

THE KAVERY ENGINEERING COLLEGE
(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV/DEC 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)*

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
1.	Write the purpose and goals of an operating system.	L1	1	2
2.	Differentiate between system calls and system programs.	L2	1	2
3.	Which of the following scheduling algorithms could result in starvation? FCFS, SJF, RR, Priority.	L3	2	2
4.	State the four necessary and sufficient conditions for a deadlock to occur.	L2	2	2
5.	Mention the difference between internal and external fragmentation.	L2	3	2
6.	Distinguish logical address space and physical address space.	L2	3	2
7.	List the various access methods of the file system.	L1	4	2
8.	Identify the purpose of the application I/O interface.	L1	4	2
9.	State the role of the hypervisor in virtualization.	L2	5	2
10.	Recollect the features of Mobile Operating systems.	L1	5	2

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

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
11.	a i List the various operating system services and provide a brief overview of each of them.	L2	1	8
	ii Construct a comparison between different user interfaces in operating systems, such as Command Line Interface (CLI) and Graphical User Interface (GUI). Discuss the advantages and disadvantages of each.	L2	1	8
	Or			
	b i Classify the types of system calls. Also, list and explain any two types of system calls.	L2	1	8
	ii Illustrate the transition from user mode to kernel mode. Which call makes the transitions? Why do you need such transitions?	L2	1	8
12.	a i Demonstrate any two CPU Scheduling algorithms.	L2	2	8
	ii Illustrate two fundamental models of interprocess communication.	L2	2	8

Or

- b i Describe various types of multithreading models. L2 2 8
- ii Consider the following snapshot of a system: L2 2 8

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P ₀	0	0	1	2	0	0	1	2	1	5	2	0
P ₁	1	0	0	0	1	7	5	0				
P ₂	1	3	5	4	2	3	5	6				
P ₃	0	6	3	2	0	6	5	2				
P ₄	0	0	1	4	0	6	5	6				

With reference to Bankers algorithm,

i) What is the content of the matrix need?

ii) Is the system in a safe state?

iii) If a request from process P1 arrives for (0,4,2,0), can the request be granted immediately?

13. a i Describe the hardware support for paging. L2 3 8
- ii Given five memory partitions of 300KB,600KB,350KB,200KB,750KB (in order), how would the first fit, worst fit and best fit algorithms place processes of size 115KB, 500KB, 358KB and 200KB (in order) Compute final fragmentations and Rank them in terms memory efficient use. L2 3 8
- Or
- b i Describe the concept of pure demand paging in virtual memory management. L2 3 8
- ii Illustrate page replacement algorithms with an example. L2 3 8
14. a i Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving the request at cylinder 2150 and the previous request was at cylinder 1805. The queue of pending requests, are in FIFO order is: 2069, 1212, 2296, 2800, 544, 1618, 356, 1523, 4965, 3681. Starting at the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for each of the following disk-scheduling algorithms: FCFS, SSTF, SCAN, C-SCAN and C-LOOK. L4 4 8
- ii Give a schematic view of a virtual file system (VFS). L3 4 8
- Or
- b i Explain the role of I/O systems in operating systems, detailing how I/O hardware interacts with application interfaces and the kernel I/O subsystem. L3 4 8
- ii Analyze the various file system implementation methods, including the structure of file systems and the techniques for directory implementation. Discuss their advantages and disadvantages. L4 4 8
15. a i Discuss the future trends in virtualization technology and its potential impact on mobile operating systems. L3 5 8
- ii Discuss the history of virtual machines and how they have evolved over time. L2 5 8
- Or
- b i Examine the key features of iOS and Android mobile operating systems. L3 5 8
- ii Explain the types of virtual machines. L2 5 8