

27-12-2022 (E)


**SOMAIYA**  
 VIDYAVIHAR UNIVERSITY

Semester: August 2022 – December 2022		Duration: 3hours
Maximum Marks: 100	Examination: ESE Examination	
Programme code: 01	Class: FY/SY/TY/LY	Semester: I/II/III/IV/V/VI/VII/VIII (SVU 2020)
Programme: B Tech Computer Engineering		
Name of the Constituent College: K. J. Somaiya College of Engineering		Name of the department: COMP/ETRX/EXTC/IT/MECH
Course Code: 116U01C503	Name of the Course: Operating System	
Instructions: 1) Draw neat diagrams 2) Assume suitable data if necessary		

Questi on No.		Max. Marks																								
Q1 (a)	Differentiate between monolithic and microkernel	05																								
Q1 (b)	Define the term Critical section and Race condition.	05																								
Q1 (c)	What is Process Control Block (PCB)?	05																								
Q1 (d)	Explain the effect of page size on the performance of a process.	05																								
Q2 (a)	Given five memory partitions of 100 KB, 500 KB, 200 KB, 300 KB, and 600 KB (in order), how would each of the first-fit, best-fit, and worst-fit algorithms place processes of 212 KB, 417 KB, 112 KB, and 426 KB (in order)? Which algorithm makes the most efficient use of memory?	10																								
Q2 (b)	What are System calls? List and explain file-handling system calls. OR Explain Process control fork(), exec(), and wait() System calls.	10																								
Q3 (a)	Explain the following in brief:(anyone) 1. Semaphores 2. Scheduling in Linux system	10																								
Q3 (b)	Assume the following processes arrive for execution at the indicated time and the CPU burst time is given in ms. <table border="1"><thead><tr><th>Process</th><th>Burst Time</th><th>Arrival Time</th><th>Priority</th></tr></thead><tbody><tr><td>P1</td><td>10</td><td>0</td><td>5</td></tr><tr><td>P2</td><td>6</td><td>0</td><td>2</td></tr><tr><td>P3</td><td>7</td><td>1</td><td>4</td></tr><tr><td>P4</td><td>4</td><td>1</td><td>1</td></tr><tr><td>P5</td><td>5</td><td>2</td><td>3</td></tr></tbody></table> Find the Average waiting time, and the average turnaround time for FCFS, SJF(Non-preemptive), and Round Robin(Quantum-3ms)	Process	Burst Time	Arrival Time	Priority	P1	10	0	5	P2	6	0	2	P3	7	1	4	P4	4	1	1	P5	5	2	3	10
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Q4 (a)	Explain the difference between Paging and Segmentation. OR Explain the hardware support for Paging.	10																																																																																										
Q4 (b)	On a disk with 1000 cylinders, numbers 0-999, compute the number of tracks the disk arm must move to satisfy all requests in the disk queue. Assume the last request received was at track 345 and the head is moving toward track 0. The queue in the FIFO order contains requests for the following tracks 123, 874, 692, 475, 105, 376. Perform the computation for the following scheduling algorithms: i. FIFO      ii. SSTF      iii. SCAN	10																																																																																										
Q5 (a)	Consider the given snap of the System <table border="1"><thead><tr><th rowspan="2"></th><th colspan="4">Allocation</th><th colspan="4">Max</th><th colspan="4">Available</th></tr><tr><th>A</th><th>B</th><th>C</th><th>D</th><th>A</th><th>B</th><th>C</th><th>D</th><th>A</th><th>B</th><th>C</th><th>D</th></tr></thead><tbody><tr><td>P0</td><td>0</td><td>2</td><td>1</td><td>2</td><td>0</td><td>3</td><td>2</td><td>2</td><td>2</td><td>5</td><td>3</td><td>2</td></tr><tr><td>P1</td><td>1</td><td>1</td><td>0</td><td>2</td><td>2</td><td>7</td><td>5</td><td>2</td><td></td><td></td><td></td><td></td></tr><tr><td>P2</td><td>2</td><td>2</td><td>5</td><td>4</td><td>2</td><td>3</td><td>7</td><td>6</td><td></td><td></td><td></td><td></td></tr><tr><td>P3</td><td>0</td><td>3</td><td>1</td><td>2</td><td>1</td><td>6</td><td>4</td><td>2</td><td></td><td></td><td></td><td></td></tr><tr><td>P4</td><td>2</td><td>4</td><td>1</td><td>4</td><td>3</td><td>6</td><td>5</td><td>8</td><td></td><td></td><td></td><td></td></tr></tbody></table> Answer the following questions using Bankers algorithm. 1) What is the content of Matrix need? 2) Is the system in a safe state? 3) If a request from process P1 arrives for (1,3,2,1) can the request be granted immediately?		Allocation				Max				Available				A	B	C	D	A	B	C	D	A	B	C	D	P0	0	2	1	2	0	3	2	2	2	5	3	2	P1	1	1	0	2	2	7	5	2					P2	2	2	5	4	2	3	7	6					P3	0	3	1	2	1	6	4	2					P4	2	4	1	4	3	6	5	8					10
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Q5 (b)	Explain the conditions for deadlock. Suggest techniques to avoid deadlock. OR Explain an algorithm for the producer-consumer problem.	10																																																																																										