

Reg.No.:



VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 50042

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – JAN. 2025

Fourth Semester

Computer Science and Engineering

U19CS413 – OPERATING SYSTEMS

(Regulation 2019)

Time : Three Hours

Maximum : 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	What is system call? List the types of system call.	2	K2	CO1
2.	What is an Operating System? Why OS is considered as Resource Manager? Justify your answer.	2	K2	CO1
3.	Define Monitor.	2	K2	CO2
4.	Differentiate Hard and Soft red time scheduling.	2	K2	CO2
5.	“If there is a cycle in the resource allocation graph, the system may or may not be in deadlock state“, Justify your answer.	2	K4	CO3
6.	State the differences between paging and segmentation.	2	K2	CO3
7.	Mention the various RAID levels.	2	K2	CO4
8.	Why rotational latency usually not considered in disk scheduling?	2	K2	CO4
9.	What are the information associated with an open file?	2	K2	CO5
10.	Write Short notes on file system mounting.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
11. a)	What are the advantage of inter process communication? Explain various implementations of inter process communication.	13	K2	CO1

(OR)

b) i.	With neat sketch explain the different state in which process shall exist during its execution.	8	K2	CO1
ii.	Discuss the role of Linkers and Loader in OS.	5		
12. a)	Suppose that the following processes arrive for execution at the times indicated.	13	K3	CO2

<u>Process</u>	<u>Arrival Time</u>	<u>Burst Time</u>
P_1	0.0	8
P_2	0.4	4
P_3	1.0	1

- i. Draw the Gantt chart and compute the average turnaround time & waiting time for these processes with the FCFS scheduling algorithm.
- ii. Draw the Gantt chart and compute the average turnaround time & waiting time for these processes with the preemptive and non-preemptive SJF scheduling algorithm.

(OR)

b)	Illustrate a solution using semaphores to solve dining philosopher problem.	13	K3	CO2
13. a) i.	Discuss deadlock detection with one resource of each type	7	K2	CO3
ii.	Write about Deadlock Prevention Methods.	6		

(OR)

b)	Consider a logical address space of 2,048 pages with a 4-KB page size, mapped onto a physical memory of 512 frames.	13	K3	CO3
i.	How many bits are required in the logical address?			
ii.	How many bits are required in the physical address?			

14. a) Consider the following page reference string: 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6. K3 CO4

Identify the no. of page faults that would occur for the following replacement algorithms, assuming three, four, frames? Remember all frames are initially empty, so first unique pages will all cost one fault each.

- | | |
|--------------------------|---|
| i. LRU replacement | 4 |
| ii. FIFO replacement | 4 |
| iii. Optimal replacement | 5 |

(OR)

- b) Explain about the RAID structure in disk management with various RAID levels of organization in detail. 13 K2 CO4

15. a) Consider a system that supports 5000 users. Suppose that you want to allow 4990 of these users to be able to access one file K3 CO5

- | | |
|---|---|
| i. How would you specify this protection scheme in file system? | 7 |
| ii. Could you suggest another protection scheme that can be used more effectively for this purpose than the scheme provided by the file system? | 6 |

(OR)

- b) Illustrate three major methods of file allocation in secondary storage space. 13 K2 CO5

PART – C

(1 x 15 = 15Marks)
Marks KL CO

- | | | |
|--------|--|--|
| Q.No. | Questions | |
| 16. a) | Consider the following snapshot of a system: | |

	<u>Allocation</u>	<u>Max</u>	<u>Available</u>
	A B C D	A B C D	A B C D
T_0	0 0 1 2	0 0 1 2	1 5 2 0
T_1	1 0 0 0	1 7 5 0	
T_2	1 3 5 4	2 3 5 6	
T_3	0 6 3 2	0 6 5 2	
T_4	0 0 1 4	0 6 5 6	

K3 CO3

Answer the following questions using the banker's algorithm:

- | | |
|--|----|
| i. What is the content of the Need matrix? Is the system in a safe state? | 10 |
| ii. If a request from thread T1 arrives for (0,4,2,0), can the request be granted immediately? | 5 |

(OR)

- b) On a disk with 200 cylinders, numbered 0 to 199. Compute the number of tracks the disk arm must move to satisfy the entire request in the disc queue. Assume the last request received at track 100. The queue in FIFO order contains requests for the following tracks 55, 58, 39, 18, 90, 160, 150, 38, 184. Perform the computation to find the seek time for the following disk scheduling algorithms. 5*3 K3 CO4

(i) FCFS (ii) SSTF (iii) SCAN (iv) C-SCAN (v) LOOK
