

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

May-June 2024	
(B.Tech / M.Tech.) Program: B.Tech. (Artificial Intelligence and Data Science) Scheme I/II/IIB/III: IIB	
Regular/Supplementary Examination: SY Semester: IV	
Course Code: AIC 404 and Course Name: Operating System	
Date of Exam: <del>21/08/2024</del>	Duration: 2.5 Hours
	Max. Marks: 60

**Instructions:**

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

		Max. Marks	CO	BT level
<b>Q 1</b>	<b>Solve any six questions out of eight:</b>	<b>12</b>		
i)	What is shell and its types?	02	CO1	U
ii)	List types scheduler and explain in brief..	02	CO2	U
iii)	State four conditions that create deadlock?	02	CO3	U
iv)	What is TLB?	02	CO4	U
v)	What are typical access file access rights that may be assigned to a particular user ?	02	CO5	U
vi)	Define and State types of I/O buffering.	02	CO6	U
vii)	What is Swapping?	02	CO4	U
viii)	What is RAG?	02	CO3	U
<b>Q.2</b>	<b>Solve any four questions out of six.</b>	<b>16</b>		
i)	List functions of OS and explain one of them in detail.	04	CO1	U
ii)	What is a context switch? Describe the action taken by a kernel to context switch between processes.	04	CO2	U
iii)	What is the critical-section problem? show how to solve critical section problems using the Test and Set Method.	04	CO3	U
iv)	Explain how to prevent deadlock?	04	CO4	U
v)	List and briefly define five file organizations?	04	CO5	U
vi)	What is DMA? Explain in detail with a suitable diagram.	04	CO6	U

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<b>Q.3</b>	Solve any two questions out of three.	<b>16</b>																										
i)	Explain multithreading and its models	08	CO2	U																								
ii)	What is Segmentation? With the help of a neat diagram explain the hardware architecture of segmentation.	08	CO4	U																								
iii)	What is the Dining Philosopher problem? Explain how to solve this problem using Semaphore.	08	CO3	U																								
<b>Q.4</b>	Solve any two questions out of three.	<b>16</b>																										
i)	<p>Consider the following set of processes, with the length of CPU burst given in milliseconds.</p> <table border="1" style="margin-left: 20px; border-collapse: collapse; width: 200px;"> <thead> <tr> <th>Process</th> <th>Arrival time</th> <th>Burst Time</th> <th>Priority</th> </tr> </thead> <tbody> <tr> <td>P1</td> <td>0</td> <td>4</td> <td>2</td> </tr> <tr> <td>P2</td> <td>4</td> <td>5</td> <td>3</td> </tr> <tr> <td>P3</td> <td>5</td> <td>1</td> <td>4</td> </tr> <tr> <td>P4</td> <td>1</td> <td>6</td> <td>5</td> </tr> <tr> <td>P5</td> <td>2</td> <td>2</td> <td>5</td> </tr> </tbody> </table> <p>Calculate the average turnout time and average waiting time for a) Preemptive priority scheduling algorithm b) Non-Preemptive priority scheduling algorithm.</p>	Process	Arrival time	Burst Time	Priority	P1	0	4	2	P2	4	5	3	P3	5	1	4	P4	1	6	5	P5	2	2	5	08	CO2	Ap
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P2	4	5	3																									
P3	5	1	4																									
P4	1	6	5																									
P5	2	2	5																									
ii)	Given memory partitions of 200KB,500KB,300KB,600KB and 800KB (in order), how would each of the first fit, best fit and worst fit algorithms place processes of 312KB,517 KB,105KB,589 KB and 345 KB (in order)? Which algorithm makes the most efficient use of memory?	08	CO6	Ap																								
iii)	What is Disk scheduling? List and Explain types of disk scheduling algorithms with their advantages and disadvantages.	08	CO4	U																								

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