

K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

May-June 2026		
(B. Tech / M. Tech.) Program: Information Technology Scheme: II		
Regular Examination: SY Semester: VI		
Course Code: ITC403	and	Course Name: Operating Systems
Date of Exam: 23/05/26	Duration: 02.5 Hours	Max. Marks: 60

Instructions:

- (1) All questions are compulsory.
- (2) Draw neat diagrams wherever applicable.
- (3) Assume suitable data, if necessary.

Q. No.	Question	Max. Marks	CO	BT level																	
Q 1	Solve any two questions out of three: (05 marks each)	10																			
a)	Explain Process Control Block with example.		CO2	U																	
b)	Explain the advantages of a tree-structured directory over a linear directory.		CO5	U																	
c)	Explain what is meant by a race condition with a suitable example.		CO3	U																	
Q 2	Solve any two questions out of three: (05 marks each)	10																			
a)	Explain System Call with its types.		CO1	U																	
b)	Explain the sequence of steps involved in a context switch when the CPU transitions from one process to another.		CO2	U																	
c)	Explain the methods of deadlock prevention by describing how each be eliminated to prevent deadlock in an operating system.		CO3	U																	
Q.3	Solve any two questions out of three. (10 marks each)	20																			
a)	Explain Preemptive Scheduling and Non-Preemptive Scheduling, and for the following set of processes: <table><tr><th>Process</th><th>Burst Time</th><th>Arrival Time</th></tr><tr><td>P1</td><td>7</td><td>2</td></tr><tr><td>P2</td><td>6</td><td>0</td></tr><tr><td>P3</td><td>10</td><td>4</td></tr><tr><td>P4</td><td>2</td><td>3</td></tr><tr><td>P5</td><td>7</td><td>1</td></tr></table> Apply Shortest Job First Scheduling (non-preemptive and preemptive) draw the Gantt charts and calculate Average		Process	Burst Time	Arrival Time	P1	7	2	P2	6	0	P3	10	4	P4	2	3	P5	7	1	CO2
Process	Burst Time	Arrival Time																			
P1	7	2																			
P2	6	0																			
P3	10	4																			
P4	2	3																			
P5	7	1																			

K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

May-June 2026		
(B. Tech / M. Tech.) Program: Information Technology Scheme: II		
Regular Examination: SY Semester: VI		
Course Code: ITC403 and Course Name: Operating Systems		
Date of Exam: 23/05/26	Duration: 02.5 Hours	Max. Marks: 60

	Turnaround Time (ATAT) and Average Waiting Time (AWT).			
b)	Explain the concept of non-contiguous memory allocation and describe its different types.		CO 4	U
c)	Explain the Shortest Seek Time First (SSTF), C-LOOK Disk Scheduling, and C-SCAN Disk Scheduling algorithms, and for the disk request sequence 95, 180, 34, 119, 11, 123, 62, 64 with the read/write head starting at 50 on a disk having 200 tracks, calculate the total seek time (seek time per track = 0.25 ms) for each algorithm and compare their performance. Consider head moving towards left direction.		CO5	U
Q.4	Solve any two questions out of three. (10 marks each)			
a)	Analyze embedded operating system, and evaluate its advantages and disadvantages with suitable real-world examples		CO6	A
b)	Explain the role of page replacement algorithms, and for the page reference string 7, 2, 1, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0 with 4 frames, calculate the number of page faults using First-In First-Out (FIFO), Optimal Page Replacement, and Least Recently Used (LRU) page replacement algorithms.		CO4	U
c)	Consider a system with five processes (P0–P4) and three resource types (A, B, C) having the following data; using the Banker's Algorithm, determine whether the system is in a safe state, find the safe sequence, and check whether the request (1, 0, 2) from process P1 can be granted immediately. Available Resources are A = 3, B = 3, C = 2 Process Allocation (A B C) Maximum (A B C) P0 0 1 0 7 5 3 P1 2 0 0 3 2 2 P2 3 0 2 9 0 2 P3 2 1 1 2 2 2 P4 0 0 2 4 3 3 20		CO3	A
