USN No.										

CMRIT
CMR INSTITUTE OF TECHNOLOGY, BENGALURU.
ACCREDITED WITH A++ GRADE BY NAAC

Internal Assessment Test 2 –January 2026

Sub:	OPERATING SYSTEM					Sub Code:	BCS303	Branch:	ISE
Date:	08-01-2026	Duration:	90 min's	Max Marks:	50	Sem / Sec:	III A,B,C		OBE

	Answer any FIVE FULL QUESTIONS	MARKS	CO	RBT
1	Explain with a diagram, how TLB is used to solve the problem of simple paging scheme	10	CO4	L2
2	Consider the following page reference string: 7 0 2 0 3 0 4 2 3 0 3 2 2 0 7 0 1. How many page faults would occur for the following replacement algorithms-a.LRU replacement b. FIFO replacement c. Optimal replacement.Assuming frame size=3.	10	CO4	L2
3	Given the memory partitions of 100K, 500K, 200K, 300K, AND 600K. Apply First fit, Best Fit and Worst Fit algorithm to place 212K, 417K, 112K, 426K.	10	CO4	L2
4	Define Thrashing. What are the main causes of thrashing	10	CO4	L2
5	Suppose that a disk drive has 200 cylinders, numbered 0 to 199. The drive is currently serving a request at cylinder 53 and the previous request was at cylinder 12. The queue of pending requests in FIFO order is: 98, 183, 37, 122, 14, 124, 65, 67 Starting from the current head position, what is the total distance (in cylinder) that the disk arm moves to satisfy all pending requests for each of the following disk scheduling algorithms a) FCFS b) SSTF c) SCAN iv) C-SCAN	10	CO5	L3

USN No.										

(b)	Considering a system screenshot with five processes P0 through P4 and three resources of type A, B, C. Resource type A has 10 instances, B has 5 instances and type C has 7 instances. Suppose at time t0 following snapshot of the system has been taken:Answer the following Using Banker's algorithm, 1. What are the contents of Need Matrix? 2. If a process P1 is requesting for (1,1,0,0) can the request be granted immediately? Explain the algorithm and derive the safe sequence of process execution	10	CO3	L3

Process	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P0	1	1	2	5	4	4	3	2	1
P1	2	1	2	4	3	3			
P2	3	0	1	9	1	3			
P3	0	2	0	8	6	4			
P4	1	1	2	2	2	3			

Internal Assessment Test 2 –January 2026

Sub:	OPERATING SYSTEM					Sub Code:	BCS303	Branch:	ISE
Date:	08-01-2026	Duration:	90 min's	Max Marks:	50	Sem / Sec:	III A,B,C		OBE

	Answer any FIVE FULL QUESTIONS	MARKS	CO	RBT
1	Explain with a diagram, how TLB is used to solve the problem of simple paging scheme	10	CO1	L2
2	Consider the following page reference string: 7 0 2 0 3 0 4 2 3 0 3 2 2 0 7 0 1. How many page faults would occur for the following replacement algorithms-a.LRU replacement b. FIFO replacement c. Optimal replacement.Assuming frame size=3.	10	CO2	L2
3	Given the memory partitions of 100K, 500K, 200K, 300K, AND 600K. Apply First fit, Best Fit and Worst Fit algorithm to place 212K, 417K, 112K, 426K.	10	CO2	L2
4	Define Thrashing. What are the main causes of thrashing	10	CO2	L2
5	Suppose that a disk drive has 200 cylinders, numbered 0 to 199. The drive is currently serving a request at cylinder 53 and the previous request was at cylinder 12. The queue of pending requests in FIFO order is: 98, 183, 37, 122, 14, 124, 65, 67 Starting from the current head position, what is the total distance (in cylinder) that the disk arm moves to satisfy all pending requests for each of the following disk scheduling algorithms a) FCFS b) SSTF c) SCAN iv) C-SCAN	10	CO1	L2

