1. What is the main function of the command interpreter?
   a) to provide the interface between the API and application program
   b) to handle the files in the operating system
   c) **to get and execute the next user-specified command**
   d) none of the mentioned

2. To access the services of the operating system, the interface is provided by the _____
   a) Library
   b) System calls
   c) Assembly instructions
   d) API

3. CPU scheduling is the basis of _____
   a) multiprogramming operating systems
   b) larger memory sized systems
   c) multiprocessor systems
   d) none of the mentioned

4. Which one of the following is not true?
   a) kernel remains in the memory during the entire computer session
   b**) kernel is made of various modules which can not be loaded in running operating system**
   c) kernel is the first part of the operating system to load into memory during booting
   d) kernel is the program that constitutes the central core of the operating system

5. Which one of the following errors will be handle by the operating system?
   a) lack of paper in printer
   b) connection failure in the network
   c) power failure
   d) all of the mentioned

6. In operating system, each process has its own _____
   a) open files
   b) pending alarms, signals, and signal handlers
   c) address space and global variables
   d) all of the mentioned

7. In a timeshare operating system, when the time slot assigned to a process is completed, the process switches from the current state to?
   a) Suspended state

b) Terminated state

c) Ready state

d) Blocked state

8. Cascading termination refers to the termination of all child processes if the parent process terminates _____

   a) Normally or abnormally

   b) Abnormally

   c) Normally

   d) None of the mentioned

9. When a process is in a "Blocked" state waiting for some I/O service. When the service is completed, it goes to the _____

   a) Terminated state

   b) Suspended state

   c) Running state

   d) Ready state

10. The portion of the process scheduler in an operating system that dispatches processes is concerned with _____

    a) assigning ready processes to waiting queue

    b) assigning running processes to blocked queue

    c) assigning ready processes to CPU

    d) all of the mentioned

11. The operating system is responsible for?

    a) bad-block recovery

    b) booting from disk

    c) disk initialization

    d) all of the mentioned

12. In Unix, Which system call creates the new process?

    a**) fork**

    b) create

    c) new

    d) none of the mentioned

13. A Process Control Block(PCB) does not contain which of the following?

    a) Code

    b) Stack

    c**) Bootstrap program**

    d) Data

14. The number of processes completed per unit time is known as _____

    a) Output

    b) Throughput

    c) Efficiency

    d) Capacity

15. The state of a process is defined by _____
   a) the final activity of the process
   b) the activity just executed by the process
   c) the activity to next be executed by the process
   d) the current activity of the process

16. The entry of all the PCBs of the current processes is in _____
   a) Process Register
   b) Program Counter
   c**) Process Table**
   d) Process Unit

17. A single thread of control allows the process to perform _____
   a) only one task at a time
   b) multiple tasks at a time
   c) only two tasks at a time
   d) all of the mentioned

18. hich of the following do not belong to queues for processes?
   a) Job Queue
   b) **PCB queue**
   c) Device Queue
   d) Ready Queue

19. When the process issues an I/O request _____
   a) It is placed in an I/O queue
   b) It is placed in a waiting queue
   c) It is placed in the ready queue
   d) It is placed in the Job queue

20. What will happen when a process terminates?
   a) It is removed from all queues
   b) It is removed from all, but the job queue
   c) Its process control block is de-allocated
   d) Its process control block is never de-allocated

21. What will happen when a process terminates?
   a) It is removed from all queues
   b) It is removed from all, but the job queue
   c) **Its process control block is de-allocated**
   d) Its process control block is never de-allocated

22. Suppose that a process is in "Blocked" state waiting for some I/O service. When the service is completed, it goes to the _____
   a) Running state
   b) Ready state
   c) Suspended state
   d) Terminated state

23. Which module gives control of the CPU to the process selected by the short-term scheduler?
    a) **dispatcher**
    b) interrupt
    c) scheduler
    d) none of the mentioned

24. The processes that are residing in main memory and are ready and waiting to execute are kept on a list called _____
    a) job queue
    b) **ready queue**
    c) execution queue
    d) process queue

