Register No: _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL-MAY 2025

Fourth semester

Computer Science and Engineering

CS3451 - Introduction to Operating Systems

(Common to Information Technology)

Regulations - 2021

Duration: 3 Hrs ***Maximum: 100 Marks***

PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)

Q.No	*Questions*	*BLT*	*CO*	*Marks*
1.	Describe the functions of an operating system.	L1	1	2
2.	Why is OS design important for system performance?	L2	1	2
3.	How does inter-process communication work in a client-server model?	L3	2	2
4.	Show how mutex locks can prevent race conditions.	L3	2	2
5.	Convert a logical address into a physical address using a two-level page table.	L3	3	2
6.	How does frame allocation impact system performance?	L4	3	2
7.	How does file system mounting work?	L2	4	2
8.	Given a file of size 500KB and a block size of 4KB, calculate the number of blocks required in contiguous allocation.	L3	4	2
9.	Evaluate the benefits of virtual machines for disaster recovery and business continuity.	L5	5	2
10.	Justify the use of containers instead of full virtualization for running mobile apps.	L5	5	2

PART – B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

Q.No			*Questions*	*BLT*	*CO*	*Marks*
11.	a	i	Show the structure of an operating system with suitable diagrams.	L1	1	8
		ii	Outline the differences between single-user and multi-user operating systems.	L2	1	8
			Or			
	b	i	List the different user OS interfaces with suitable diagrams.	L1	1	8
		ii	Compare different types of system programs.	L2	1	8
12.	a		Explain the different scheduling algorithms to a given set of processes.	L2	2	16
			Or			

	b	Discuss the role of semaphores in process synchronization.	L2	2	16
13.	a	Explain the concept of memory management in operating systems, including the different techniques used to manage memory.	L2	3	16
		Or			
	b	Explain the global and local allocation strategies for page frames in detail.	L2	3	16
14.	a	Given a disk with 500 cylinders and a request queue with track requests at 20, 100, 300, 250, and 400, apply the SCAN scheduling algorithm and calculate the total seek time.	L3	4	16
		Or			
	b	Given a disk with a bitmap-based free space management system, calculate the number of bits needed to track free blocks on a 500GB disk with a 4KB block size.	L3	4	16
15.	a	Create a hybrid virtualization model that balances security, performance, and cost.	L6	5	16
		Or			
	b	Design a new mobile OS architecture that integrates virtualization for better performance.	L6	5	16