Sample Questions

Computer Engineering

Subject Name: High Performance Computing **Semester: VIII**

Multiple Choice Questions

Choose the correct option for following questions. All the Questions carry equal marks	
1.	_____ classified the computers on the basis of organization of the constituent elements in the computer.
Option A:	Flynn
Option B:	Handler
Option C:	Shore
Option D:	Feng
2.	Two stage instruction pipeline has
Option A:	fetch and Execute instruction
Option B:	Fetch and Write Instruction
Option C:	Fetch and Decode
Option D:	Fetch and Memory Excess
3.	In 3-D hypercube network topology the neighbor of node zero are
Option A:	node 1 and node 2 and node 4
Option B:	node 2 and node 3 and node 4
Option C:	node 3 and node 1 and node 4
Option D:	node 1 and node 4 and node 3
4.	The length of the longest path in a task dependency graph is called
Option A:	the critical path length
Option B:	the critical data length
Option C:	the critical bit length
Option D:	the critical byte length
5.	_____suited to problems that are solved using the divide-and-conquer strategy
Option A:	exploratory decomposition
Option B:	Recursive Decomposition
Option C:	speculative decomposition
Option D:	data decomposition
6.	Using fewer than the maximum possible number of processing elements to execute a parallel algorithm is called _____ a parallel system in terms of the number of processing elements.
Option A:	Scaling down
Option B:	Scaling up
Option C:	Cost optimal

Option D:	Non Cost optimal
7.	Which speedup could be achieved according to Amdahl´s law for infinite number of processors if 5% of a program is sequential and the remaining part is ideally parallel?
Option A:	Infinite speedup
Option B:	5
Option C:	50
Option D:	20
8.	Parallelism can be used to increase the (parallel) size of the problem is applicable in _____.
Option A:	Amdahl's Law
Option B:	Gustafson-Barsis's Law
Option C:	Newton's Law
Option D:	Pascal's Law
9.	The Prefix Sum Operation can be implemented using the_____
Option A:	All-to-all broadcast kernel.
Option B:	All-to-one broadcast kernel.
Option C:	One-to-all broadcast Kernel
Option D:	Scatter Kernel
10.	The _____ functions are used to determine the number of processes
Option A:	MPI_Init
Option B:	MPI_Comm_world
Option C:	MPI_Comm_size
Option D:	MPI_Comm_rank
11.	Handler's classification uses the following three pairs of integers to describe a computer: Computer = (p * p', a * a', b * b') So here what is a meaning of P’
Option A:	Number of PCUs that can be pipelined
Option B:	Number of bits that can be pipelined
Option C:	Number of segments can be pipelined
Option D:	Number of bytes that can be pipelined
12.	Control hazards occurs due to_____
Option A:	ADD instruction
Option B:	MUL instruction
Option C:	DIV instruction
Option D:	Branch instruction
13.	Messages in Cut through routing are divided into?
Option A:	Packets
Option B:	Segments
Option C:	Flits
Option D:	smaller units

14.	We anticipate which pages we are going to browse ahead of time and issue requests for them in advance is known as _____.
Option A:	Prefetching
Option B:	Multithreading
Option C:	Multitasking
Option D:	Latency
15.	The number and size of tasks into which a problem is decomposed determines the_____ of the decomposition.
Option A:	Concurrency
Option B:	Task dependency
Option C:	Granularity
Option D:	Efficiency
16.	_____ is due to load imbalance, synchronization, or serial components as parts of overheads in parallel programs.
Option A:	Inter process interaction
Option B:	Synchronization
Option C:	Idling
Option D:	Excess computation
17.	Which speedup could be achieved according to Amdahl´s law for infinite number of processors if 5% of a program is sequential and the remaining part is ideally parallel?
Option A:	Infinite speedup
Option B:	5
Option C:	50
Option D:	20
18.	Parallelism can be used to increase the (parallel) size of the problem is applicable in _____.
Option A:	Amdahl's Law
Option B:	Gustafson-Barsis's Law
Option C:	Newton's Law
Option D:	Pascal's Law
19.	Synchronization is one of the common issues in parallel programming. The issues related to synchronization include the followings, EXCEPT:
Option A:	Deadlock
Option B:	Livelock
Option C:	Fairness
Option D:	Correctness
20.	Which MPI function is used to determine the label of calling process?
Option A:	MPI_Init
Option B:	MPI_Comm_world
Option C:	MPI_Comm_size
Option D:	MPI_Comm_rank

