Code: 23CS3401, 23IT3401

II B.Tech - II Semester – Supplementary Examinations
DECEMBER 2025

OPERATING SYSTEMS
(Common for CSE, IT)

Duration: 3 hours   Max. Marks: 70

Note: 1. This question paper contains two Parts A and B.
2. Part-A contains 10 short answer questions. Each Question carries 2 Marks.
3. Part-B contains 5 essay questions with an internal choice from each unit. Each Question carries 10 marks.
4. All parts of Question paper must be answered in one place.

PART – A

1.a)	Explain the purpose of system programs in an operating system.
1.b)	Describe the importance of an operating system's user interface.
1.c)	Explain the significance of CPU scheduling criteria in brief.
1.d)	Differentiate between process and thread.
1.e)	Describe the role of semaphores in process synchronization.
1.f)	What are the necessary conditions for a deadlock to occur?
1.g)	Explain the concept of swapping in memory management.
1.h)	Explain the need for page replacement algorithms.
1.i)	What is file-system mounting? Explain its significance.
1.j)	Explain the concept of an access matrix in file protection.

PART – B

			Max. Marks
		UNIT-I	
2	a)	Explain different types of system calls with examples.	5 M
	b)	Analyze different types of user interfaces provided by operating systems.	5 M
		OR	
3	a)	Illustrate the structure of an operating system and explain its components.	5 M
	b)	Compare the design considerations of Open-Source vs. Proprietary OS.	5 M
		UNIT-II	
4	a)	Describe different multithreading models and their advantages.	5 M
	b)	What are the criteria for evaluating the CPU scheduling algorithm?	5 M
		OR	
5	a)	Demonstrate how inter-process communication works with an example.	5 M
	b)	Examine threading issues and propose solutions for concurrency problems.	5 M
		UNIT-III	
6	a)	Explain in detail Readers and Writers Problem of Synchronization.	5 M

	b)	Explain the techniques used to prevent the deadlocks.	5 M
		OR	
7	a)	Explain the Resource-Allocation-Graph algorithm for deadlock avoidance.	5 M
	b)	What are the semaphores? How do they implement mutual exclusion?	5 M
		UNIT-IV	
8	a)	Define Virtual Memory. Explain the process of converting virtual addresses to physical addresses with a neat diagram.	5 M
	b)	Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The current head position is at cylinder 143. The queue of pending requests is: 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130. What is the total distance that the disk arm moves to satisfy all the pending requests for each of the following Disk scheduling algorithms? i) SSTF ii) SCAN	5 M
		OR	
9	a)	Consider the following page reference string 1,2,3,4,5,3,4,1,6,7,8,7,8,9,7,8,9,5,4,5,4,2 With four Frames. How many page faults would occur for the FIFO, Optimal page replacement algorithms? Which algorithm is efficient? (Assume all frame are initially empty)	5 M
	b)	Explain about Swapping.	5 M

		UNIT-V	
10	a)	Explain in detail about different file access methods.	5 M
	b)	Explain the role of partitions and mounting in file system design.	5 M
		OR	
11	a)	Briefly explain about single-level, two-level and Tree-Structured directories.	5 M
	b)	Explain the Indexed File allocation method with an example.	5 M