Roll No. | | | | | | | | | | | | | **Total No. of Pages : 04**

Total No. of Questions : 14

BCA (Sem.–4)

OPERATING SYSTEM

Subject Code : BCA-404

Paper ID : A0219

Time : 3 Hrs. **Max. Marks : 75**

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A will be compulsory and have 20 questions of 1 mark each.**
2. **SECTION-B will have 8 short answer type questions of 5 marks each, out of which candidate will have to attempt any 5.**
3. **SECTION-C will have 5 long answer type questions of 10 marks each, out of which candidate will have to attempt any 3.**

SECTION-A

1. Multiple Choice Questions :

A) In a time-sharing operating system, when the time slot given to a process is completed, the process goes from the RUNNING state to

a) READY state b) BLOCKED state

c) TERMINATED state d) SUSPENDED state

B) Time quantum is defined in

a) shortest job scheduling algorithm b) round robin scheduling algorithm

c) priority scheduling algorithm d) multilevel queue scheduling algorithm

C) A solution to the problem of indefinite blockage of low - priority processes is

a) Starvation b) Wait queue

c) Ready queue d) Aging

D) A system has 6 identical resources and N processes competing for them. Each process can request atmost 2 resources. Which one of the following values of N could lead to a deadlock?

a) 1 b) 2

c) 3 d) 4

E) A process executes the code

```
fork();
fork();
forkQ;
```

The total number of child processes created is

a) 3 b) 4

c) 7 d) 8

F) What is breach of availability?

a) This type of violation involves unauthorized reading of data

b) This violation involves unauthorized modification of data

c) This violation involves unauthorized destruction of data

d) This violation involves unauthorized use of resources

G) In paged memory systems, if the page size is increased, then the internal fragmentation generally

a) becomes less b) becomes more

c) remains constant d) none of the above

H) Which of the following is NOT true of deadlock prevention and deadlock avoidance schemes?

a) In deadlock prevention, the request for resources is always granted if the resulting state is safe

b) In deadlock avoidance, the request for resources is always granted if the result state is safe

c) Deadlock avoidance is less restrictive than deadlock prevention

d) Deadlock avoidance requires knowledge of resource requirements a priori

I) 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 timesharing 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 = 50ms b) tQ = 40ms

c) tQ = 45ms d) tQ = 15ms

J) Which of the following is NOT a valid deadlock prevention scheme?

a) Release all resources before requesting a new resource

b) Number the resources uniquely and never request a lower numbered resource than the last one requested.

c) Never request a resource after releasing any resource

d) Request and all required resources be allocated before execution.

Fill in the Blanks :

K) …….. scheduler select the process that is ready to execute and allocate the CPU to it.

L) …….. is a software-generated interrupt caused either by an error or by a specific request from a user program that an operating-system service be performed.

M) Each process is represented in the operating system by a ……., which contains information associated with a specific process.

N) In …….. attack, a legitimate-looking e-mail or web page.misleads a user into entering confidential information.

O) A ……. is a process that uses the spawn mechanism to ravage system performance. It spawns copies of itself, using up system resources and locking out all other processes.

P) The interval from the time of submission of a process to the time of completion is the ……. time.

Q) The sequence of directories searched when a file is named is called the ……..

R) A section of disk at the beginning of each volume is set aside to contain the table known as …… which has one entry for each disk block and is indexed by block number.

S) Request and release of resources that are not managed by the operating system can be accomplished through the …….. and …… operations on semaphores.

T) A program in execution is called ……...

SECTION-B

2. What is trojan horse? Give an example.
3. Discuss multilevel queue scheduling algorithm.
4. What are the five major activities of an operating system in regard to file management?
5. How Multitasking operating system is different from Multiprogramming operating system?
6. What is the significance of indexed file allocation?
7. Explain the difference between internal and external fragmentation.
8. To protect a system, we must take security measures at various levels. Explain.
9. Explain how deadlocks are detected and corrected.

SECTION-C

10. How symmetric encryption is different from asymmetric encryption? Explain the RSA encryption algorithm in detail.

11. Consider the following snapshot of a system :

	Allocation	Max	Available
	ABCD	ABCD	ABCD
P0	0 0 12	0 0 12	1520
PI	10 0 0	17 5 0	
P2	13 5 4	2 3 5 6	
P3	0 6 3 2	0 6 5 2	
P4	0 0 14	0 6 5 6	

Use the banker's algorithm to find whether the system in a safe state? If a request from process PI arrives for (0,4,2,0), can the request be granted immediately?

12. Describe the following allocation algorithms with suitable example:
    a. First fit
    b. Best fit
    c. Worst fit

13. Consider following processes, with the CPU burst time given in milliseconds.

Process	Burst Time	Priority
P1	10	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

Process are arrived in PI, P2, P3, P4, P5 order of all at time 0. Draw Gantt chart and calculate turnaround time and waiting time for SJF and FCFS scheduling algorithm.

14. Consider the following page reference string :

1,2,3,4, 2, 1,5, 6, 2, 1,2, 3, 7, 6,3,2, 1,2, 3, 6.

How many page faults would occur for the optimal replacement algorithm, assuming three and four frames? Remember all frames are initially empty, so your first unique pages will all cost one fault each.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.