National Institute of Technology, Hamirpur
End Sem Examination, May-2023
Title of the Course: <Operating System>
B.Tech (Mathematics and Computing)

Max. Marks: 50   **Semester:** 4th
Course Code: MA-224   **Time:** 3 Hour

➢ **All Questions are compulsory.**

1	What is mean by Operating system? Explain the evolution of Operating system in detail. **[01+04 Marks]**
2	a) Define CPU Scheduling and its type. **[01+01 Marks]** b) What is mean by Process? Explain the process state diagram in detail. **[01+02 Marks]**
3	Define the semaphore and its types. Explain how it can be used to implement mutual exclusion. **[02+02 marks]**
4	Define the following terms: Arrival Time, Burst Time, Waiting Time, Response Time, Turnaround Time, and Completion Time. **[03 Marks]**
5	Find the average waiting time, average turnaround time, and response time using Gantt chart. Apply the SJF (with non-preemptive mode) and SRTF (with preemption mode) for the following set of processes. **[03+03 Marks]** Process Arrival Time Burst time p1 2 1 p2 1 5 p3 4 1 p4 0 6 p5 2 3
6	Define deadlock in operating system? Describe necessary conditions for a deadlock situation to arise. Also explain any two methods to handle deadlocks. **[01+02+04 Marks]**
7	Consider the reference stream 3,2,1,3,4,1,6,2,4,3,4,2,1,4,5,2,1,3,4. How many Page faults while using optimal and LRU page replacement algorithms for 3 frames? Also calculate the hit ratio and miss ratio. **[02+02 Marks]**
8	What is mean by paging and segmentation? Explain with neat diagram internal and external fragmentation. **[02+04 Marks]**
9	Describe the LOOK disk scheduling algorithm. The disk head is initially at cylinder number 53 and moving towards larger cylinder numbers on its servicing pass. The sequences of cylinder's requests are 98, 183, 41, 122, 14, 124, 65, and 67. Find the total head movement. **[02+03 Marks]**
10	Explain the goals of protection and security violation categories in operating system. **[02+03 Marks]**