21.	Due to architectural arrangement of a single instruction stream with multiple data streams , array processors machines are called _____ array processor.
Option A:	MISD
Option B:	SIMD
Option C:	SISD
Option D:	MIMD
22.	SIMD computers require less memory because only _____ needs to be stored.
Option A:	one copy of the program
Option B:	one instruction of the program
Option C:	two instruction of the program
Option D:	few instruction of the program
23.	A processor without structural Hazards is _____.
Option A:	Faster
Option B:	Stock
Option C:	Deadlock
Option D:	Structural hazard
24.	Control hazards occurs due to_____
Option A:	ADD instruction
Option B:	MUL instruction
Option C:	DIV instruction
Option D:	Branch instruction
25.	Pipeline increases the CPU instruction_____.
Option A:	Size
Option B:	Through put
Option C:	Cycle rate
Option D:	Time
26.	If during a cycle, no functional units are utilized, this is referred to as _____ waste
Option A:	Horizontal waste
Option B:	Vertical waste
Option C:	Data waste
Option D:	Explicitly waste
27.	If the second instruction cannot be issued because it has a data dependency with the first, only one instruction is issued in the cycle. This is called _____ issue.
Option A:	In-order
Option B:	Out-order
Option C:	Execution
Option D:	Data
28.	Since it uses the out of order mode of execution, the results are stored in _____
Option A:	Buffers

Option B:	Special memory locations
Option C:	Temporary registers
Option D:	TLB
29.	If an exception is raised and the succeeding instructions are executed completely, then the processor is said to have _____
Option A:	Exception handling
Option B:	Imprecise exceptions
Option C:	Error correction
Option D:	Exception
30.	The pattern of_____ among tasks is captured by what is known as a task-interaction graph
Option A:	Interaction
Option B:	Communication
Option C:	Optimization
Option D:	Flow
31.	_____ mapping techniques distribute the work among processes during the execution of the algorithm.
Option A:	Static
Option B:	Sequential
Option C:	Uniform
Option D:	Dynamic
32.	_____ is a method for inducing concurrency in problems that can be solved using the divide-and-conquer strategy.
Option A:	exploratory decomposition
Option B:	speculative decomposition
Option C:	data-decomposition
Option D:	Recursive decomposition
33.	A decomposition into a large number of small tasks is called _____.
Option A:	coarse-grained
Option B:	coarse-ungrained
Option C:	fine-grained
Option D:	fine-ungrained
34.	The number of processors used to execute a program is defined as the _____ of parallelism.
Option A:	Degree
Option B:	Level
Option C:	Amount
Option D:	Rank
35.	Speed up is defined as a ratio of
Option A:	S=Ts/Tp

Option B:	S= Tp/Ts
Option C:	Ts=S/Tp
Option D:	Tp=S /Ts
36.	Total cost of a parallel algorithm is the product of
Option A:	Total Cost = Time complexity × Number of processors used
Option B:	Total Cost = Time complexity × Number of cycle used
Option C:	Total Cost = Time complexity × Number of task used
Option D:	Total Cost = Time complexity × Number of instructions used
37.	Most commonly used topologies in message-passing programs are one-, two-, or higher-dimensional grids, that are also referred to as _____
Option A:	Higher Dimensional topology
Option B:	Cartesian topologies
Option C:	Cart topologies
Option D:	Ring topologies
38.	If the parallel program is highly synchronous (i.e., sends and receives are posted around the same time), _____.
Option A:	buffered Receive may perform better than buffered sends
Option B:	buffered Receive may perform better than non buffered sends
Option C:	buffered sends may perform better than non buffered sends
Option D:	non-buffered sends may perform better than buffered sends
39.	The one-to-all broadcast operation is performed in MPI using the _____
Option A:	MPI_Bcast function
Option B:	MPI_Broadcast function
Option C:	MPI_BroadCast function
Option D:	MPI_BCast function
40.	Non-blocking Message Passing Operations are generally accompanied by a_____ operation.
Option A:	Send Buffer
Option B:	Buffer
Option C:	check-status
Option D:	Receive Buffer

Descriptive Questions

Explain Decomposition techniques.
Write MPI program for Cannon's Matrix-Matrix Multiplication.
Explain different performance metrics for Parallel System.
Explain Non-Blocking Communication using MPI.
Explain sources of overhead in parallel programs
Describe pipeline performance (Efficiency , Speedup and Throughput) w.r.t length of the pipe (n) and task run on pipe(m) for condition m>>n, n>>m and m=n.
Write a MPI program to find sum of N numbers.
Explain speedup, efficiency and scalability with suitable example.

Short note on 'SIMD matrix multiplication'.
State and explain Amdahl’s law. What is the relevance of Amdahl’s law in HPC?
Discuss different levels of parallel processing?
With neat block diagram explain in detail about the various programmatic levels of parallel processing.
Explain the different mapping techniques that are used load balancing.
Discuss in detail Pipeline hazards with its types.
Explain Very long instruction word (VLIW) in detail.
Write a parallel MPI program to broadcast a data from root process to 4 other processes.
State and Explain the performance metric speed up , Efficiency , Throughput and Scalability
Explain in brief classification of parallel system based on memory access.
Discuss the categories of computers based on Handler’s classification.
Explain write-Invalidate Protocol with the help of diagram.
Explain Granularity, Concurrency and dependency graph.
Write MPI program for broadcast of data.
Explain the pros and Cons of Open MP.
Explain the Concept of Scatter and Gather.
Explain Quantum Computers.
Write a short note on Memory organization
Give the advantages in using non-uniform memory access model.
Explain the pros and Cons of Open MP.
Distinguish between loosely coupled and tightly coupled multiprocessors.
Discuss the categories of computers based on Flynn's classification.