



SCHOOL OF COMPUTER SCIENCE AND ENGINEERING
CONTINUOUS ASSESSMENT TEST - I
FALL SEMESTER 2025-2026

Programme Name & Branch : B.Tech / CSE(BBS)
Course Code and Course Name : CBS1006 - Principles of Operating Systems
Faculty Name(s) : Dr. Priyadharsini M
Class Number(s) : VL2025260103273
Date of Examination : 19.08.2025
Exam Duration : 90 minutes

Maximum Marks: 50

General instruction(s):

- Answer All Questions
 - M - Max mark; CO - Course Outcome; BL - Blooms Taxonomy Level (1 - Remember, 2 - Understand, 3 - Apply, 4 - Analyse, 5 - Evaluate, 6 - Create)
- Course Outcomes:
1. Describe the various OS functionalities, structures and layers.
 2. Usage of system calls related to OS management and interpreting different stages of various process states.
 3. Design CPU scheduling algorithms to meet and validate the scheduling criteria.
 4. Apply and explore the communication between inter process and synchronization techniques.

Q. No	Questions	M	CO	BL
1.	a) Identify the most suitable operating system for the following scenario and justify your answer with appropriate reasons. i) An airbag system in a car must respond within milliseconds during a collision. ii) In a college computer lab, multiple students are logged into the same server.	5	CO1	BL2
	b) Justify the suitability of microkernel architecture for systems that require frequent updates to device drivers and user services without impacting the entire operating system. Also, mention its advantages.	5		
2.	Assume an organization needs to run legacy applications that are incompatible with their current operating system without affecting their main system. i) Describe how virtual machines can be used to solve this problem. ii) Justify how resource management is handled. iii) Explain the advantages and possible limitations.	10	CO1	BL2
3.	Explain the concept of a process and discuss the different states it can occupy, supported by a suitable diagram. In the context of a multitasking operating system, consider a scenario where Process A is currently running and issues an I/O request, causing it to move into the blocked state. Due to memory	10	CO2	BL2



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	management or scheduling decisions, Process A is later moved to the suspended blocked state. At the same time, Process B, which was in the suspended ready state, is brought into main memory and moved to the ready state for execution. Illustrate and describe the resulting state transitions for both processes using a relevant state transition diagram.																					
4.	Consider the following set of processes, whose arrival time and burst time are given below in milliseconds. Draw the Gantt chart illustrating the execution of these processes using FCFS and Preemptive SJF. Calculate the average turnaround time and average waiting time. <table><tr><th>Process</th><th>Arrival Time</th><th>Burst time</th></tr><tr><td>P1</td><td>3</td><td>1</td></tr><tr><td>P2</td><td>1</td><td>4</td></tr><tr><td>P3</td><td>4</td><td>5</td></tr><tr><td>P4</td><td>0</td><td>9</td></tr><tr><td>P5</td><td>2</td><td>3</td></tr></table>	Process	Arrival Time	Burst time	P1	3	1	P2	1	4	P3	4	5	P4	0	9	P5	2	3	10	CO3	BL3
Process	Arrival Time	Burst time																				
P1	3	1																				
P2	1	4																				
P3	4	5																				
P4	0	9																				
P5	2	3																				
5.	Assume in a restaurant kitchen, several chefs work simultaneously to prepare different dishes. Each chef requires two specific cooking tools, such as a spatula and a pan, to start cooking. However, these tools are limited and shared among the chefs, so they must wait if the tools are in use. If all chefs pick up one tool at the same time and wait for the other, a deadlock can occur, halting the entire cooking process. Proper coordination and synchronization are needed to ensure that chefs get both tools without causing delays or conflicts. Discuss the need of process synchronization and develop the solution (pseudo code) to this problem.	10	CO4	BL3																		
