Introduction to MPI - Worksheet 2 – Chapter 2
(See WebCT-HPC Course)

1. Sharing of data between processes takes place by _________________.

2. A parallel computation consists of a number of *processes*. What is the difference between *processes* and *processors*?

3. A usefulness of the message passing model is that is general and ...?

4. The MPI-1 standard was developed in what year?

5. MPI-1 is developed for what language(s)?

6. What are two primary goals of MPI?

7. Parallel I/O is part of MPI-1. True/False

8. All programming problems can benefit from parallel programming and MPI. True/False

9. **Message passing programs** consist of multiple instances of a serial program that communicate by library calls. What are the 4 *classes* of these library calls?

10. We have used library calls from the first 3 classes in #9 above. Give an example of each.

11. Each process executes a copy of the entire code. in an MPI program. True/False

12. Point-to-point communication in MPI is "two-sided", meaning what?

13. MPI uses what three pieces of information in the “message body”?

14. What is the difference between blocking and nonblocking send/receive?

15. What is the difference between a synchronous and a buffered send?

16. Briefly describe a “broadcast” operation.

17. Briefly describe a “scatter” operation.

18. Briefly describe a “reduction” operation.

19.1. Point-to-point communication (check your answers online)
2. Collective communication 3. Communication mode 4. Blocking send
5. Synchronous send 6. Broadcast 7. Scatter 8. Gather

a. A send routine that does not return until it is is complete
b. Communication involving one or more groups of processes
c. A send routine that is not complete until receipt of the message at its destination has been acknowledged
d. An operation in which one process sends the same data to several others
e. Communication involving a single pair of processes
f. An operation in which one process distributes different elements of a local array to several others
g. An operation in which one process collects data from several others and assembles them in a local array
h. Specification of the method of operation and completion criteria for a communication routine

20. Which of the following is true for all send routines?

A. It is always safe to overwrite the sent variable(s) on the sending processor after the send returns.

B.Completion implies that the message has been received at its destination.

C. It is always safe to overwrite the sent variable(s) on the sending processor after the send is complete.

D. All of the above.

E. None of the above.

21. Is a blocking send necessarily also synchronous? Yes/No
Briefly explain why.

22.Consider the following fragment of MPI pseudo-code:

```
...
x = fun(y)
MPI_SOME_SEND(the value of x to some other processor)
x = fun(z)
...
```

where MPI_SOME_SEND is a generic send routine. In this case, it would be best to use

A. A blocking send

B. A nonblocking send

21. Explain your reasoning for #20 above.