**M.Sc. Sem-IV (CS)**

**Paper-IV (Parallel Computing)**

**Unit-III**

1. What are the Performance Metrics for Parallel Systems?

A. Execution time

B. Total parallel overhead

C. speedup

D. all of the above

Ans: D

2. What is a measure of the fraction of time for which a processing element is usefully employed?

A. Efficiency

B. Speedup

C. Execution time

D. parallel overhead

Ans: A

3. What reflects the sum of the time that each processing element spends solving the problem? A. Speedup

B. Cost

C. Efficiency

D. None of these

Ans: B

4. Which is the sources of overhead in parallel programs?

A. Interprocess Interaction

B. Idling

C. Excess Computation

D. All of the above

Ans: D

5. How can derive Parallel Time?

A. 

B. 

C. 

D. None of these

Ans: A

6. The maximum number of tasks that can be executed simultaneously at any time in a parallel algorithm is called?

A. degree of concurrency

B. concurrency

C. Both A & B

D. None of these

Ans: A

7. What are the other scalability metrics?

A. Scaled Speedup

B. Serial Fraction f

C. Both A & B

D. None of these

Ans: C

8. What are the basic concepts that are essential in writing correct and efficient message-passing programs using MPI?

A. Starting and Terminating the MPI Library

B. Communicators

C. Getting Information

D. All of the above

Ans: D

9. A ***parallel system*** is the combination of an algorithm and the parallel architecture on which it is implemented.

A. True

B. False

Ans: A

10. The overheads incurred by a parallel program are not encapsulated into a single expression referred to as the ***overhead function***.

A. True

B. False

Ans: B

11. Programs are designed and tested for smaller problems on fewer processing elements. A. True

B. False

Ans: A

12. The *scalability* of a parallel system is a measure of its capacity to increase speedup in proportion to the number of processing elements.

A. True

B. False

Ans: A

13. Parallel execution time cannot be expressed as a function of problem size, overhead function, and the number of processing elements.

A. True

B. False

Ans: B

14. Parallel system is cost-optimal if and only if its overhead function does not asymptotically exceed the problem size.

A. True

B. False

Ans: A

15. The ***message-passing programming paradigm*** is one of the oldest and most widely used approaches for programming parallel computers.

A. True

B. False

Ans: A

16. Message-passing programs are not often written using the ***asynchronous*** or ***loosely synchronous*** paradigms.

A. True

B. False

Ans: B

17. What are the Blocking Message Passing Operations?

A. Blocking Non-Buffered Send/Receive

B. Idling overheads in Blocking Non-Buffered Operations

C. Blocking Buffered Send/Receive

D. Deadlocks in Blocking Non-Buffered Operations

Ans: A & C

18. What are the collective communication and computation operations?

A. Barrier

B. Broadcast

C. Reduction

D. Deadlock

Ans: A, B & C

19. What are the techniques for evaluating the scalability of parallel programs using analytical tools?

A. Superlinearity effects from caches

B. Cost optimality and the Isoefficiency Function

C. superlinear speedup

D. A Lower Bound on the Isoefficiency Function

Ans: A & D

20. What are the numbers of metrics used based on the desired outcome of performance analysis?

A. Efficiency

B. Speedup

C. Idling

D. Interprocess

Ans: A & B

21. Can be Single Program Multiple Data programs?

A. synchronous

B. loosely synchronous

C. completely asynchronous

D. asynchronous

Ans: B & C

22. \_\_\_\_\_\_\_\_\_ is a measure that captures the relative benefit of solving a problem in parallel. A. Execution time

B. Parallel Overhead

C. Speedup

D. None of these

Ans: C

23. We define the ***\_\_\_\_\_*** of solving a problem on a parallel system as the product of parallel runtime and the number of processing elements used.

A. efficiency

B. cost

C. speedup

D. none of these

Ans: B

24. The total overhead function \_\_\_ is an increasing function of *p*.

A. *To*

B. E

C. S

D. Tp

Ans: A

25. The message-passing programming paradigm is one of the oldest and most widely used approaches for programming \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

A. serial computers

B. parallel computers

C. distributed

D. none of these

Ans: B

26. \_\_\_\_\_\_\_\_\_\_\_\_ is called prior to any calls to other MPI routines

A. MPI\_Init

B. MPI\_Finalize

C. MPI\_SUCCESS

D. none of these

Ans: A

27. Every process that belongs to a communicator is uniquely identified by its ***\_\_\_\_\_.*** A. size

B. rank

C. rank & size

D. none of these

Ans: B

28. The \_\_\_\_\_\_\_\_\_ returns only after the requested message has been received and copied into the buffer.

A. MPI\_Send

B. MPI\_comm

C. MPI\_Recv

D. none of these

Ans: C

29. MPI views the processes as being arranged in a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ topology and uses a linear ordering to number the processes.

A. one-dimensional

B. two-dimensional

C. multi-dimensional

D. all of these

Ans: A

30. Match the pair

A. MPI\_Init 1. Determines the label of the calling process B. MPI\_Finilize 2. Initializes MPI

C. MPI\_comm\_size 3. Terminates MPI

D. MPI\_comm\_rank 4. Determines the number of processes Ans: A-2, B-3, C-4, D-1

31. Match the pair

A. Barrier 1. MPI\_Scan

B. Broadcast 2. MPI\_Reduce

C. Reduction 3. MPI\_Bcast

D. Prefix 4. MPI\_Barrier

Ans: A-4, B-3, C-2, D-1

32. Match the Pair

A. Maximum C integers and floating point 1. MPI\_LAND B. Logical AND C integers 2. MPI\_MAX C. Bit-wise XOR C integers and byte 3. MPI\_MINLOC D. min-min value-location Data-pairs 4. MPI\_BXOR Ans: A-2, B-1, C-4, D-3

33. Match the pair

A. MPI\_Gather 1.The scatter operation

B. MPI\_Scatter 2.The all-to-all personalized communication operation C. MPI\_Alltoall 3.The gather operation

D. MPI\_Onetoall 4. The one-to-all personalized communication operation Ans: A-3, B-1, C-2, D-4