**A**

1. A set of processes is deadlock if: **each process is blocked and will remain so forever**
2. A state is safe if the system can allocate resources to each process (up to its maximum) in some order and still avoid deadlock. Then: **all of these**
3. A computer system has 6 tape drives, with 'n' processes competing for them. Each process may need 3 tape drives. The maximum value of 'n' for which the system is guaranteed to be deadlock free is: **2**
4. A system has 3 processes sharing 4 resources. If each process needs a maximum of 2 units, then: **deadlock can never occur**
5. A process said to be in \_\_\_\_\_\_\_\_\_\_\_ state if it was waiting for an event that will never occur.: **Dead lock**
6. A set of resources' allocations such that the system can allocate resources to each process in some order, and still avoid a deadlock is called \_\_\_\_\_\_\_\_.**Safe state**
7. A process is starved **if it is permanently waiting for a resource**
8. A solution to the Dining Philosophers Problem which avoids deadlock.. **is ensure that one particular philosopher picks up the left fork before the right fork, and that all other philosophers pick up the right fork before the left fork**
9. A system has 'm' number of resources of same type and 3 processes A, B, C. Share these resources A, B, C which have the peak demand of 3, 4 and 6 respectively. Deadlock will not occur if the value of 'm' is \_\_\_\_\_\_\_\_\_\_. **m = 13**
10. An operating system contains 3 user processes each requiring 2 units of resource R .The minimum number of units of R such that no deadlocks will ever arise is **4**
11. A direct method of deadlock prevention is to prevent the occurrences of ................... **Circular waits**
12. A direct method of deadlock prevention is to prevent the occurrence of **…………..Circular waits**
13. A system is in the safe state if **the system can allocate resources to each process in some order and still avoid a deadlock**
14. A problem encountered in multitasking when a process is perpetually denied necessary resources is called **starvation**
15. A deadlock avoidance algorithm dynamically examines the \_\_\_\_\_\_\_\_\_\_ to ensure that a circular wait condition can never exist. **resource allocation state**
16. A state is safe, if : **the system can allocate resources to each process in some order and still avoid a deadlock**
17. A system is in a safe state only if there exists a : **safe sequence**
18. All unsafe states are : **not deadlocks**
19. An edge from process Pi to Pj in a wait for graph indicates that : **Pi is waiting for Pj to release a resource that Pi needs**
20. A deadlock eventually cripples system throughput and will cause the CPU utilization to \_\_\_\_\_\_ **drop**
21. A computer system has 6 tape drives, with ‘n’ processes competing for them. Each process may need 3 tape drives. The maximum value of ‘n’ for which the system is guaranteed to be deadlock free is : **2**
22. A system has 3 processes sharing 4 resources. If each process needs a maximum of 2 units then, deadlock : **can never occur**
23. A deadlock can be broken by : **abort one or more processes to break the circular wait**
24. All deadlocks involve conflicting needs for **Resources**
25. An interrupt vector  **is** **an address that is indexed to an interrupt handler**
26. A \_\_\_\_ a set of wires and a rigidly defined protocol that specifies a set of messages that can be sent on the wires. **Bus**
27. A \_\_\_\_\_\_\_\_ is a collection of electronics that can operate a port, a bus, or a device. **Controller**
28. An I/O port typically consists of four registers status, control, \_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_ registers. **data in, data out**
29. A character stream device transfers : **bytes one by one**
30. A block device transfers : **block of bytes as a unit**
31. A dedicated device is : **opposite to a sharable device**
32. A keyboard is an example of a device that is accessed through a \_\_\_\_\_\_\_\_\_\_ interface. **character stream**
33. A non blocking system call \_\_ **does not halt the execution of the application**
34. An asynchronous call **: returns immediately, without waiting for the I/O to complete**
35. A \_\_\_\_\_\_\_\_ is a full duplex connection between a device driver and a user level process **Stream**
36. A major problem with priority scheduling is \_ **Starvation**
37. The host repeatedly checks if the controller is busy until it is not. It is in a loop that status register's busy bit becomes clear. This is called \_\_\_\_\_\_\_\_\_\_\_\_\_ and a mechanism for the hardware controller to notify the CPU that it is ready is called \_\_\_\_\_\_\_\_\_\_\_. **Polling and Interrupt**
38. An optimal scheduling algorithm in terms of minimizing the average waiting time of a given set of processes is \_\_\_\_\_\_ **Shorest job - first scheduling algorithm**
39. A scheduling algorithm is fair **if no process faces starvation**
40. Another type of multiple-CPU system is the **Clustered System**
41. Accessing same data from storage of the computer system is provided by **parallel clusters**