25. The interval from the time of submission of a process to the time of completion is termed as _____
    a) waiting time
    b**) turnaround time**
    c) response time
    d) throughput

26. Which scheduling algorithm allocates the CPU first to the process that requests the CPU first?
    a) **first-come, first-served scheduling**
    b) shortest job scheduling
    c) priority scheduling
    d) none of the mentioned

27. In priority scheduling algorithm _____
    a) **CPU is allocated to the process with highest priority**
    b) CPU is allocated to the process with lowest priority
    c) Equal priority processes can not be scheduled
    d) None of the mentioned

28. In priority scheduling algorithm, when a process arrives at the ready queue, its priority is compared with the priority of _____
    a) all process
    b) **currently running process**
    c) parent process
    d) init process

29. Which algorithm is defined in Time quantum?
    a) shortest job scheduling algorithm
    b) **round robin scheduling algorithm**
    c) priority scheduling algorithm
    d) multilevel queue scheduling algorithm

30. Which algorithm is defined in Time quantum?

a) **shortest job scheduling algorithm**

b) round robin scheduling algorithm

c) priority scheduling algorithm

d) multilevel queue scheduling algorithm

31. What are the two steps of a process execution?

a) I/O & OS Burst

b**) CPU & I/O Burst**

c) Memory & I/O Burst

d) OS & Memory Burst

32. An I/O bound program will typically have _____

a) a few very short CPU bursts

b) many very short I/O bursts

c) many very short CPU bursts

d) a few very short I/O bursts

33. In the following cases non – preemptive scheduling occurs?

a) When a process switches from the running state to the ready state

b) **When a process goes from the running state to the waiting state**

c) When a process switches from the waiting state to the ready state

d) All of the mentioned

34. The switching of the CPU from one process or thread to another is called _____

a) process switch

b) task switch

c) context switch

d) **all of the mentioned**

35. Scheduling is done so as to _____

a**) increase the throughput**

b) decrease the throughput

c) increase the duration of a specific amount of work

d) none of the mentioned

36. What is Response time?

a) the total time taken from the submission time till the completion time

b) **the total time taken from the submission time till the first response is produced**

c) the total time taken from submission time till the response is output

d) none of the mentioned

37. Round robin scheduling falls under the category of _____

a) Non-preemptive scheduling

b) **Preemptive scheduling**

c) All of the mentioned

d) None of the mentioned

38. With round robin scheduling algorithm in a time shared system _____
a) **using very large time slices converts it into First come First served scheduling algorithm**
b) using very small time slices converts it into First come First served scheduling algorithm
c) using extremely small time slices increases performance
d) using very small time slices converts it into Shortest Job First algorithm

39. he portion of the process scheduler in an operating system that dispatches processes is concerned with _____
a) **assigning ready processes to CPU**
b) assigning ready processes to waiting queue
c) assigning running processes to blocked queue
d) all of the mentioned

40. The strategy of making processes that are logically runnable to be temporarily suspended is called _____
a) Non preemptive scheduling
b) **Preemptive scheduling**
c) Shortest job first
d) First come First served

41. There are 10 different processes running on a workstation. Idle processes are waiting for an input event in the input queue. Busy processes are scheduled with the Round-Robin time sharing method. Which out of the following quantum times is the best value for small response times, if the processes have a short runtime, e.g. less than 10ms?
a) **tQ = 15ms**
b) tQ = 40ms
c) tQ = 45ms
d) tQ = 50ms

42. Which of the following algorithms tends to minimize the process flow time?
a) First come First served
b**) Shortest Job First**
c) Earliest Deadline First
d) Longest Job First

43. Which is the most optimal scheduling algorithm?
a) FCFS – First come First served
b**) SJF – Shortest Job First**
c) RR – Round Robin
d) None of the mentioned

