Sub Code: R2322053 **R23** **Set No. 1**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY-GURUJADA VIZINAGARAM
II B. Tech II Semester Regular/Supplementary Examinations NOV-2025
OPERATING SYSTEMS
(CSE ,CSE(CS))

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.
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1		PART-A	(20Marks)
	a)	Explain the differences between multi-programming and multi-tasking Operating Systems.	[2]
	b)	What is System Call? List system calls related to Process Management.	[2]
	c)	What are the differences between user-level threads and kernel-supported threads?	[2]
	d)	What are the components of Task Control Block?	[2]
	e)	What is semaphore? Why it is important?	[2]
	f)	What is Dining Philosophers problem?	[2]
	g)	What is a Belady's anomaly? Which algorithm suffers from Belady's anomaly?	[2]
	h)	Define Virtual Memory.	[2]
	i)	"File is an Abstract data type" Justify this statement.	[2]
	j)	List various File Allocation Methods.	[2]
		PART-B	(50Marks)
		Question from **Unit - I**	
2	a)	Operating System Can be viewed as a Resource Manager, Control Program and Government. Justify your answer?	[5]
	b)	Define the essential properties of the following types of operating systems: i) Batch ii) Time sharing iii) Real time	[5]
		(OR)	
3	a)	What are the major activities of an operating system in regard to file management, memory management? Explain.	[5]
	b)	In a multiprogramming and time-sharing environment, several users share the system simultaneously. This situation can result in various security problems. i) What are two such problems? ii) Can we ensure the same degree of security in a time-shared machine as in a dedicated machine? Explain your answer.	[5]
		Question from **Unit - II**	
4	a)	Define process and explain with a neat diagram about process state model.	[5]
	b)	What are the advantages of inter-process communication? How communication takes place through Direct Communication mechanism? Explain.	[5]
		(OR)	

5 a) Consider the following workload processes arrive for execution at the times indicated. Each process will run for the amount of time listed [5]

Process	Burst Time	Priority	Arrival Time
P1	50 ms	4	0 ms
P2	20 ms	1	20 ms
P3	100 ms	3	40 ms
P4	40 ms	2	60 ms

i) Draw four **Gantt charts** that illustrate the execution of these processes using the following scheduling algorithms: **FCFS, SJF**

ii) What is the Average waiting time & Average TT for each of these scheduling algorithms?

b) What is a scheduler? List and describe different types of schedulers and scheduling queues. [5]

Question from **Unit - III**

6 a) What is Peterson's Solution? Discuss the Critical Section problem using Peterson's Solution. [5]

b) Explain various methods used to recover from deadlock. [5]

(OR)

7 a) Consider a system with the following information. Determine whether the system is in a deadlock situation by applying Deadlock Detection Algorithm. [5]

Total Resources in the system is (R1, R2,R3)=(8, 5, 7)

Process	Allocation			Request		
	R1	R2	R3	R1	R2	R3
P1	1	0	2	1	0	0
P2	0	0	0	0	1	1
P3	2	1	1	2	0	0
P4	1	1	0	1	0	1
P5	2	2	2	1	1	0

b) What is a semaphore? Why it is important? Suggest the solution for bounded buffer problem with semaphores. [5]

Question from **Unit - IV**

8 a) If the hit ratio to a TLB is 80%, and it takes 15 nanoseconds to search the TLB, and 150 nanoseconds to access the main memory, then what must be the effective memory access time in nanoseconds? [5]

b) What is demand paging? Discuss the hardware support required to support demand paging. [5]

(OR)

9 a) Given memory partitions of 500KB,100KB,200KB,300KB and 600KB(in order),How would each of the first fit ,best fit, worst fit algorithms place process of 212KB,471KB, 112KB, and426KB(in order)?Which algorithm makes the most efficient use of memory. [5]

b) What is segmentation? Describe in detail about general method with hardware implementation of segmentation. [5]

Question from **Unit - V**

10 a) Briefly explain Tree-Structured, Acyclic graph and General graph directory Structures. [5]

b) Suppose that a disk drive has 5000 cylinders numbered 0 to 4999.The drive is currently at cylinder143, and the previous request was at cylinder 125.The queue of pending requests, in FIFO order is 86, 1470, 913, 1774, 948, 1509, 1022, 1750,130. Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for each of the following disk scheduling algorithms? [5]

i) SSTF

ii) SCAN

(OR)

11	a)	What is the relation of File Allocation Table with Linked allocation? How it is different from indexed allocation? Explain.	[5]
	b)	Write a note on Generic Security Attacks.	[5]

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