

- N.B.** 1. Q.no.1 is **compulsory**
 2. Attempt any **three** out of the remaining five questions

- Q.1. (a) Explain the critical section problem in brief 5
 (b) What do you mean by virtual memory? 5
 (c) Explain the system components in Windows Architecture 5
 (d) State any five system calls 5
- Q.2. (a) Given the following queue - 95, 180, 34, 119, 11, 123, 62, 64, in FIFO order with Read-write head initially at the track 50 and the tail track being at 199, discuss the following disk scheduling algorithms- 10
 i. FCFS ii. SSTF iii. SCAN iii. LOOK
 (b) Explain the readers/writers problem. Suggest a solution for the same 10
- Q.3. (a) Explain file management in UNIX 10
 (b) What is deadlock? Explain the deadlock avoidance in detail 10
- Q. 4. (a) Explain different page replacement policies with a suitable example 10
 (b) Differentiate the following: 10
 (i) Paging vs segmentation (ii) Monolithic vs Microkernel Operating System.
- Q.5. (a) Consider the following set of processes, with the length of CPU burst in milliseconds 10

Process	Burst time	Priority
P1	8	4
P2	6	1
P3	1	2
P4	9	2
P5	3	3

The processes are assumed to have arrived in the order P1, P2, P3, P4, P5 all at time 0. Draw Gantt charts for the following scheduling algorithms- FCFS, SJF, Non-preemptive priority and RR(quantum=1) and also calculate the turnaround time, average waiting time.

- (b) Explain the hardware support for paging 10
- Q.6. Write notes on the following: 20
- (a) Thrashing and working set model
 (b) State transition in UNIX
 (c) I/O buffering techniques
 (d) Semaphores.