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New Delhi – 110062

Even Semester Examination 2023

(Students Admitted in 2022)

Paper Name: Operating Systems
Time: 3 Hours

Paper Code: BTCSE 403 (Lateral Entry)
Maximum Marks: 75

Section-A

ALL questions are compulsory in this Section (7 x 5 = 35 Marks)

Q.No	Question	Marks	CO	BL												
1.	i) What is the difference between a program and a process? ii) Draw a diagram and explain each state of a process.	5	1	L2 L6												
2.	i) Explain what is Round Robin CPU scheduling algorithm? ii) For a CPU with process burst times as mentioned below and time quantum = 2 draw the Gantt chart and calculate the average waiting time using Round Robin CPU scheduling algorithm. <table border="1"><thead><tr><th>Process</th><th>Burst Time</th></tr></thead><tbody><tr><td>P1</td><td>10</td></tr><tr><td>P2</td><td>1</td></tr><tr><td>P3</td><td>2</td></tr><tr><td>P4</td><td>1</td></tr><tr><td>P5</td><td>5</td></tr></tbody></table>	Process	Burst Time	P1	10	P2	1	P3	2	P4	1	P5	5	5	1	L1 L3 L6
Process	Burst Time															
P1	10															
P2	1															
P3	2															
P4	1															
P5	5															
3.	What is a deadlock? Explain the four necessary conditions of a deadlock.	5	3	L1												
4.	Explain the Critical-Section Problem and the necessary conditions for its solution.	5	2	L2												
5.	'C-SCAN Disk scheduling algorithm is the best'. Agree or disagree with the statement giving 5 reasons.	5	5	L5												
6.	Explain the differences between internal and external fragmentation. How can you reduce each type of fragmentation?	5	4	L4												
7.	What is contiguous memory allocation? Explain: first fit, worst fit, best fit memory allocation. Which is the best allocation scheme in your opinion and why?	5	4	L1 L2 L5												

Section-B				
Attempt any FOUR Questions from this Section (4 x 10 = 40 Marks)				
Q.No	Question	Marks	CO	BL
1.	i) Explain the difference between FCFS, SCAN, C-SCAN, LOOK AND C-LOOK Disk Scheduling Algorithm. ii) Calculate the total head movements using SSTF Disk Scheduling Algorithm with initial head position at 100 and disk size as 200 for the below sectors: 98, 183, 37, 122, 14	10	5	L2 L3
2.	Write a short note on the following Page Replacement algorithms: i) First in First Out (FIFO) ii) Optimal iii) Least Recently Used (LRU)	10	4	L1 L2
3.	i) Explain the difference between deadlock prevention and deadlock avoidance. ii) Using a resource allocation graph explain how a deadlock can be detected.	10	3	L2 L4 L6
4.	Write short notes on classical problems of Synchronization: i) Bounded-Buffer Problem ii) Readers-Writers Problem iii) Dining-Philosophers Problem	10	2	L1 L2
5.	i) What is paging? Using a diagram explain logical address, physical address and page table. ii) Calculate the page faults for the below reference string for 3 frames using Least Recently Used Page Replacement Algorithm . 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3	10	4	L1 L3 L6
6.	What is Bankers Algorithm? Write the pseudocode to find if the system is in safe state using Bankers Algorithm.	10	3	L2 L6

BL- Bloom's Taxonomy Levels (1 Remembering, 2 Understanding, 3 Applying, 4 Analyzing, 5 Evaluating, 6 Creating)

CO- Course Outcome