



School of Computer Science and Engineering

Fall Semester 2024-25

CAT I

SLOT: B1 Slot

Programme Name & Branch: B. Tech CSE

Course Name & Code: Operating Systems & BCSE303L

Class Number (s): Common to all

Exam Duration: 90 Min.

Maximum Marks: 50

Q. No.	Question	Max Marks
1.	(i) A Computer system can have single processor, multiprocessor, and multicore processor architecture. A job or program can be executed either sequentially or in parallel based on its design. Enumerate the advantages of having different system architecture and analyse the effect of executing a set of jobs run in sequential or parallel over these architectures. (ii) Operating system provides tremendous services to the user. From the security perspective, which are the services to be considered. Justify your answer.	5+5
2.	(i) What is a system call? Why are system calls necessary? Illustrate the methods to pass the parameters of system calls to the operating systems. (ii) Categorize the following instructions into privileged instructions and non-privileged instructions. Also mention whether the instruction to be executed under user mode or kernel mode. i) Reading system time ii) Clear Memory iii) Opening and reading a file iv) Set the timer v) Performing arithmetic operation	5+5
3.	What are the differences between user-level threads and kernel level threads? Discuss the threading issues in implementing it in multi-programming.	10

4.

10

Assume the following workload in a system:

Process	Arrival Time(ms)	Burst Time(ms)	Priority
P1	5	5	0
P2	4	2	7
P3	3	7	5
P4	0	4	10
P5	3	5	5

Draw the Gantt chart illustrating the execution of these processes using round robin scheduling algorithm (Time Quantum= 3 ms) and priority scheduling algorithm, also calculate the average waiting time and average turnaround time.

5.

10

Consider a system with five processes (P1, P2, P3, P4, P5), all arriving at time zero, with total execution time (includes CPU Burst time and I/O Burst time) of 25, 15, 20, 10 and 5 milliseconds respectively. Each process spends 20% of execution time doing I/O and 80% of time doing computation. The operating system uses SJF and FCFS scheduling algorithms to schedule the processes by considering only CPU burst time of each process. Draw the Gantt chart and calculate average turnaround time and average waiting time for both the algorithms.