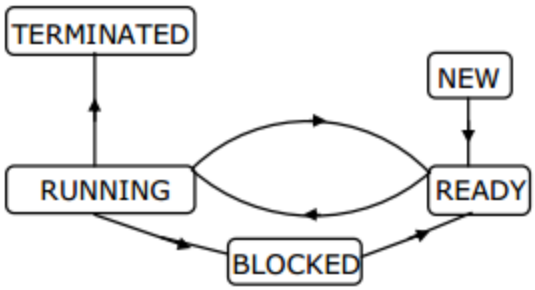
Operating System

Time : 1 hour

1. Which scheduling policy is most suitable for a time-shared operating system?
    a. Shortest Job First
    b. Round Robin
    c. First Come First Served
    d. Elevator

2. Which of the following system is represented by given figure



    a. Batch Operating System
    b. An OS with preemptive scheduler
    c. An OS with a non-preemptive scheduler
    d. A uni-programmed OS

3. System calls are usually invoked by using
    a. Software Interrupt
    b. Polling
    c. Indirect Jump
    d. Priviledged Instruction

4. Which of the following actions are **NOT** performed by the operating system when switching from process A to process B?
    a. Saving current register values and restoring saved register values for process B
    b. Changing address translation tables
    c. Swapping out memory image of process A to the disk
    d. Invalidating the translation look-aside buffer

5.Consider following code fragment:

```
if (fork() == 0)
        { a=a+5; printf("%d%d\n ",a,&a); }
else  { a=a-5; printf("%d%d\n ",a,&a); }
```

let u,v be the values printed by the process and x,y be the values printed by child process then which of the following is TRUE?

a. $u = x + 10$ and $v = y$

b. $u = x + 10$ and $v \neq y$

c. $u + 10 = x$ and $v = y$

d. $u + 10 = x$ and $v \neq y$

6. Consider following statements about user level threads and kernel level threads. Which one is FALSE?

a. Context switch time is longer for kernel level threads than for user level threads

b. User level threads do not need any hardware support

c. related kernel level threads can be scheduled on different processors.

d. Blocking one kernel level thread blocks all related threads.

7. A process executes following code

```
for ( i=0 ; i<n ; i++ )  fork( );
```

the total number of child process created is

a. n

b. $2^n - 1$

c. 2^n

d. $2^{n+1} - 1$

8. A solution to dining philosophers problem which avoids deadlock is

a. Ensure that all philosophers pick up the left fork before the right.

b.Ensure that all philosophers pick up the right fork before the left.

c. Ensure that one particular philosopher picks the left fork before the right fork, and that all other philosophers pick up the right fork before the left.

d. None of the Above.

9.

Consider Peterson's algorithm for mutual exclusion between two concurrent processes i and j. The program executed by process is shown below.

```
repeat
    flag[i]=true;
    turn=j;
    while (P) do no-op;
    Enter critical section, perform actions, then
    exit critical section
    Flag[i]=false;
    Perform other non-critical section actions.
Until false;
```

For the program to guarantee mutual exclusion, the predicate P in the while loop should be

a. flag[j] = true and turn = i

b. flag[j] =true and turn =j

c. flag [i] = true and turn = j

d. flag [i] = true and turn =i

10.

A system has n resources $R_0,\ldots,R_{n-1}$, and k processes $P_0,\ldots..P_{k-1}$. The implementation of the resource request logic of each process P_i. is as follows:

```
if (i% 2==0) {
    if (i<n) request Ri;
    if (i+2<n)request Ri+2;
}
else {
    if (i<n) request Rn-i;
    if (i+2<n)request Rn-i-2;
}
```

In which one of the following situations is a deadlock possible?

a. n=40, k = 26

b. n=21, k=12

c. n=20, k=10

d. n=41, k=19

11. Suppose n processes P_1....P_n share m identical resource units which can be reserved and released one at a time. the maximum resource requirement of process P_i is S_i where $S_i > 0$. which one of the following is a sufficient condition for ensuring that deadlock does not occur.

a. $\forall i , Si < m$

b. $\forall i , Si < n$

c. $\sum_{i=1}^{n} Si < (m + n)$

d. $\sum_{i=1}^{n} Si < (m * n)$

12. Total size of address space in a virtual memory system is limited by

a. the length of MAR

b. the available secondary storage

c. the available main memory

d. None of the above

13. The capacity of memory units is defined by the number of works multiplied by the number of bits/work, how many seperate address and data lines are needed for memory of $4K \times 16$

a. 10 address, 16 data lines

b. 11 address , 8 data lines

c. 12 address, 16 data lines

d. 12 address, 12 data lines

14. Thrashing

a. Reduces page IO

b. Decreases the degree of multi-programming

c. Implies excessive page IO

d. Improves system performance.