44. The FCFS algorithm is particularly troublesome for _____
a) time sharing systems
b) **multiprogramming systems**

c) multiprocessor systems

d) operating systems

45. Consider the following set of processes, the length of the CPU burst time given in milliseconds.

Process	Burst time
P1	6
P2	8
P3	7
P4	3

Assuming the above process being scheduled with the SJF scheduling algorithm.

a) **The waiting time for process P1 is 3ms**

b) The waiting time for process P1 is 0ms

c) The waiting time for process P1 is 16ms

d) The waiting time for process P1 is 9ms

46. What is 'Aging'?

a) keeping track of cache contents

b) keeping track of what pages are currently residing in memory

c) keeping track of how many times a given page is referenced

d) **increasing the priority of jobs to ensure termination in a finite time**

47. A solution to the problem of indefinite blockage of low – priority processes is _____

a) Starvation

b) Wait queue

c) Ready queue

d) **Aging**

48. Which of the following scheduling algorithms gives minimum average waiting time?

a) FCFS

b) **SJF**

c) Round – robin

d) Priority

49. What is Interprocess communication?

a) allows processes to communicate and synchronize their actions when using the same address space

b) **allows processes to communicate and synchronize their actions**

c) allows the processes to only synchronize their actions without communication

d) none of the mentioned

50. Message passing system allows processes to _____
    a) **communicate with each other without sharing the same address space**
    b) communicate with one another by resorting to shared data
    c) share data
    d) name the recipient or sender of the message
51. Message passing system allows processes to _____
    a) communicate with each other without sharing the same address space
    b) communicate with one another by resorting to shared data
    c) share data
    d) n**ame the recipient or sender of the message**
52. The link between two processes P and Q to send and receive messages is called _____
    a) **communication link**
    b) message-passing link
    c) synchronization link
    d) all of the mentioned
53. In indirect communication between processes P and Q _____
    a) there is another process R to handle and pass on the messages between P and Q
    b) there is another machine between the two processes to help communication
    c) there is a mailbox to help communication between P and Q
    d) none of the mentioned
54. In the non blocking send _____
    a) the sending process keeps sending until the message is received
    b) **the sending process sends the message and resumes operation**
    c) the sending process keeps sending until it receives a message
    d) none of the mentioned
55. Which process can be affected by other processes executing in the system?
    a**) cooperating process**
    b) child process
    c) parent process
    d) init process
56. When several processes access the same data concurrently and the outcome of the execution depends on the particular order in which the access takes place is called _____
    a) dynamic condition
    b) race condition
    c) essential condition
    d) critical condition

57. If a process is executing in its critical section, then no other processes can be executing in their critical section. What is this condition called?
   a) **mutual exclusion**
   b) critical exclusion
   c) synchronous exclusion
   d) asynchronous exclusion

58. Which one of the following is a synchronization tool?
   a) thread
   b) pipe
   c) **semaphore**
   d) socket

59. A semaphore is a shared integer variable _____
   a) **that can not drop below zero**
   b) that can not be more than zero
   c) that can not drop below one
   d) that can not be more than one

60. Mutual exclusion can be provided by the _____
   a) mutex locks
   b) binary semaphores
   c**) both mutex locks and binary semaphores**
   d) none of the mentioned

61. Mutual exclusion can be provided by the _____
   a) mutex locks
   b) binary semaphores
   c) **both mutex locks and binary semaphores**
   d) none of the mentioned

62. A monitor is a module that encapsulates _____
   a) shared data structures
   b) procedures that operate on shared data structure
   c) synchronization between concurrent procedure invocation
   d) all of the mentioned

63. To enable a process to wait within the monitor _____
   a) **a condition variable must be declared as condition**
   b) condition variables must be used as boolean objects
   c) semaphore must be used
   d) all of the mentioned

64. Concurrent access to shared data may result in _____
   a) data consistency
   b) data insecurity
   c) **data inconsistency**
   d) none of the mentioned

65. The segment of code in which the process may change common variables, update tables, write into files is known as _____
a) program
b**) critical section**
c) non – critical section
d) synchronizing

66. Which of the following conditions must be satisfied to solve the critical section problem?
a) Mutual Exclusion
b) Progress
c) Bounded Waiting
d**) All of the mentioned**

