Roll No.												

PRESIDENCY UNIVERSITY

BENGALURU

Mid - Term Examinations – October 2025

Date: 07-10-2025 **Time:** 02.00pm to 03.30pm

School: SOCSE	**Program:** B.Tech. (CSE)	
Course Code : CSE2269	**Course Name:** Operating Systems	
Semester: V	**Max Marks**: 50	**Weightage**: 25%

CO - Levels	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**
Marks	**24**	**26**			

Instructions:

(i) Read all questions carefully and answer accordingly.

(ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks. **5Q x 2M=10M**

1	Name the four main components of a computer system.	**2 Marks**	**L1**	**CO1**
2	Differentiate between system software and application software, providing one example for each.	**2 Marks**	**L2**	**CO1**
3	What is a thread?	**2 Marks**	**L1**	**CO2**
4	List the key difference between a program and a process.	**2 Marks**	**L1**	**CO2**
5	Describe the concept of a context switch.	**2 Marks**	**L2**	**CO2**

Part B

Answer the Questions. **Total Marks 40M**

6.	**a.**	Describe the dual role of an operating system from both the user view and the system view. Describe how the OS acts as a resource allocator and a control program from the system's perspective.	**10 Marks**	**L2**	**CO1**
		Or			
7.	**a.**	Explain the complete process of how a system call is handled by the operating system, from the moment a user application	**10 Marks**	**L2**	**CO1**

		invokes it to when control is returned and use a diagram to illustrate the process.			

8.	**a.**	Compare the monolithic, layered, and microkernel operating system structures. Discuss the primary advantages and disadvantages of each structure in terms of performance, reliability, and kernel size.	**10 Marks**	**L2**	**CO1**
		Or			
9.	**a.**	Clarify the key process management system calls in UNIX: fork(), exec(), wait(), and exit(). Describe the function of each call and how they work together to create and manage a new process.	**10 Marks**	**L2**	**CO1**

10.	**a.**	Describe the role of the Process Control Block (PCB) in an operating system. Explain in detail the various types of information stored in the PCB and how the operating system uses this information to manage processes.	**10 Marks**	**L2**	**CO2**
		Or			
11.	**a.**	Differentiate between the shared memory and message passing models of Inter-Process Communication (IPC). Explain the advantages and disadvantages of each model and provide a scenario where each would be the preferred method of communication.	**10 Marks**	**L2**	**CO2**

12.	**a.**	Consider the following four processes with their respective arrival times, CPU burst times, and priorities: **Process** | **Arrival Time (ms)** | **Burst Time (ms)** | **Priority** **P1** | **0** | **10** | **2** **P2** | **1** | **6** | **1** **P3** | **3** | **14** | **4** **P4** | **5** | **8** | **3** Draw the Gantt charts for the execution of these processes using both the preemptive Priority Scheduling and Round Robin (RR) algorithms. Assume a time quantum of 4 ms for the Round Robin algorithm. For each algorithm calculate the Waiting-time, Finish-time and Turnaround time, Calculate the average waiting time and average turnaround time for both preemptive Priority Scheduling and Round Robin. Based on	**10 Marks**	**L2**	**CO2**

		your results, compare the performance of the two algorithms in this specific scenario.			
		Or			
13.	**a.**	Describe the concept of threads and multithreading models. Explain the key difference between user-level threads and kernel-level threads, and discuss one-to-one and many-to-one models.	**10 Marks**	**L2**	**CO2**