# Shiv Nadar University Chennai

Mid Semester Examinations 2024-2025 Odd

Question Paper

| Name of the Program: B.Tech. (AI&DS) B.Tech. (CSE - Cyber Security) | | Semester: III |
|---|---|---|
| Course Code & Name: CS2701 & OPERATING SYSTEMS + LAB | | |
| Regulation 2021 | | |
| Time: 2 Hours | Answer All Questions | Maximum: 50 Marks |

| Q.No. | | Questions | Marks | CO | KL |
|---|---|---|---|---|---|
| 1 | a | A process executes the code:<br>fork();<br>fork();<br>fork();<br>The total number of child processes created is _____. | 2 | CO2 | KL3 |
| 2 | a | The primary objective of multiprogramming is to minimize user response time, while the primary objective of time sharing is to maximize processor utilization. Justify or contradict. | 2 | CO1 | KL2 |
| 3 | a | Thread scheduling is faster than process scheduling. Justify or contradict. | 2 | CO2 | KL3 |
| 4 | a | Consider a time-sharing system that uses a round robin scheduling algorithm. Suppose there are **N processes** in the ready queue, with **time quantum** $\Delta$ and context-switch overhead of $\delta$. Assume that the average CPU burst time of a process is $\beta$. Estimate the average waiting time of a process before it again gets chance to run on the CPU. Clearly state any assumptions you make. | 2 | CO2 | KL3 |
| 5 | a | List any two methods for passing parameters to the operating system. | 2 | CO1 | KL1 |
| 6 | a | Three concurrent processes P1, P2 and P3 are concurrently updating a shared variable xyz (with initial value of 100) as follows:<br>P1: xyz = xyz + 10;<br>P2: xyz = xyz - 20;<br>P3: xyz = xyz * 2;<br>What will be the maximum value and minimum value of xyz after execution of three processes?<br>[step by step explanation of answer is mandatory] | 5 | CO3 | KL3 |
| 7 | a | Why do you need to protect the operating system from errant users? Explain the different ways of achieving it. | 5 | CO1 | KL2 |
| 8 | a | What do you mean by booting? Explain the steps involved in the process of booting. | 5 | CO1 | KL2 |
| 9 | a | With necessary illustrations, discuss in detail about the different types of operating system structure. | 10 | CO1 | KL1 |

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|---|---|---|---|---|---|
| 10 | a | Consider the following set of processes P1 to P6. Calculate the average waiting time, average completion time and average turn around time for the following scheduling algorithms:<br>i) FCFS (3 marks)<br>ii) Non-preemptive SJF (4 marks)<br>iii) Pre-emptive SJF (4 marks)<br>iv) Round robin with time quantum of 3 milliseconds. (4 marks) | 15 | CO2 | KL4 |

| Process | P1 | P2 | P3 | P4 | P5 | P6 |
|---|---|---|---|---|---|---|
| Arrival Time (msec) | 0 | 2 | 3 | 5 | 6 | 8 |
| CPU Burst (msec) | 7 | 4 | 6 | 2 | 8 | 5 |

KL – Bloom's Taxonomy Levels
(KL1: Remembering, KL2: Understanding, KL3: Applying, KL4: Analyzing, KL5: Evaluating, KL6: Creating)
CO – Course Outcomes

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