**B**

1. Banker's algorithm for resource allocation deals with ? **deadlock avoidance**
2. Banker's algorithm deals with **deadlock avoidance**
3. Before proceeding with its execution, each process must acquire all the resources it needs is called : **hold and wait**
4. Banker's algorithm for resource allocation deals with **deadlock avoidance**
5. Buffering is done to : **all of the mentioned**

**C**

1. Consider a system having 'm' resources of the same type. These resources are shared by 3 processes A, B, C, which have peak time demands of 3, 4, 6 respectively. The minimum value of 'm' that ensures that deadlock will never occur is: **11**
2. Choose the correct option regarding deadlock. **Both a and b are correct.**
3. Consider a computer system with 6 tape drives and 'n' processes completing for them. What is the maximum value of 'n' for the system to be deadlock free? (Assuming that each processes may need 3 tape drives) : **2**
4. ……………. can be defined as the permanent blocking of a set of processed that either complete for system resources or communicate with each other. **Deadlock**

1. Cost factors of process termination include : **Amount of time a deadlocked process has thus far consumed during its execution**
2. Caching is \_\_\_\_\_\_\_\_ spooling. **not the same as**
3. Caching : **holds a copy of the data**
4. CPU performance is measured through \_\_\_\_\_\_ **Throughput**
5. CPU Scheduling is the basis of \_\_\_\_\_\_\_\_\_ operating system. **Multiprogramming**
6. Controller of the computer system transfers data from device to **buffers**

**D**

1. Deadlocks can be described by which graph? **Resource-Allocation Graph**
2. Deadlock prevention is a set of methods : **to ensure that at least one of the necessary conditions cannot hold**
3. Deadlock prevention strategies are very **Conservative**
4. DMA is used for : **Both a and c**
5. Division by zero, accessing a protected or non existent memory address, or attempting to execute a privileged instruction from user mode are all categorized as **\_\_\_\_\_\_\_\_ exceptions**
6. \_\_\_\_\_\_\_ does the job of allocating a process to the processor. **Dispatcher**
7. Dual mode of operating system has **2 modes**

**E**

1. Each request requires that the system consider the \_\_\_\_\_\_\_\_\_\_\_\_\_ to decide whether the current request can be satisfied or must wait to avoid a future possible deadlock. **resources currently available**
2. Every time a request for allocation cannot be granted immediately, the detection algorithm is invoked. This will help identify : **the set of processes that have been deadlocked**
3. Example of open source operating system is **UNIX & Linux**

**F**

1. Four necessary conditions for deadlock are non pre-emption, circular wait, hold and wait and **mutual exclusion**
2. From the following statements which one is not a valid deadlock prevention scheme? **Never request a resource after releasing any resources**
3. For effective operating system, when to check for deadlock**? every time a resource request is made at fixed time intervals**
4. For a deadlock to arise, which of the following conditions must hold simultaneously ? **All of the mentioned**
5. For Mutual exclusion to prevail in the system : **at least one resource must be held in a non sharable mode**
6. For a Hold and wait condition to prevail **: A process must be holding at least one resource and waiting to acquire additional resources that are being held by other processes**
7. Four necessary conditions for deadlock to exist are: mutual exclusion, no-preemption, circular wait and **hold and wait**
8. For large data transfers, \_\_\_\_\_\_\_\_\_ is used. **dma**
9. For non sharable resources like a printer, mutual exclusion : **must exist**
10. For sharable resources, mutual exclusion : **is not required**
11. FIFO scheduling is \_\_\_\_\_\_\_\_. **Non Preemptive Scheduling**

**G**

1. Given a priori information about the \_\_\_\_\_\_\_\_ number of resources of each type that maybe requested for each process, it is possible to construct an algorithm that ensures that the system will never enter a deadlock state**. maximum**

**H**

1. How does the software trigger an interrupt ? **executing a special operation called system call**
2. How does the Hardware trigger an interrupt ? **sending signals to CPU through system bus**