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(b)	Considering a system screenshot with five processes P0 through P4 and three resources of type A, B, C. Resource type A has 10 instances, B has 5 instances and type C has 7 instances. Suppose at time t0 following snapshot of the system has been taken: Answer the following Using Banker's algorithm, 1. What are the contents of Need Matrix? 2. If a process P1 is requesting for (1,1,0,0) can the request be granted immediately? Explain the algorithm and derive the safe sequence of process execution	10	CO3	L3

Process	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P0	1	1	2	5	4	4	3	2	1
P1	2	1	2	4	3	3			
P2	3	0	1	9	1	3			
P3	0	2	0	8	6	4			
P4	1	1	2	2	2	3			

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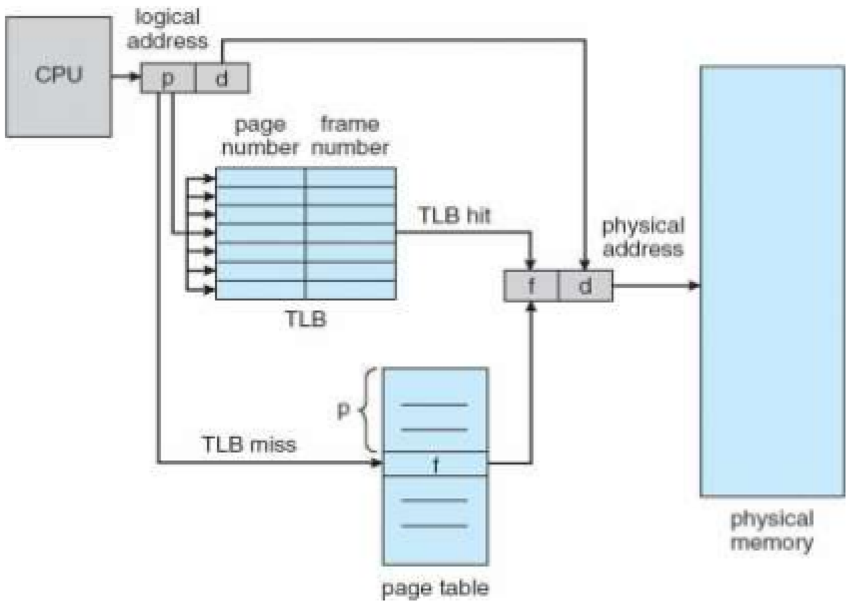
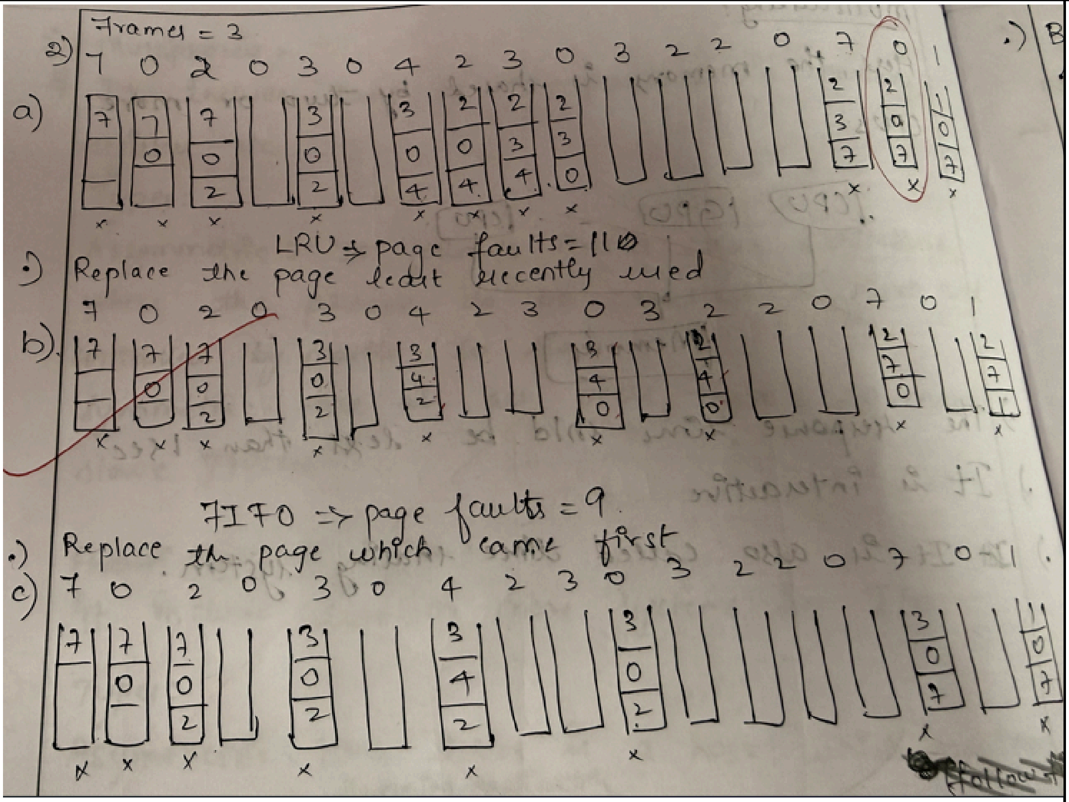
Internal Assessment Test 1 – November 2024

