

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY-GURUJADA VIZINAGARAM

III B. Tech I Semester Regular Examinations November -2025

## OPERATING SYSTEMS

(OPEN ELECTIVE)

Time: 3 hours

Max. Marks: 70

The Question paper consists of Part A &amp; Part B.

Part A is compulsory, Answer all questions. Part B Answers any one question from each unit.

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1		PART-A	(20Marks)																		
	a)	Write any two differences between a batch operating system and time-sharing operating system.	[2]																		
	b)	Define system call and give one example	[2]																		
	c)	Describe the components of a Process Control Block(PCB).	[2]																		
	d)	Explain the term “inter process communication (IPC)”.	[2]																		
	e)	What are the three conditions that a solution to the critical-section problem must satisfy?	[2]																		
	f)	Give an example of the situation describing deadlock.	[2]																		
	g)	Define internal fragmentation and external fragmentation.	[2]																		
	h)	What is thrashing and how can it affect system performance?	[2]																		
	i)	What is a file? List down various file attributes.	[2]																		
	j)	What is disk scheduling and why is it important?	[2]																		
		PART-B	(50Marks)																		
		Question from <b>Unit - I</b>																			
2	a)	Discuss the Functionalities of Operating Systems in detail.	[5]																		
	b)	Differentiate between Multi Programming, Multi-Tasking and Multi processing systems.	[5]																		
		(OR)																			
3	a)	What are the various components of operating system structure and explain with a neat diagram.	[5]																		
	b)	Summarize the evolution of Operating system in detail.	[5]																		
		Question from <b>Unit - II</b>																			
4	a)	Compute average waiting time for SJF scheduling algorithm for following given data (time quantum is 2 units). <table><tr><th>Process ID</th><th>Arrival Time</th><th>Burst Time</th></tr><tr><td>P01</td><td>0</td><td>5</td></tr><tr><td>P02</td><td>2</td><td>1</td></tr><tr><td>P03</td><td>3</td><td>8</td></tr><tr><td>P04</td><td>6</td><td>9</td></tr><tr><td>P05</td><td>7</td><td>3</td></tr></table>	Process ID	Arrival Time	Burst Time	P01	0	5	P02	2	1	P03	3	8	P04	6	9	P05	7	3	[5]
Process ID	Arrival Time	Burst Time																			
P01	0	5																			
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P03	3	8																			
P04	6	9																			
P05	7	3																			
	b)	Explain the preemptive and non-preemptive scheduling criteria.	[5]																		
		(OR)																			
5	a)	What is a process? Distinguish between a process and a program.	[5]																		
	b)	What are CPU bound and I/O bound processes?	[5]																		
		Question from <b>Unit - III</b>																			
6	a)	Discuss about implementation of Semaphores.	[5]																		
	b)	Explain about deadlock detection.	[5]																		
		(OR)																			
7	a)	Discuss about resuming processes within a Monitors	[5]																		
	b)	Explain banker’s algorithm for deadlock avoidance with an example	[5]																		
		Question from <b>Unit - IV</b>																			
8	a)	Describe basic method of segmentation	[5]																		

	b)	List the advantages and disadvantages of Demand Paging.	[5]
		(OR)	
9	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?	[5]
	b)	Explain the concept of Least Recently Used memory page replacement method and how it is different from First In First Out (FIFO) page replacement method.	[5]
		Question from <b>Unit - V</b>	
10	a)	What are various file access methods? Explain.	[5]
	b)	Explain the organization and structure of mass-storage systems. How does the operating system manage them?	[5]
		(OR)	
11	a)	What is file system mounting? Explain its purpose and how the operating system manages mounted file systems.	[5]
	b)	Discuss the <b>role of device drivers</b> in the operating system. How do they interact with the I/O subsystem?	[5]

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