B3.4-R4: OPERATING SYSTEMS

NOTE:

1. **Answer question 1 and any FOUR from questions 2 to 7.**
2. **Parts of the same question should be answered together and in the same sequence.**

Time: 3 Hours **Total Marks: 100**

1.

a) What is the difference between wait state and sleep state of a process? Explain in brief.
b) How system calls gets executed?
c) What is process starvation? How can it be avoided?
d) "To find out the target sector on the CD surface CAV is required" True or False? Justify your answer.
e) Differentiate between worm and virus.
f) What is race condition? When does it occur?
g) With a block diagram show how does RPC work?

(7x4)

2.

a) What is a critical section? How semaphore can be used to solve critical section problem for producer consumer problem.
b) The details of five processes P1, P2, P3, P4, and P5 running on a system are given below. Compute average waiting time for the process using SRTF and SJF process scheduling algorithm.

Process	Arrival Time in ms	CPU Burst Time in ms
P1	0	10
P2	0	12
P3	3	6
P4	0	7
P5	5	1

(12+6)

3.

a) Differentiate between real time and time sharing systems giving examples of each.
b) Consider a system that contains 4 concurrently non-sharing and reusable resources as R1 (8 instances), R2 (10 instances), R3 (5 instances), R4 (6 instances).

There are five processes in the system for which the Maximum Resource Requirement and Allocation matrices are given below:

Process	Max				Allocation			
	R1	R2	R3	R4	R1	R2	R3	R4
P1	6	1	1	3	3	0	1	3
P2	3	8	3	0	0	4	2	0
P3	2	2	0	1	2	1	0	1
P4	3	2	5	6	1	2	2	2
P5	5	0	1	3	1	0	0	0

Apply Banker's Safety Algorithm to find out whether the system is in a safe state.

(6+12)

4.

a) What is Belady's Anomaly? Explain with an example
b) Differentiate between internal and external fragmentation in memory management schemes.
c) If the primary memory is divided into 3 pages and the following page request sequence is followed:

3, 1, 3, 4, 2, 4, 1, 2, 3, 1, 2, 4, 2, 3, 1, 3

Compare the performances of LRU and LFU page replacement algorithms in this case.

(6+4+8)

5.

a) Compare and Contrast NTFS and FAT file systems.
b) What do you mean by Cycle Stealing Method?
c) Find out total seek time estimated by total arm motion for SSTF, SCAN CSCAN and LOOK algorithms if the following sequence of cylinders is requested from the hard disk:

30, 85, 130, 45, 175

(Consider the r/w head is initially placed on sector 100 and Total 200 cylinders are present)

(6+4+8)

6.

a) What is VPN? How can different security measures be implemented in VPN?
b) What is blended threat?
c) Is there any disadvantage of one-time password? How can it be recovered?

(6+6+6)

7.

a) What is name server? How does it work?
b) State the differences between stateful and stateless services.
c) How mutual exclusion is maintained in distributed architecture?
d) Compare Bully Algorithm and Ring Algorithm with an example in the distributed system.

(3+3+5+7)