

THE KAVERY ENGINEERING COLLEGE
(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV /DEC 2024

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.	List the system components for OS.	RE	1	2
2.	How does an interrupt differ from a trap?	RE	1	2
3.	Sketch PCB.	RE	2	2
4.	List the conditions that must hold for deadlock prevention.	RE	2	2
5.	Interpret TLB and hit ratio.	UN	3	2
6.	Define thrashing.	RE	3	2
7.	Outline about C-SCAN scheduling.	UN	4	2
8.	Identify the attributes of a file.	UN	4	2
9.	Summarize the need of virtualization.	UN	5	2
10.	Illustrate the functions of virtual file system.	UN	5	2

PART – B (ANSWER ALL QUESTIONS) (Marks 5*13 = 65)

Q.No	Questions	BLT	CO	Marks
11.	a i Explain different operating system structures with neat sketch (Any 2).	UN	1	7
	ii Summarize the functionalities of system boot with respect to operating system.	UN	1	6
	Or			
	b i Explain the DMA driven data transfer technique.	UN	1	8
	ii With neat sketch, explain about computer system overview.	UN	1	5
12.	a Consider the following snapshot of a system:	AP	2	13
	Allocation Max Available A B C D A B C D A B C D P0 0 0 1 2 0 0 1 2 1 5 2 0 P1 1 0 0 0 1 7 5 0 P2 1 3 5 4 2 3 5 6 P3 0 6 3 2 0 6 5 2 P4 0 0 1 4 0 6 5 6			
	Answer the following questions using the banker's algorithm:			
	a. What is the content of the need matrix?			
	b. Is the system in a safe state?			
	c. If a request from process P1 arrives for (0,4,2,0), can the request be granted immediately?			

Or

- b i Consider the that following processes with its arrival time, burst time and priority AP 2 9

Process	Arrival Time	Burst Time	Priority
P1	0	12	2
P2	1	16	5
P3	2	5	1
P4	3	8	4
P5	4	12	3

Give Gantt chart and calculate Average Turnaround Time and Average Waiting Time for:

- First Come First Served (FCFS)
- SJF

- ii Develop the resource allocation graph with a cycle and without a deadlock. AP 2 4

13. a i Explain the hardware support for paging. UN 3 8

- ii Explain swapping of two processes using a disk as a backing store. UN 3 5

Or

- b Consider the page-reference string: 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6 AP 3 13
How many page faults would occur for the following replacement algorithms, assuming one, two, three, four frames? Remember that all frames are initially empty, so your first unique pages will all cost one fault each.
- LRU replacement
 - FIFO replacement
 - LRU approximation

14. a The requested tracks, in the order received are: 55, 58, 39, 18, 90, 160, 150, 38, and 184. Apply the following disk scheduling algorithms. Starting track at 100. AN 4 13

- SCAN
- LOOK
- SSTF

Examine the best algorithm for the given scenario.

Or

- b i Inspect the working of single level & two-level directories in directory structure with neat sketch. AN 4 7

- ii Classify the pros and cons of linked allocation. AN 4 6

15. a i Explain the types of virtual machines. UN 5 8

- ii Explain virtualization and OS components. UN 5 5

Or

- | | | | | |
|-----|---|----|---|---|
| b i | Analyze the various types of processors used in mobile devices. | AN | 5 | 7 |
| ii | Analyze the characteristics of smartphone OS. | AN | 5 | 6 |

*PART – C (Marks 1*15 = 15)*

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
16.	a i Given memory partitions of 10K, 4 KB, 20KB, 18KB, 7 KB, 9KB, 12 KB and 15KB, how would each of the first fit, best fit and worst fit algorithms place processes of 12 K, 10 K, 9 K and 7K? Which algorithm makes the most efficient use of memory.	AP	3	8
	ii Sketch the structure of page table.	UN	3	7
Or				
b i	Analyze the various system calls for the following environment: a. File management b. Device management	AN	2	8
ii	Analyze the system program with a neat sketch.	AN	2	7