**I**

1. In one of the deadlock prevention methods, impose a total ordering of all resource types, and require that each process requests resources in an increasing order of enumeration. This violates the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ condition of deadlock.: **Circular Wait**
2. If the wait for graph contains a cycle : **then a deadlock exists**
3. If deadlocks occur frequently, the detection algorithm must be invoked \_\_\_\_\_\_\_\_ **frequently**
4. If we preempt a resource from a process, the process cannot continue with its normal execution and it must be : **rolled back**
5. In a memory mapped input/output : **the CPU writes one data byte to the data register and sets a bit in control register to show that a byte is available**
6. In a programmed input/output(PIO) : **the CPU uses polling to watch the control bit constantly, looping to see if device is ready**
7. **In** an interrupt driven input/output : **the CPU receives an interrupt when the device is ready for the next byte**
8. **In** the layered approach of Operating Systems : **Both b and c**
9. In polling **: busy – wait cycles wait for I/O from device**
10. I/O is a \_\_\_\_\_\_\_\_\_ in system performance. **major factor**
11. If the number of cycles spent busy – waiting is not excessive, then **: programmed I/O is more efficient than interrupt driven I/O**
12. In Priority Scheduling a priority number (integer) is associated with each process. The CPU is allocated to the process with the highest priority (smallest integer = highest priority). The problem of Starvation of low priority processes may never execute, is resolved by \_\_\_\_\_\_\_\_\_\_. **Aging**
13. In interactive environments such as time-sharing systems, the primary requirement is to provide reasonably good response time and in general, to share system resources equitably. In such situations, the scheduling algorithm that is most popularly applied is \_\_\_\_\_\_\_\_.**Round Robin Scheduling**
14. In the multi-programming environment, the main memory consisting of \_\_\_\_\_\_\_\_\_ number of process. **More than one**
15. Interrupt table of pointers having addresses for each interrupt is **located at low memory**

**J**

**K**

**L**

1. Logical extension of multiprogramming operating system is **time sharing & multi-tasking**

**M**

1. 'm' processes share 'n' resources of the same type. The maximum need of each process doesn't exceed 'n' and the sum all the their maximum needs is always less than m + n. In this set up: **deadlock can never occur**
2. Multithreaded programs are : **more prone to deadlocks**
3. Multi-processor system gives a **tightly coupled system**
4. Multiprocessor system have advantage of **Increased Throughput**
5. Multiprogramming of the computer system increases **CPU utilization**
6. Main memory of the computer system is also called **volatile**

**N**

**O**

1. One way to ensure that the circular wait condition never holds is to **: impose a total ordering of all resource types and to determine whether one precedes another in the ordering**
2. One word memory storage is the collection of **4 bytes**

**P**

**Q**

**R**

1. Resource locking \_\_\_\_\_\_\_\_.: **Forces only one task to use any resource at any time**
2. Round robin scheduling is essentially the preemptive version of \_\_\_\_\_\_\_\_.**FIFO**
3. In the blocked state **the processes waiting for I/O are found**

**S**

1. Situations where two or more processes are reading or writing some shared data and the final results depends on the order of usage of the shared data, are called \_\_\_\_\_\_\_\_.: **Race conditions**
2. Semophores are used to solve the problem of **mutual exclusion**
3. Semaphores function is to **synchronize critical resources to prevent deadlock**
4. Spooling : **holds the only copy of the data**
5. \_\_\_\_\_\_\_\_ scheduler selects the jobs from the pool of jobs and loads into the ready queue. **Long term**
6. Saving the state of the old process and loading the saved state of the new process is called \_\_\_\_\_\_\_\_.**Context Switch**
7. Scheduling of threads are done by **operating system**
8. Symmetric multiprocessing architecture of the computer system uses shared **bus & memory**
9. Secondary memory of the computer system is also called **non volatile**

