Unit IV

8. (a) Explain various file access methods. Write advantages and limitations of each. 7

   (b) The head of a moving disk with 200 tracks numbered 0 to 199 is currently serving the request at track 120 and has just finished a request at track 125. If the queue request is kept in FIFO order, 86, 147, 91, 177, 94, 150, 102, 175, 130, 45. What is the total head movement to satisfy these requests for (i) FCFS (ii) SSTF disk scheduling algorithms. 7

9. (a) Explain disk formatting, boot block and bad blocks. 7

   (b) Explain the features of Linux Operating system in detail. 7

❖❖❖❖❖❖❖

CSE IV

(T) Roll No. .....

PAPER ID—21143

B.Tech. EXAMINATION, 2026

(Fourth Semester)

OPERATING SYSTEM

Time : 3 Hours *Maximum Marks : 70*

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting *one* question from each Section. Q. No. **1** is compulsory.

Compulsory Question

1. (a) What is a process ?

   (b) What is turnaround time ?

   (c) What is a race condition ?

5. Consider the following snapshot of a system in which four resources A, B, C and D are available. **14**

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
	2	0	1	1	3	2	1	1	6	4	4	2
P1	1	1	0	0	1	2	0	2				
P2	1	0	1	0	3	2	1	0				
P3	0	1	0	1	2	1	0	1				

The system contains a total of 6 instances of A, 4 of resource B, 4 of resource C, and 2 of resource D. Using the banker's algorithm :

(i) Calculate the need matrix.

(ii) Is the system in a safe state ? Why or why not ?

(iii) Is the system deadlocked ? Why or why not ?

(iv) If a request from P3 arrives for (2,1,0,0), can the request be granted immediately ?

Unit III

6. (a) Consider six memory partitions of size 200 KB, 400 KB, 600 KB, 500 KB, 300 KB and 250 KB. These partitions need to be allocated to four processes of sizes 357 KB, 210 KB, 468 KB and 491 KB in that order. Perform the allocation of processes using First Fit, Best Fit and Worst Fit Algorithms. **7**

(b) Explain internal and external fragmentation. Discuss various techniques to minimize fragmentation, **7**

7. (a) Describe demand paging in detail. Explain the process of handling a page fault with a diagram. **7**

(b) A system has 32-bit logical addresses and 4 KB page size : **7**

(i) Calculate number of bits for page number and offset.

(ii) Determine size of page table.

(iii) Explain the address mapping process.

(d) Explain the difference between logical and physical address.

(e) What are the disadvantages of paging ?

(f) What are file attributes ?

(g) Explain the concept of a safe state.

7×2=14

Unit I

2. (a) What is an Operating System ? Explain various types of Operating Systems. 7

(b) What is a Process Control Block ? Explain its various components. 7

3. (a) What is the difference between a process and a thread ? Explain and compare different types of threads with suitable diagram. 7

(b) What are the effects of selecting an appropriate time quantum in round-robin scheduling algorithm ? Consider the set of 6 processes whose arrival time and burst time are given below, if the CPU scheduling policy is Round Robin with time quantum = 2, calculate the average waiting time and average turnaround time. 7

Process Id	Arrival time	Burst time
P1	0	4
P2	1	5
P3	2	2
P4	3	1
P5	4	6
P6	6	3

Unit II

4. (a) What is a Semaphore ? Explain producer consumer problem using semaphore. 7

(b) Explain the critical section problem. What are the different approaches used to ensure mutual exclusion in concurrent systems ? 7