Sub :	**Operating Systems**			Sub Code:	BCS303	Branch :	ISE	
Date:	08-01-2026	Duration:	90 min's	Max Marks: 50	Sem/Sec :	III A, B & C		OBE

	Answer any FIVE FULL Questions	MARKS	CO	RBT
Q1	Explain with a diagram, how TLB is used to solve the problem of simple paging scheme Solution:  Explanation: 5M Diagram: 5M	10	CO4	L2
Q2	Q2Consider the following page reference string: 7 0 2 0 3 0 4 2 3 0 3 2 2 0 7 0 1. How manypage faults would occur for the following replacement algorithms- a.LRU replacement b.FIFO replacement c. Optimal replacement. Assuming frame size=3. Solution: FIFO: 9 LRU-10 Optimal-8	10	CO4	L3

	 			
Q3	Given the memory partitions of 100K, 500K, 200K, 300K, AND 600K. Apply First fit, Best Fit and Worst Fit algorithm to place 212K, 417K, 112K, 426K. Solution: FF 212-500 417-600 112-200 426-X BF 212-300 417-500 112-200 426-600 WF 212-600 417-500 112-300 426-X	10	CO4	L3
Q4	Define Thrashing. What are the main causes of thrashing Solution: A process is thrashing if it is spending more time in paging than executing.	10	CO4	L2

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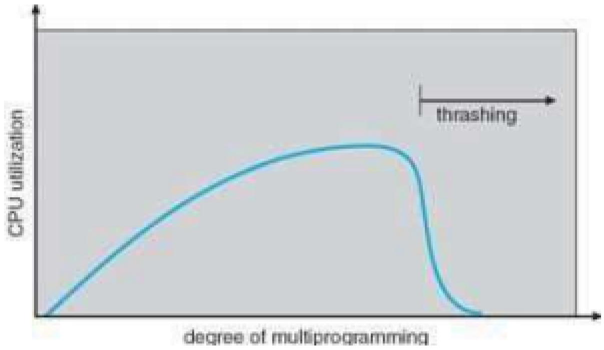
<td>