**T**

1. To avoid the race condition, the number of processes that may be simultaneously inside their critical section is: **1**
2. The methods for dealing with the deadlock problem is: **all of these**
3. The state of a process after it encounters an I/O instruction is \_\_\_\_\_\_\_\_\_\_.**Blocked/Waiting**
4. The Banker's algorithm is used **to** **prevent deadlock in operating systems**
5. To avoid race condition, the maximum number of processes that may be simultaneously inside the critical section is : **one**
6. The simplest way of remove deadlock from the system is to **... kill one of the processes**
7. The circular wait condition can be prevented by **defining a linear ordering of resource types**
8. To avoid deadlock **there must be a fixed number of resources to allocate**
9. The number of resources requested by a process : **must not exceed the total number of resources available in the system**
10. The request and release of resources are \_\_\_\_\_\_\_\_\_\_\_ **system calls**
11. To ensure that the hold and wait condition never occurs in the system, it must be ensured that : **all of the mentioned**
12. The disadvantage of a process being allocated all its resources before beginning its execution is : **Low resource utilization**
13. To ensure no preemption, if a process is holding some resources and requests another resource that cannot be immediately allocated to it : **then all resources currently being held are preempted**
14. The resource allocation graph is not applicable to a resource allocation system : **with multiple instances of each resource type**
15. The Banker’s algorithm is \_\_\_\_\_\_\_\_\_\_\_\_\_ than the resource allocation graph algorithm. **less efficient**
16. The data structures available in the Banker’s algorithm are : **All of the mentioned**
17. The content of the matrix Need is : **Max – Allocation**
18. The wait-for graph is a deadlock detection algorithm that is applicable when : **all resources have a single instance**
19. The disadvantage of invoking the detection algorithm for every request is : **considerable overhead in computation time**
20. The two ways of aborting processes and eliminating deadlocks are : **Abort one process at a time until the deadlock cycle is eliminated**
21. Those processes should be aborted on occurrence of a deadlock, the termination of which : **incurs minimum cost**
22. The process to be aborted is chosen on the basis of the following factors **: all of the mentioned**
23. To \_\_\_\_\_\_\_ to a safe state, the system needs to keep more information about the states of processes. **Roll back the process**
24. The solution to starvation is : **the number of rollbacks must be included in the cost factor**
25. **The fast** form of inter process communication provided in UNIX is   
    **Shared Memory**
26. **The** initial program that is run when the computer is powered up is called : **bootstrap program**
27. The following is not a layer of IO management module: **MCS (Management Control System)**
28. The \_\_\_\_\_\_\_\_\_ present a uniform device-access interface to the I/O subsystem, much as system calls provide a standard interface between the application and the operating system.

**Device drivers**

1. The \_\_\_\_\_\_ register is read by the host to get input. **Data in**
2. The \_\_\_\_\_\_ register is written by the host to send output. **data out**
3. The hardware mechanism that allows a device to notify the CPU is called i**nterrupt**
4. The CPU hardware has a wire called \_\_\_\_\_\_\_\_\_\_ that the CPU senses after executing every instruction **interrupt request line**
5. The \_\_\_\_\_\_\_\_\_ are reserved for events such as unrecoverable memory errors. **nonmaskable interrupts**
6. The \_\_\_\_\_\_\_\_ can be turned off by the CPU before the execution of critical instruction sequences that must not be interrupted**. nonmaskable interrupt**
7. The \_\_\_\_\_\_\_\_\_\_ is used by device controllers to request service **maskable interrupt**
8. The interrupt vector contains **: the memory addresses of specialized interrupt handlers**
9. The \_\_\_\_\_\_\_\_ keeps state information about the use of I/O components. **Kernel**
10. The kernel data structures include : **open file table**
11. The degree of Multiprogramming is controlled by **Long-term Sched**uler
12. The number of processes completed per unit time is known as \_\_\_\_**Throughput**
13. The collection of processes on the disk that is waiting to be brought into memory for execution forms the \_\_\_\_\_\_\_\_\_\_\_ . **Input queue**
14. To start an I/O operation the device driver loads the appropriate register into? **Device Controller**
15. The \_\_\_\_\_\_\_\_\_ determines the cause of the interrupt, performs the necessary processing and executes a return from the interrupt instruction to return the CPU to the execution state prior to the interrupt.   
    **interrupt handler**
16. The ability to continuously providing service proportional to the level of surviving hardware **graceful degradation**

**U**

1. Using Priority Scheduling algorithm, find the average waiting time for the following set of processes given with their priorities in the order: Process : Burst Time : Priority respectively . P1 : 10 : 3 , P2 : 1 : 1 , P3 : 2 : 4 , P4 : 1 : 5 , P5 : 5 : 2. **8.2 milliseconds**
2. Under multiprogramming, turnaround time for short jobs is usually \_\_\_\_\_\_\_\_ and that for long jobs is slightly \_\_\_\_\_\_\_\_\_\_\_.**Shortened; Lengthened**

