

- (c) Differentiate between : 7
 (i) Time-Sharing system and Real-Time system
 (ii) Multiprogramming system and multiprocessing system
- (d) Explain the file allocation methods in detail. 7

Unit-II

2. (a) Define the term process. 2
 (b) Explain life cycle of a process. 7
 (c) For different processes the arrival and burst time is given as below : 7

Process	Burst Time (in ms)	Arrival Time (in hrs)
P ₁	5	0
P ₂	15	1
P ₃	10	2

Calculate average waiting time using FCFS, SJF (Preemptive and Non-Preemptive) scheduling mechanism. 7

- (d) Suppose the moving head disk with 200 tracks is

currently serving a request for track 143. If the queue of the request is kept in FIFO order : 86, 147, 91, 177, 94 and 150. What is the total head movement for the following scheduling schemes?

- (i) FCFS
 (ii) SSTF
 (iii) C-SCAN 7

Unit-III

3. (a) What is Demand paging? 2
 (b) Explain memory management techniques paging and segmentation in detail. 7
 (c) What is Thrashing and how it can be handled? Explain in brief. 7

(d) Consider the following reference string : 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3. How many page fault will occur for the following algorithm. (Assume frame size = 3).

- (i) FIFO
 (ii) LRU
 (iii) Optimal Page Replacement 7

Unit-IV

4. (a) What is Resource Allocation Graph? 2
- (b) Define Deadlock. Explain four necessary conditions for deadlock to occur. 7
- (c) What is critical section problem? Give two solutions for critical section problem. 7
- (d) Consider a system with five processes P_0 through P_4 and three resources A, B, C . Resource A has 10 instances, B has 5 instances and type C has 7 instances. Suppose at time t_0 following snapshot of the system has been taken :

Process	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P_0	0	1	0	7	5	3	3	3	2
P_1	2	0	0	3	2	2			
P_2	3	0	2	9	0	2			
P_3	2	1	1	2	2	2			
P_4	0	0	2	4	3	3			

- (i) What will be the content of need matrix.

- (ii) Is the system in safe state? If yes, then what is the safe sequence?

Unit-V

5. (a) What is device-driver and device-controller? 2
- (b) Explain interrupt handlers. 7
- (c) Write short notes on the following operating systems : 7
- (i) MS-DOS
- (ii) Unix
- (d) Explain Direct Memory Access (DMA). 7