O.P.Code: 23CS0511	R23	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech. II Year II Semester Regular Examinations July/August-2025

OPERATING SYSTEMS

(Common to CSE, CCC & CIC)

Time: 3 Hours **Max. Marks: 70**

PART-A

(Answer all the Questions **10 x 2 = 20** Marks)

1	a	Define an Operating System.	CO1	L1	2M
	b	What is the role of the bootstrap program during system startup?	CO1	L1	2M
	c	What is a Process Control Block (PCB)?	CO2	L2	2M
	d	List two differences between threads and processes.	CO2	L2	2M
	e	What is the Critical Section Problem.	CO3	L1	2M
	f	What is a resource-allocation graph and how is it used in deadlock detection?	CO3	L1	2M
	g	Define paging and mention one advantage of using it.	CO4	L1	2M
	h	Name any two common HDD scheduling algorithms.	CO4	L2	2M
	i	What is a directory in a file system?	CO5	L1	2M
	j	Name any two file allocation methods.	CO5	L1	2M

PART-B

(Answer all Five Units **5 x 10 = 50** Marks)

UNIT-I

2	a	Describe the different types of computing environments and how the OS supports them.	CO1	L1	5M
	b	List and explain any five types of system calls with examples.	CO1	L2	5M
		OR			
3		Explain different operating system structures such as monolithic, layered, and microkernel.	CO1	L1	10M

UNIT-II

4	a	Explain the different states of a process with a neat diagram of the process state transition.	CO2	L1	5M
	b	What is inter-process communication (IPC)? Describe any two methods used for IPC with examples.	CO2	L2	5M
		OR			
5	a	Consider a CPU scheduling scenario where four processes are scheduled using the Priority scheduling algorithm.. Compute the average waiting time and turnaround time.	CO2	L2	5M

Note : 4 being the highest priotity.

Process	Burst Time	Priority
P1	6	2
P2	2	1
P3	8	4
P4	3	3

	b	Explain the multithreading models in operating systems. Compare many-to-one, one-to-one, and many-to-many models.	**CO2**	**L1**	**5M**

UNIT-III

6	**a**	Explain Peterson's Solution to the critical section problem. How does it ensure mutual exclusion, progress, and bounded waiting?	**CO3**	**L1**	**5M**
	b	Explain the Banker's Algorithm for deadlock avoidance. Give an example with step-by-step allocation and need matrix.	**CO3**	**L2**	**5M**

OR

7	**a**	Describe the four necessary conditions for a deadlock. For each condition, explain how it can be prevented with examples.	**CO3**	**L1**	**6M**
	b	Compare Mutex Locks and Semaphores in terms of usage, implementation, and advantages.	**CO3**	**L2**	**4M**

UNIT-IV

8	**a**	What is thrashing? Explain the causes of thrashing and suggest techniques to prevent it.	**CO4**	**L1**	**6M**
	b	List and explain SSTF disk scheduling algorithms with suitable example.	**CO4**	**L2**	**4M**

OR

9	**a**	Explain the concept of paging. How does the page table support address translation? Give an example.	**CO4**	**L1**	**5M**
	b	Explain FIFO and LRU page replacement algorithms with an example for each.	**CO4**	**L2**	**5M**

UNIT-V

10	**a**	Explain the file allocation methods in file systems. Compare contiguous, linked, and indexed allocation with diagrams.	**CO5**	**L1**	**5M**
	b	What is free space management in file systems? Explain any two methods to manage free disk space.	**CO5**	**L1**	**5M**

OR

11	**a**	Explain the concept of file-system mounting. What are partitions, and how are they managed during mounting?	**CO5**	**L1**	**5M**
	b	Describe the steps involved in implementing a directory. How are directories structured and managed on disk?	**CO5**	**L2**	**5M**

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