15. Locality of reference implies that the page reference being made by the process

a. Will always be to the page used in previous page reference

b. Is likely to be one of the pages used in last few page references

c. Will always be to one of the pages existing in memory

d. Will always lead to page fault

16. What is swap space in disk used for ?

a. Saving temporary HTML pages

b. Saving process data

c. Storing the super-block

d. Storing the device drivers

17. The root directory of a disk should be placed

a. At a fixed address in main memory

b. At fixed location on disk

c. Any where on the disk
d. Any where on system disk

18. Using the larger block size in a fixed block size file system leads to
a. better disk throughput but poor disk space utilization
b. better disk throughput and better disk space utilization
c. poorer disk throughput and better disk space utilization
d. poorer disk throughput and poorer disk space utilization

19. Which of the following is a real time system?
a. On-line railway reservation system
b. A process control system
c. Aircraft control system
d. Payroll processing system

20. A part of system software which under all circumstances must reside in main memory is
a. Text Editor
b. Assembler
c. Linker
d.Loader

21 .Banker's algorithm for resource allocation deals with
a. Deadlock avoidance
b. Deadlock prevention
c. Deadlock recovery
d. Mutual exclusion

22. The size of virtual memory depends on
a. Data Bus
b. Address Bus
c. Main Memory
d. None

23. An operating system contains 3 user processes each requiring 2 units of resource R. The minimum number of units of R required such that deadlock will never occur?
a. 3
b. 4
c. 5
d. 6

24. Memory protection is of no use in a
a. Single user system
b. non multi-programming system
c. non multi-tasking system
d. None

25. Fence register is used for

a. CPU protection
b. memory protection
c. File protection
d. All of the above

26. Which of the following is/are single user operating system

a. MS-DOS
b. UNIX
c. XENIX
d. both a and c

27. In a multi-user operating system, 20 requests are made to use a particular resource per hour, on an average. the probability that no request is made in 45 minutes is

a. e^{-15}
b. e^{-5}
c. $1 - e^{-5}$
d. $1 - e^{-10}$

28. To obtain better memory utilization dynamic loading is used, with dynamic loading a routine is not loaded until it is called for implementing dynamic loading

a. special support from hardware is required
b. special support from operating system is required
c. special support from both hardware and operating system is required
d. user program can implement dynamic loading without any special support from hardware or OS.

29. Which of the following is TRUE?

a. Overlays are used to increase size of physical memory
b. Overlays are used to increase the logical address space
c. When Overlays are used the size of processes is not limited to size of physical memory
d. Overlays are used whenever physical address space is smaller thanlogical address space.

30. The main function of shared memory is to

a. Use primary memory efficiently
b. do intra process communication

c. do inter process communication

d. None

31. If there are 32 segments of 1KB each then logical address should have

a. 13 bits

b. 14 bits

c. 15 bits

d. 16 bits

32. Dirty bit for a page in page table

a. helps avoids unnecessary writes

b. helps maintain LRU information

c. allows only read on page

d. None

33. Each process P_i, i=1..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

a. 1

b. 2

c. 3

d. 0

34. Working set (r,k) at an instance of time t, is set of ?

a. k future references that operating system will make

b. Future references that the operating system will make in next 'k' time units

c. k references with higher frequency

d. Pages that have been referenced in the last k time units

35. Which of the following is TRUE?

a.Fixed partition memory organization has a problem called external fragmentation.

b. Dynamic partition memory organization has a problem called internal fragmentation

c. Paging has a problem called internal fragmentation.

d.Paging has a problem called external fragmentation.

36. Which one of the following is NOT an advantage of using shared, dynamically linked libraries as opposed to using statically linked libraries?

a. Smaller sizes of executable files

b. Lesser overall page fault rate in that system

c. Faster program startup

d. Existing program need not be re-linked to take advantage of newer version of libraries.

37. In Linux , what command is used used to count total number of lines, words and characters contained in a file

a. countw

b. wcount

c. wc

d. None

38. How many primary partitions can exist on one drive?

a.16

b. 4

c. 2

d. 1

39. The exception to the fact that any process in UNIX, has a parent is

a. Dev

b. Sh

c. Kernel

d. Login

40. Kernel is not involved

a. When a read operation is done

b. When a pressed key is echoed on screen

c. In resource allocation

d. None