K. K. Wagh Institute of Engineering Education & Research, Nashik

(An Autonomous Institute From A.Y. 2022-23)

WINTER-2025	
Exam Seat No.:	
Academic Year:2025-2026	Semester:V
Class:TY	Program:B.Tech
Branch Code:INT	Pattern:2023
Name of Course:Operating Systems	Course Code:2308302
Max. Marks:60	Duration:2.30 Hrs.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 3 page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

		Marks	CO
Question No. 1			
1a)	Explain Distributed Operating System.	(6)	CO1
Question No. 2			
2a)	Illustrate any 3 states of processes in detail a) New b) Ready c) Running d) Suspended e) Blocked	(6)	CO2
Question No. 3			
3a)	List out various mechanisms of Inter-Process communication. Explain any one in detail.	(5)	CO3
	OR		
3b)	Explain need of mutual exclusion in the critical-section problem? List the issues that arise without it.	(5)	CO3
3c)	Differentiate between deadlock prevention or avoidance and deadlock detection and recovery.	(5)	CO3
	OR		
3d)	Demonstrate the following terms: a) Independent Processes b) Cooperating / Cooperative Processes	(5)	CO3
3e)	Solve by using Banker's Algorithm and total resources are A=10 B=5 C=7. Find out safe / unsafe sequence of process state.	(6)	CO3

Process	Allocation			Max Need			Available		
	A	B	C	A	B	C	A	B	C
P1	0	1	0	7	5	3			
P2	3	0	2	3	2	2			
P3	3	0	2	9	0	2			
P4	2	1	1	2	2	2			
P5	0	0	2	4	3	3			

OR

3f) Solve by using Banker's Algorithm and total resources are A=4 B=2 C=2. Find out safe / unsafe sequence of process state. Explain importance of Banker's Algorithm. (6) CO3

Process	Allocation			Max Need			Available		
	A	B	C	A	B	C	A	B	C
P0	0	1	0	1	2	1			
P1	2	0	0	3	2	1			
P2	2	1	1	3	1	2			

Question No. 4

4a) Draw structure of a page table. How does the OS translate logical addresses into physical addresses in paging? (5) CO4

OR

4b) Differentiate between Static Relocation and Dynamic Relocation. (5) CO4

4c) Describe Dynamic Partitioning with an example showing external fragmentation. (5) CO4

OR

4d) Illustrate the role of Memory Manager / Management in detail and why Memory Management is important? (5) CO4

4e) Solve using Least Recently Used (LRU) Page Replacement Algorithm, Consider page reference string 5, 0, 1, 0, 2, 3, 0, 2, 4, 3, 3, 2, 0, 2, 1, 2, 7, 0, 1, 1, 0 with three frames. Find out no. of Page Fault and Page Hit/Miss. (6) CO4

OR

4f) Solve using First In First Out (FIFO) Page Replacement Algorithm, Consider page reference string 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6 with four frames. Find out no. of Page Fault and Page Hit/Miss. (6) CO4

Question No. 5

5a) Describe the use of SMB and NFS file sharing methods in OS with suitable examples. (5) CO5

OR

5b) Demonstrate how indexed sequential file access method combines the features of direct and sequential access. (5) CO5

5c) Discuss FAT, NTFS, and EXT file systems based on features and usage. (5) CO5

OR

5d) Explain fixed record blocking in detail with example. (5) CO5

5e)	Solve by using SSTF Disk Scheduling Algorithm, Total no. of tracks are 200, Suppose the order of request is - (82,170,43,140,24,16,190) and current position of Read/Write head is 50. Calculate Total seek time / Total head movements.	(6)	CO5

OR

5f)	Solve by using LOOK Disk Scheduling Algorithm, Total no. of tracks are 200, Suppose the order of request is - (82,170,43,140,24,16,190) and current position of Read/Write head is 50. It is also given that the disk arm should move “towards the larger value”. Calculate Total seek time / Total head movements.	(6)	CO5

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