67. Bounded waiting implies that there exists a bound on the number of times a process is allowed to enter its critical section _____
a**) after a process has made a request to enter its critical section and before the request is granted**
b) when another process is in its critical section
c) before a process has made a request to enter its critical section
d) none of the mentioned

68. n the bakery algorithm to solve the critical section problem _____
a) each process is put into a queue and picked up in an ordered manner
b**) each process receives a number (may or may not be unique) and the one with the lowest number is served next**
c) each process gets a unique number and the one with the highest number is served next
d) each process gets a unique number and the one with the lowest number is served next

69. Semaphore is a/an _____ to solve the critical section problem.
a) hardware for a system
b**) special program for a system**
c) integer variable
d) none of the mentioned

70. he wait operation of the semaphore basically works on the basic _____ system call.
a) stop()
b) block()
c) hold()
d) wait()

71. The signal operation of the semaphore basically works on the basic _____ system call.
a) continue()

b) wakeup()

c) getup()

d) start()

72. If the semaphore value is negative _____

a) **its magnitude is the number of processes waiting on that semaphore**

b) it is invalid

c) no operation can be further performed on it until the signal operation is performed on it

d) none of the mentioned

73. The following program consists of 3 concurrent processes and 3 binary semaphores. The semaphores are initialized as S0 = 1, S1 = 0, S2 = 0.

```
Process P0

while(true)

{

    wait(S0);

    print '0';

    release(S1);

    release(S2);

}


Process P1

wait(S1);

release(S0);


Process P2

wait(S2);

release(S0);
```

How many times will P0 print '0'?

a) **At least twice**

b) Exactly twice

c) Exactly thrice

d) Exactly once

74. Each process Pi, i = 0,1,2,3,......,9 is coded as follows.

```
repeat

 P(mutex)

 {Critical Section}

 V(mutex)

 forever
```

The code for P10 is identical except that it uses V(mutex) instead of P(mutex). What is the largest number of processes that can be inside the critical section at any moment (the mutex being initialized to 1)?
a) 1
b) 2
c) 3
d) None of the mentioned

75. What are the two kinds of semaphores?
  a) mutex & counting
  b) **binary & counting**
  c) counting & decimal
  d) decimal & binary

76. What is a mutex?
  a) is a binary mutex
  b) **must be accessed from only one process**
  c) can be accessed from multiple processes
  d) none of the mentioned

77. At a particular time of computation the value of a counting semaphore is 7.Then 20 P operations and 15 V operations were completed on this semaphore. The resulting value of the semaphore is? (GATE 1987)
  a) 42
  b) 2
  c) 7
  d) 12

78. The bounded buffer problem is also known as _____
  a) Readers – Writers problem
  b) Dining – Philosophers problem
  c**) Producer – Consumer problem**
  d) None of the mentioned

79. In the bounded buffer problem, there are the empty and full semaphores that _____
  a) **count the number of empty and full buffers**
  b) count the number of empty and full memory spaces
  c) count the number of empty and full queues

d) none of the mentioned

80. To ensure difficulties do not arise in the readers – writers problem _____ are given exclusive access to the shared object.
a) readers
b) writers
c) readers and writers
d) none of the mentioned

81. The dining – philosophers problem will occur in case of _____
a) **5 philosophers and 5 chopsticks**
b) 4 philosophers and 5 chopsticks
c) 3 philosophers and 5 chopsticks
d) 6 philosophers and 5 chopsticks

82. A deadlock free solution to the dining philosophers problem _____
a) necessarily eliminates the possibility of starvation
b) **does not necessarily eliminate the possibility of starvation**
c) eliminates any possibility of any kind of problem further
d) none of the mentioned

83. All processes share a semaphore variable **mutex**, initialized to 1. Each process must execute wait(mutex) before entering the critical section and signal(mutex) afterward.
Suppose a process executes in the following manner.

```
signal(mutex);

.....

critical section

.....

wait(mutex);
```