**I**

1. \_\_\_\_\_\_ is a high level abstraction over Semaphore. **Monitor**
2. In one of the deadlock prevention methods, impose a total ordering of all resource types, and require that each process requests resources in an increasing order of enumeration. This voilates the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ condition of deadlock. **Circular Wait**
3. In a graph the number of vertices of odd degree is always **even**
4. In an undirected graph, the sum of degrees of all vertices is **Even**
5. In the multiprogramming system, a set of processes is deadlock if each process in the set is waiting for an event to occur that can be initialized only by another process in the set. Which of the following is not one of the four conditions that are necessary for deadlock to occur? **process suspension**
6. If no cycle exists in the resource allocation graph : **then the system will be in a safe state**
7. If the resources are always preempted from the same process, \_\_\_\_\_\_\_\_\_\_ can occur. **Starvation**
8. If one or more devices use a common set of wires to communicate with the computer system, the connection is called \_\_\_\_\_\_ **bus**
9. In general the two interrupt request lines are : **maskable & nonmaskable interrupts**
10. \_\_\_\_\_\_\_\_\_ is the situation in which a process is waiting on another process,which is also waiting on another process, which is waiting on the first process. None of the processes involved in this circular wait are making progress. **Deadlock**
11. In asymmetric clustering other machines perform operations while one machine is in **hot standby mode**

**V**

**W**

1. With deadlock detection, requested resources are granted to : **Processes**
2. With a single resource, deadlock occurs: **none of these**
3. When two or more processes attempt to access the same resource a \_\_\_\_\_\_\_\_\_ occurs. **Race condition**
4. What is the maximum number of processes that may enter simultaneously inside the critical section to avoid race condition ? **One**
5. What are global locks ? **they synchronize access to global resources**
6. Which of following is not a condition of Dead Lock ? **Data Transfer**
7. What are the necessary conditions to occur the deadlock? **Mutual exclusion, Hold and wait, No preemption, Circular wait.**
8. Which of the following is deadlock avoidance algorithm? **banker's algorithm**
9. Which of the following statements is not valid for deadlock prevention scheme? **Never request a resource after releasing any resource.**
10. Which of the following statements is not true for the deadlock prevention and deadlock avoidance schemes? **In deadlock avoidance, the request for resources is always granted, if the resulting state is safe.**
11. What is known as a race condition? **When the result of a computation depends on the speed of the processes involved**
12. Which of the following approaches do not require knowledge of the system state? **none of the above.**
13. Which of the following is not the approach to dealing with deadlock ? **Deletion**
14. What is the reusable resource? **that can be used by one process at a time and is not depleted by that use**
15. Which of the following condition is required for deadlock to be possible? **all of the mentioned**
16. Which one of the following is the deadlock avoidance algorithm? **banker’s algorithm**
17. What is the drawback of banker’s algorithm? **all of the mentioned**
18. Which one of the following is a visual ( mathematical ) way to determine the deadlock occurrence? **resource allocation graph**
19. What problem is solved by Dijkstra's banker's algorithm? **deadlock avoidance**
20. What is a trap/exception ? s**oftware generated interrupt caused by an error**
21. What is an ISR ? **Interrupt Service Routine**
22. Which operation is performed by an interrupt handler ? **All of these**
23. Why is the Software interrupt required by the processor? **Obtain system services, which need execution of privileged instruction.**
24. Which of the following is an example of Spooled Device? **A line printer used to print the output of a number of jobs**
25. When device A has a cable that plugs into device B, and device B has a cable that plugs into device C and device C plugs into a port on the computer, this arrangement is called a \_ **daisy chain**
26. Windows NT uses a \_\_\_\_\_\_\_\_\_\_ implementation for I/O. **message – passing**
27. With the round robin CPU scheduling in a time-shared system \_\_\_\_\_\_\_\_ **Using very large time slice degenerates in to first come first served algorithm**
28. Which of the following is a criterion to evaluate a scheduling algorithm? **All of the above**
29. Which scheduler controls the degree of multi programming? **Long term scheduler**
30. What is a long-term scheduler ? **It selects which process has to be brought into the ready queue**
31. When many users accesses mainframes, this approach is called as **resource allocation**

**X**

**Y**

**Z**