

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

May-June 2024		
Program: B.Tech Information Technology Scheme: II		
Examination: SY Semester: IV		
Course Code: ITC403 and Course Name: Operating System		
Date of Exam: 18/05/2024	Duration: 2.5 Hours	Max. Marks: 60

<b>Instructions:</b> (1) All questions are compulsory. (2) Draw neat diagrams wherever applicable. (3) Assume suitable data, if necessary.				
		Max. Marks	CO	BT level
Q 1	Solve any six questions out of eight:	12		
i)	Explain Multithreading model.	2	CO2	L2,L5
ii)	Explain layered architecture of operating system	2	CO1	L2,L5
iii)	What is a scheduler? explain its types.	2	CO2	L1,L2
iv)	Explain the critical section problem	2	CO3	L2
v)	What is memory partitioning? List different memory partitioning techniques	2	CO4	L1,L5
vi)	Discuss the Mobile Operating System.	2	CO6	L4
vii)	What is File? List the various file access mechanisms.	2	CO5	L1,L5
viii)	Explain necessary and sufficient condition for deadlock to occur.	2	CO3	L1
Q.2	Solve any four questions out of six.	16		
i)	Explain System Call with its types ( <b>Any four</b> ).	4	CO1	L2,L5
ii)	Explain how to translate a logical address to physical address in Paging.	4	CO4	L2,L5
iii)	Explain critical section problems and its different solutions.	4	CO3	L2,L5
iv)	Explain CPU Scheduling Criteria.	4	CO2	L2,L3
v)	What are different file allocation methods	4	CO5	L1,L5
vi)	Explain Feature of RTOS	4	CO6	,L5
Q.3	Solve any two questions out of three.	16		

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i)	What is a deadlock? Explain Banker's algorithm for deadlock avoidance.	8	CO3	L1,L5															
ii)	Consider the following set of processes with burst time as given  <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Process</th> <th style="text-align: left;">Burst Time</th> <th style="text-align: left;">Arrival Time</th> </tr> </thead> <tbody> <tr> <td>P1</td> <td>8</td> <td>0</td> </tr> <tr> <td>P2</td> <td>12</td> <td>1</td> </tr> <tr> <td>P3</td> <td>7</td> <td>2</td> </tr> <tr> <td>P4</td> <td>6</td> <td>3</td> </tr> </tbody> </table> Draw Gantt chart for the following scheduling algorithms FCFS and Round Robin with Quantum 3ms. Also calculate average turn around time and average waiting time with throughput.	Process	Burst Time	Arrival Time	P1	8	0	P2	12	1	P3	7	2	P4	6	3	8	CO2	L3,L6
Process	Burst Time	Arrival Time																	
P1	8	0																	
P2	12	1																	
P3	7	2																	
P4	6	3																	
iii)	What is OS? Explain different types of the OS.	8	CO1	L1,L5															
Q.4	Solve any two questions out of three.	16																	
i)	Explain Dining Philosophers Problem. with semaphore.	8	CO4	L2,L5															
ii)	Calculate page hit and miss using LRU and FIFO page replacement algorithm for given page sequence 6, 1, 3, 2, 1, 4, 1, 3, 5, 4, 1, 4, 3, 2. page frame size is 3.	8	CO5	L3,L6															
iii)	Consider a disk queue with IO requests on the following cylinders in their arriving order 56, 59, 42, 22, 82, 123, 155, 57, 182 the disk head is to be assumed at the cylinder 23. The disk consists of a total of 200 cylinders. Calculate and show with a diagram the disk head movement using FCFS and SCAN algorithm.	8	CO6	L1,L3															

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