The figure shows the thrashing
• As the degree of multi programming increases, more slowly until a maximum is reached. If the degree of multi programming is increased further thrashing sets in and
the cpu utilization drops sharply.
• At this point, to increases CPU utilization and stop thrashing, we must increase degree
of multiprogramming.
• we can limit the effect of thrashing by using a local replacement algorithm. To prevent
thrashing, we must provide a process as many frames as it needs.</td>
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<tr>
<td>Q5</td>
<td>Suppose that a disk drive has 200 cylinders, numbered 0 to 199. The drive is currently serving a request at cylinder 53 and the previous request was at cylinder 12. The queue of pending requests in FIFO order is: 98, 183, 37, 122, 14, 124, 65, 67 Starting from the current head position, what is the total distance (in cylinder) that the disk arm moves to satisfy all pending requests for each of the following disk scheduling algorithms a) FCFS b) SSTF c) SCAN iv) C-SCAN

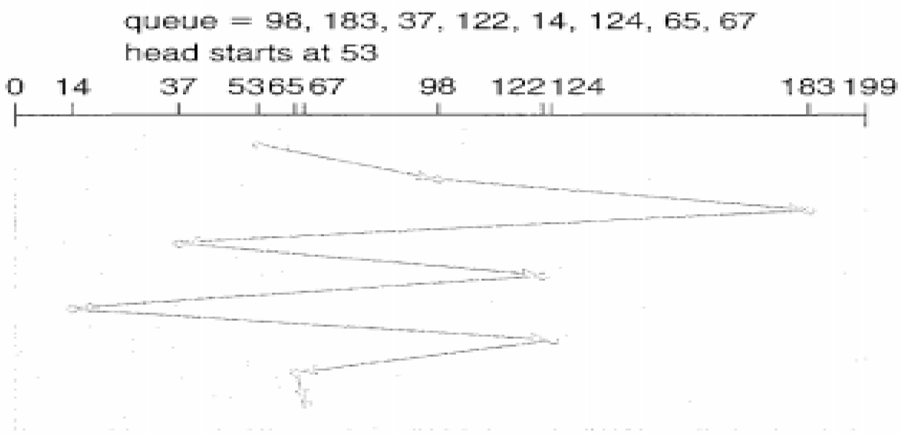
Solution:
FCFS-640


Figure 12.4 FCFS disk scheduling.

SSTF_236</td>
<td>10</td>
<td>CO5</td>
<td>L3</td>
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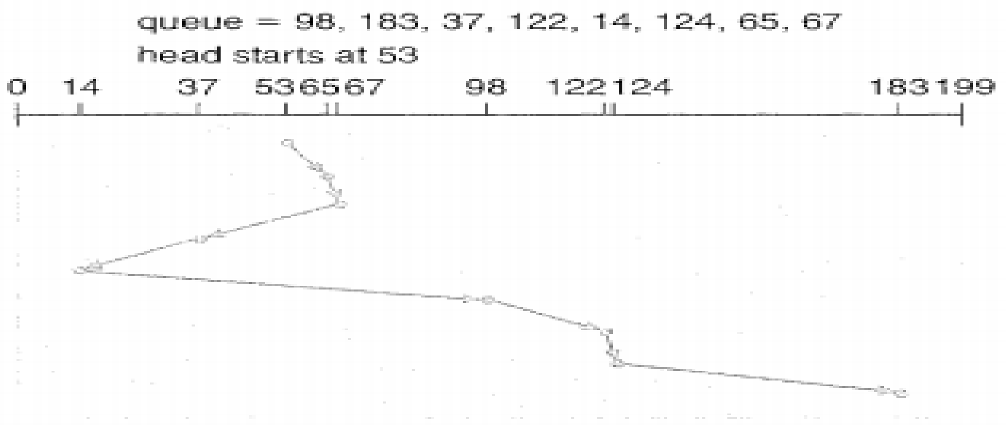

Figure 12.5 SSTF disk scheduling.

