

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL-MAY 2025****Fourth Semester****Artificial Intelligence and Data Science****AL3452 - Operating Systems****Regulations - 2021****Duration : 3 Hrs****Maximum : 100 Marks****PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)**

Q.No	Questions	BLT	CO	Marks
1.	Mention the main elements of a computer system.	1	1	2
2.	What are system calls?	1	1	2
3.	Define the term “process” with respect to an operating system.	1	2	2
4.	Identify the necessary conditions for a deadlock to occur.	2	2	2
5.	How does segmentation differ from paging in memory management?	2	3	2
6.	Write a note on Thrashing.	1	3	2
7.	List different file access methods supported by file systems.	1	4	2
8.	What is file system mounting? Give an example.	1	4	2
9.	Name two building blocks of a virtual machine.	1	5	2
10.	State any two important characteristics of virtualization.	2	5	2

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

Q.No	Questions	BLT	CO	Marks
11.	a Describe the evolution of operating systems in detail. Discuss its objectives and functions	2	1	16
	Or			
	b Explain the key factors to be considered when designing and implementing an operating system? Describe the various ways an operating system can be structured.	2	1	16
12.	a Given the following processes with their respective burst times, determine the average waiting time and average turnaround time using the First Come First Served (FCFS) and Shortest Job First (SJF) scheduling algorithms. Compare the results and identify the most suitable scheduling algorithm for the given scenario.	3	2	16

Process ID	Arrival Time	Burst Time
P1	0	2
P2	1	3
P3	2	5
P4	3	4
P5	4	6

Or

b	Implement a multithreaded program to solve a producer-consumer	3	2	16
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problem using semaphores.

13.	a	Consider a system using contiguous memory allocation. Given memory partitions of 100KB, 200KB, 300KB, and 500KB, allocate the processes P1 (120KB), P2 (50KB), P3 (230KB) and P4 (400KB) using First Fit, Best Fit and Worst Fit. Show the allocation and discuss the fragmentation issues.	3	3	16	
Or						
	b	Consider the following page reference string: 7, 0, 1, 2, 0, 3, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1. Assume 3 frames are available. Apply FIFO, LRU and Optimal Page Replacement Algorithms to find the number of page faults. Which algorithm performs best in this case?	3	3	16	
14.	a	i	Explain different types of disk scheduling algorithms and compare their efficiency with examples.	2	4	10
		i	For the disk request sequence 98, 183, 37, 122, 14, 124, 65, 67 with the disk head initially positioned at track 53, determine the total head movement using both FCFS and SSTF scheduling algorithms. Evaluate which method offers better efficiency in this scenario.	4	4	6
Or						
	b	i	Describe the three primary file allocation methods in detail.	2	4	10
		i	For the disk request sequence 58, 13, 77, 221, 20, 50, 90, 85 with the disk head initially positioned at track 60, determine the total head movement using both LOOK and SCAN scheduling algorithms. Evaluate which method offers better efficiency in this scenario.	4	4	6
15.	a	i	Describe the different types of virtual machines and their implementations.	2	5	10
		i	Analyze the role of virtualization in modern operating systems.	4	5	6
Or						
	b	i	Outline the structure and main features of the Android OS.	2	5	10
		i	Analyze the differences in system performance between Android and iOS platforms.	4	5	6