, is prime and kept. All multiples of this number are deleted as they cannot be prime. The process is repeated with each remaining number. The algorithm removes nonprimes, leaving only primes.

Write a parallel program in PVM or MPI to find the first 100 prime numbers using sieve of Eratosthenes method. Use 10 processes and a pipelined approach.

*Provide comments in your code to help the grader! If I do not understand the code, I will assume it is incorrect.*