SCAN-331 236

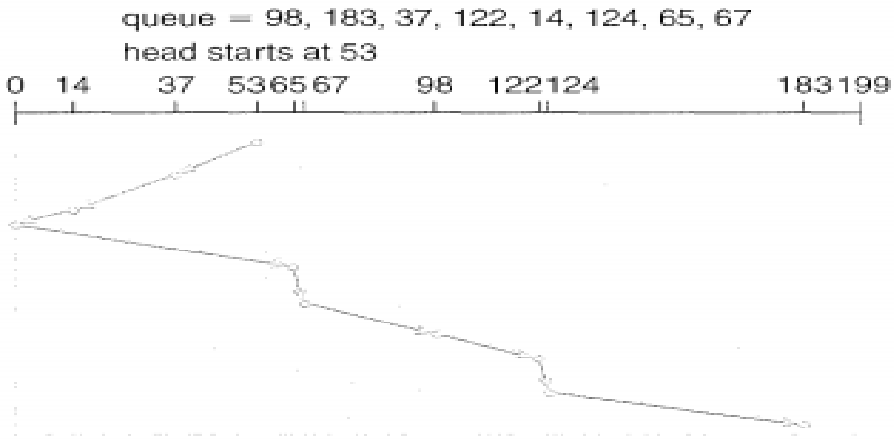

Figure 12.6 SCAN disk scheduling.

C-SCAN-382

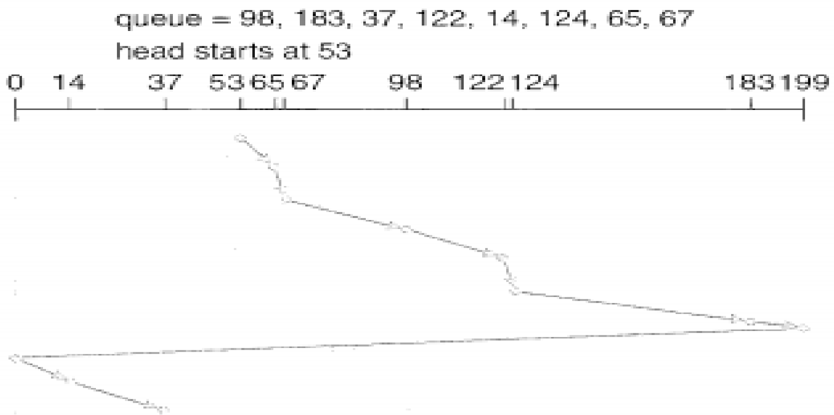

Figure 12.7 C-SCAN disk scheduling.

Q6	Considering a system screenshot with five processes P0 through P4 and three resources of type A, B, C. Resource type A has 10 instances, B has 5 instances and type C has 7 instances. Suppose at time t0 following snapshot of the system has been taken:Answer the following Using Banker’s algorithm, 1. What are the contents of Need Matrix? 2. If a process P1 is requesting for (1,1,0,0) can the request be granted immediately? Explain the algorithm and derive the safe sequence of process execution	10	CO3	L3

Solution:

Process	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P0	1	1	2	5	4	4	3	2	1
P1	2	1	2	4	3	3			
P2	3	0	1	9	1	3			
P3	0	2	0	8	6	4			
P4	1	1	2	2	2	3			

$$\text{Need} = \begin{pmatrix} 5 & 4 & 4 \\ 4 & 3 & 3 \\ 9 & 1 & 3 \\ 8 & 6 & 4 \\ 2 & 2 & 3 \end{pmatrix} - \begin{pmatrix} 1 & 1 & 2 \\ 2 & 1 & 2 \\ 3 & 0 & 1 \\ 0 & 2 & 0 \\ 1 & 1 & 2 \end{pmatrix} = \begin{pmatrix} 4 & 3 & 2 \\ 2 & 2 & 1 \\ 6 & 1 & 2 \\ 8 & 4 & 4 \\ 1 & 1 & 1 \end{pmatrix}$$

All processes finish. A safe sequence exists.

Yes, the request can be granted immediately. The system remains in a safe state because a safe sequence of process execution can be found: P1->P4->P0->P2->P3