

Sub Code: R2331441**R23****SET-2****JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY-GURUJADA VIZINAGARAM****III B. Tech I Semester Regular Examinations November -2025****OPERATING SYSTEMS****(CSE (AI&DS))****Time: 3 hours****Max. Marks: 70****The Question paper consists of Part A & Part B.****Part A is compulsory, Answer all questions. Part B Answers any one question from each unit.***********

1		PART-A	(20Marks)
	a)	List the major functions of an operating system.	[2]
	b)	What are kernel and shell? Give examples.	[2]
	c)	Define process control block (PCB) and its components.	[2]
	d)	What is the purpose of the dispatcher in process scheduling?	[2]
	e)	Define critical section and explain its importance.	[2]
	f)	List the four conditions necessary for deadlock occurrence.	[2]
	g)	What is paging? Differentiate between internal and external fragmentation.	[2]
	h)	Define segmentation. How is it different from paging?	[2]
	i)	Explain the concept of file mounting.	[2]
	j)	What are Android intents? Give an example use case.	[2]
		PART-B	(50Marks)
		Unit - I	
2	a)	Explain different views of operating systems (user, system, and kernel perspectives)	[5]
	b)	Describe different types of operating system architectures with examples.	[5]
		(OR)	
3	a)	What are system programs? How do they differ from system calls?	[5]
	b)	Discuss the various types of user interfaces provided by operating systems.	[5]
		Unit - II	
4	a)	Explain different process states with a neat state transition diagram.	[5]
	b)	Consider the following set of processes with their burst times and arrival times: Process Arrival Time Burst Time Priority <div style="margin-left: 40px;"> P1 0 5 3 P2 1 3 1 P3 2 8 2 </div> Calculate average waiting time and average turnaround time using: i) FCFS Scheduling ii) Non-preemptive Priority Scheduling	[5]
		(OR)	
5	a)	Describe round robin scheduling with an example and explain the effect of time quantum on performance.	[5]
	b)	Consider 4 processes with the following burst and arrival times: Process Arrival Time Burst Time <div style="margin-left: 40px;"> P1 0 6 P2 2 4 P3 3 5 P4 5 3 </div>	[5]

		Compute average waiting and turnaround times using Shortest Remaining Time First (SRTF) scheduling.	
		Unit - III	
6	a)	Discuss the role of semaphores in solving synchronization problems.	[5]
	b)	Explain the readers–writers problem and give its semaphore-based solution.	[5]
		(OR)	
7	a)	Explain synchronization using message passing mechanisms.	[5]
	b)	Differentiate between deadlock avoidance and deadlock detection with examples.	[5]
		Unit - IV	
8	a)	Explain the difference between contiguous and non-contiguous memory allocation techniques.	[5]
	b)	Describe the working of the Least Recently Used (LRU) and Optimal page replacement algorithms with examples.	[5]
		(OR)	
9	a)	What is demand paging? Discuss the performance of demand paging with a suitable diagram.	[5]
	b)	Explain segmentation with paging and describe its advantages.	[5]
		Unit - V	
10	a)	Explain the structure and functionality of directory systems in detail.	[5]
	b)	Describe the various allocation methods used in file systems with examples.	[5]
		(OR)	
11	a)	Explain disk scheduling algorithms and evaluate their performance using an example with request queue: 98, 183, 37, 122, 14, 124, 65, 67 (initial head = 53).	[5]
	b)	Write short notes on Android application framework and process management.	[5]
