Paper: Operating Systems Concepts

Code: INFO3102

Chapter: Process Scheduling

Full Marks: 100

1. Differentiate between CPU Burst and IO Burst Processes.	3
2. Differentiate between Pre-emptive and Non Pre-emptive Scheduling.	3
3. What are the major tasks performed by Dispatcher?	3
4. Describe process scheduling and process scheduling criteria.	10
5. Explain with example: a) FCFS Scheduling b) SJF Scheduling c) SRTF Scheduling d) Priority Scheduling e) RR Scheduling	25
6. What is convoy effect? Which scheduling algorithm is affected with it?	3
7. What is the major problem of priority scheduling? How can it be solved?	5
8. "Selection of quantum time is the most important to determine efficiency of RR scheduling" – Justify.	3
9. Describe the advantage of using Multilevel Queue Scheduling? What is the disadvantage of this algorithm? How this problem can be solved?	4+2+4
10. Consider the following table of arrival time and burst time for three processes P0, P1 and P2. Process Arrival time Burst Time P0 0 ms 9 ms P1 1 ms 4 ms P2 2 ms 9 ms The pre-emptive shortest job first scheduling algorithm is used. Scheduling is carried out only at arrival or completion of processes. What is the average waiting time for the three processes?	5
11. Consider the following set of four processes. Their arrival time and time required to complete the execution are given below. All time values are in milliseconds. Consider that time quantum is of 4 ms, and context switch overhead is of 1 ms. Process / Arrival Time (T0) / Time required for completion (ΔT)(CPU Burst Time) P0 / 0 / 10 P1 / 1 / 6 P2 / 3 / 2 P3 / 5 / 4 Find out the average Turn-around time, Waiting time and Response Time.	5
12. "The Response time and Waiting time of non pre-emptive process scheduling are same" - Justify	2

13. Consider the following set of four processes. Their priority and time required to complete the execution are given below. All time values are in milliseconds. Compare the efficiency of FCFS and Priority Scheduling on this scenario. (Consider Priority inversly proportional with priorioty value) — 5

Process	Burst Time	Priority
P1	10	3
P2	1	1
P3	2	4
P4	1	5
P5	5	2

14. Consider three process, all arriving at time zero, with total execution time of 10, 20 and 30 units respectively. Each process spends the first 20% of execution time doing I/O, the next 70% of time doing computation, and the last 10% of time doing I/O again. The operating system uses a shortest remaining compute time first scheduling algorithm and schedules a new process either when the running process gets blocked on I/O or when the running process finishes its compute burst. Assume that all I/O operations can be overlapped as much as possible. For what percentage of does the CPU remain idle? — 5

15. Consider the set of 4 processes whose arrival time and burst time are given below- — 5

Process No.	Arrival Time	Burst Time		
		CPU Burst	I/O Burst	CPU Burst
P1	0	3	2	2
P2	0	2	4	1
P3	2	1	3	2
P4	5	2	2	1

If the CPU scheduling policy is Shortest Remaining Time First, calculate the average waiting time and average turnaround time.

16. Consider three processes (process id 0, 1, 2 respectively) with compute time bursts 2, 4 and 8 time units. All processes arrive at time zero. Consider the longest remaining time first (LRTF) scheduling algorithm. In LRTF ties are broken by giving priority to the process with the lowest process id. Find the average turnaround time. — 3

17. Consider the set of processes with arrival time (in milliseconds), CPU burst time (in milliseconds), and priority (0 is the highest priority) shown below. None of the processes have I/O burst time. — 5

Process	Arrival time	Burst Time	Priority
P1	0	11	2
P2	5	28	0
P3	12	2	3
P4	2	10	1
P5	9	16	4

Find out the average waiting time (in milliseconds) of all the processes using pre-emptive priority scheduling algorithm.