In this situation :
a) a deadlock will occur
b) processes will starve to enter critical section
c) **several processes maybe executing in their critical section**
d) all of the mentioned

84. Which of the following condition is required for a deadlock to be possible?
a) mutual exclusion
b) a process may hold allocated resources while awaiting assignment of other resources
c) no resource can be forcibly removed from a process holding it
d) **all of the mentioned**

85. A system is in the safe state if _____

a) **the system can allocate resources to each process in some order and still avoid a deadlock**

b) there exist a safe sequence

c) all of the mentioned

d) none of the mentioned

86. The circular wait condition can be prevented by _____

a) **defining a linear ordering of resource types**

b) using thread

c) using pipes

d) all of the mentioned

87. Which one of the following is the deadlock avoidance algorithm?

a**) banker's algorithm**

b) round-robin algorithm

c) elevator algorithm

d) karn's algorithm

88. What is the drawback of banker's algorithm?

a) in advance processes rarely know how much resource they will need

b) the number of processes changes as time progresses

c) resource once available can disappear

d) **all of the mentioned**

89. For an effective operating system, when to check for deadlock?

a) every time a resource request is made

b) at fixed time intervals

c) **every time a resource request is made at fixed time intervals**

d) none of the mentioned

90. A problem encountered in multitasking when a process is perpetually denied necessary resources is called _____

a) deadlock

b) **starvation**

c) inversion

d) aging

91. Which one of the following is a visual (mathematical) way to determine the deadlock occurrence?

a) resource allocation graph

b) starvation graph

c) inversion graph

d) none of the mentioned

92. To avoid deadlock _____

a**) there must be a fixed number of resources to allocate**

b) resource allocation must be done only once

c) all deadlocked processes must be aborted

d) inversion technique can be used

93. he number of resources requested by a process _____

a) must always be less than the total number of resources available in the system

b) must always be equal to the total number of resources available in the system

c) **must not exceed the total number of resources available in the system**

d) must exceed the total number of resources available in the system

94. The request and release of resources are _____
    a) command line statements
    b) interrupts
    c) **system calls**
    d) special programs

95. Deadlock prevention is a set of methods _____
    a) **to ensure that at least one of the necessary conditions cannot hold**
    b) to ensure that all of the necessary conditions do not hold
    c) to decide if the requested resources for a process have to be given or not
    d) to recover from a deadlock

96. For non sharable resources like a printer, mutual exclusion _____
    a) must exist
    b) must not exist
    c) may exist
    d) none of the mentioned

97. The disadvantage of a process being allocated all its resources before beginning its execution is _____
    a) Low CPU utilization
    b) Low resource utilization
    c) Very high resource utilization
    d) None of the mentioned

98. The disadvantage of a process being allocated all its resources before beginning its execution is _____
    a) Low CPU utilization
    b) Low resource utilization
    c) Very high resource utilization
    d) **None of the mentioned**

99. One way to ensure that the circular wait condition never holds is to _____
    a**) impose a total ordering of all resource types and to determine whether one precedes another in the ordering**
    b) to never let a process acquire resources that are held by other processes
    c) to let a process wait for only one resource at a time
    d) all of the mentioned

100.   One way to ensure that the circular wait condition never holds is to _____

a) impose a total ordering of all resource types and to determine whether one precedes another in the ordering
b) to never let a process acquire resources that are held by other processes
c) **to let a process wait for only one resource at a time**
d) all of the mentioned

101. A deadlock avoidance algorithm dynamically examines the _____ to ensure that a circular wait condition can never exist.
a) **resource allocation state**
b) system storage state
c) operating system
d) resources

102. A state is safe, if _____
a) the system does not crash due to deadlock occurrence
b) **the system can allocate resources to each process in some order and still avoid a deadlock**
c) the state keeps the system protected and safe
d) all of the mentioned

103. All unsafe states are _____
a) deadlocks
b) **not deadlocks**
c) fatal
d) none of the mentioned

104. A system has 12 magnetic tape drives and 3 processes : P0, P1, and P2. Process P0 requires 10 tape drives, P1 requires 4 and P2 requires 9 tape drives.

```
Process

P0

P1

P2



Maximum needs (process-wise: P0 through P2 top to bottom)

10

4

9



Currently allocated (process-wise)

5

2
```

Which of the following sequence is a safe sequence?

a) P0, P1, P2
b) P1, P2, P0
c) P2, P0, P1
d) **P1, P0, P2**

105.   If no cycle exists in the resource allocation graph _____
    a) then the system will not be in a safe state
    b**) then the system will be in a safe state**
    c) all of the mentioned
    d) none of the mentioned
106.   The Banker's algorithm is _____ than the resource allocation
    graph algorithm.
    a) **less efficient**
    b) more efficient
    c) equal
    d) none of the mentioned
107.   The data structures available in the Banker's algorithm are _____
    a) Available
    b) Need
    c) Allocation
    d) **All of the mentioned**
108.   The content of the matrix Need is _____
    a) Allocation – Available
    b) Max – Available
    c) **Max – Allocation**
    d) Allocation – Max
109.   A system with 5 processes P0 through P4 and three resource types A,
    B, C have A with 10 instances, B with 5 instances, and C with 7 instances. At
    time t0, the following snapshot has been taken:

Process

P0

P1

P2

P3

P4

```
Allocation (process-wise : P0 through P4 top TO bottom)

A   B   C

0   1   0

2   0   0

3   0   2

2   1   1

0   0   2



MAX (process-wise: P0 through P4 top TO bottom)

A   B   C

7   5   3

3   2   2

9   0   2

2   2   2

4   3   3



Available

A   B   C

3   3   2
```

The sequence <P1, P3, P4, P2, P0> leads the system to _____
a) an unsafe state
b) **a safe state**
c) a protected state
d) a deadlock

110.　　　The wait-for graph is a deadlock detection algorithm that is applicable when _____
a) **all resources have a single instance**
b) all resources have multiple instances
c) all resources have a single 7 multiple instances
d) all of the mentioned

111.　　　An edge from process Pi to Pj in a wait for graph indicates that _____
a) **Pi is waiting for Pj to release a resource that Pi needs**
b) Pj is waiting for Pi to release a resource that Pj needs
c) Pi is waiting for Pj to leave the system

d) Pj is waiting for Pi to leave the system

112. If the wait for graph contains a cycle _____

a) then a deadlock does not exist

b) then a deadlock exists

c) then the system is in a safe state

d) either deadlock exists or system is in a safe state

113. 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?

a) 2

b) 3

c) 4

d) 1

114. system has 3 processes sharing 4 resources. If each process needs a maximum of 2 units then, deadlock _____

a) can never occur

b) may occur

c) has to occur

d) none of the mentioned

115. A deadlock can be broken by _____

a**) abort one or more processes to break the circular wait**

b) abort all the process in the system

c) preempt all resources from all processes

d) none of the mentioned

116. The two ways of aborting processes and eliminating deadlocks are _____

a) Abort all deadlocked processes

b) Abort all processes

c) **Abort one process at a time until the deadlock cycle is eliminated**

d) All of the mentioned

117. If we preempt a resource from a process, the process cannot continue with its normal execution and it must be _____

a) aborted

b) **rolled back**

c) terminated

d) queued

118. If the resources are always preempted from the same process _____ can occur.

a) deadlock

b) system crash

c) aging

d**) starvation**

119. What is the solution to starvation?

a) **the number of rollbacks must be included in the cost factor**

b) the number of resources must be included in resource preemption
c) resource preemption be done instead
d) all of the mentioned
120.   All processes share a semaphore variable **mutex**, initialized to 1. Each process must execute wait(mutex) before entering the critical section and signal(mutex) afterward.
Suppose a process executes in the following manner.

```
wait(mutex);

.....

critical section

.....

wait(mutex);
```

a) **a deadlock will occur**
b) processes will starve to enter critical section
c) several processes maybe executing in their critical section
d) all of the mentioned