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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech. II Year II Semester Supplementary Examinations December-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	What are the key functions of an operating system?	CO1	L1	2M
	b	List the different types of system calls in an operating system.	CO1	L1	2M
	c	Define inter-process communication (IPC) and its types.	CO2	L1	2M
	d	Consider a CPU scheduling scenario where five processes with the following arrival times and burst times need to be scheduled using the shortest Job First (SJF) algorithm. Compute the average waiting time and turnaround time.	CO2	L2	2M

Process	Arrival Time	Burst Time
P1	0	6
P2	1	3
P3	2	8
P4	3	4
P5	4	2

	e	What is Peterson's solution and how does it help in process synchronization?	CO3	L1	2M
	f	What is the purpose of the Banker's Algorithm in ensuring system safety?	CO3	L2	2M
	g	Compare paging and segmentation in memory management.	CO4	L2	2M
	h	What do you meant by demand Paging and Thrashing in virtual memory?	CO4	L1	2M
	i	What are the different file access methods used in an operating system?	CO5	L1	2M
	j	Compare contiguous allocation, linked allocation and indexed allocation in file systems.	CO5	L2	2M

PART-B

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

UNIT-I

2	a	Describe the following types of Operating System structures with a neat diagram. i) Layered Structure ii) Micro Kernel Structure	CO1	L1	5M
	b	Describe the process of building and booting an operating system. What is the role of the bootstrap program?	CO1	L2	5M

OR

3	a	Differentiate between batch systems, time-sharing systems, and real-time systems with examples.	CO1	L2	5M
	b	Write short notes on Virtualization.	CO1	L1	5M

UNIT-II

4	a	Consider a CPU scheduling scenario where four processes are scheduled using the Round Robin algorithm with a time quantum of 3 ms. Compute the average waiting time and turnaround time.	CO2	L2	5M

Process	Burst Time
P1	5
P2	8
P3	12
P4	6

	b	Explain the following multithreading models :- i) One to many ii) Many to one iii) Many to many	CO2	L1	5M

OR

5	a	What are the operations that can be performed on processes? Explain process creation and termination in detail.	CO2	L1	5M
	b	Describe the concept of a process control block (PCB). What information does it store?	CO2	L1	5M

UNIT-III

6	a	With a neat diagram, explain semaphores and their role in process synchronization.	CO3	L2	5M
	b	List the conditions for a deadlock to occur.	CO3	L1	5M

OR

7	a	Discuss the classic Dining Philosophers Problem. Illustrate the possible solutions using semaphores and explain how deadlock can be avoided.	CO3	L2	6M
	b	Draw and explain the Resource Allocation Graph (RAG). How is it used in deadlock detection and avoidance?	CO3	L2	4M

UNIT-IV

8	a	What is demand paging? Explain with a neat diagram how a page fault occurs and is handled.	CO4	L1	6M
	b	Compare and contrast fixed partitioning and paging in memory management.	CO4	L2	4M

OR

9	a	Describe contiguous memory allocation. Explain the problems of fragmentation associated with it.	CO4	L1	5M
	b	What is swapping in operating systems? How does it help in memory management? Also explain its advantages and limitations.	CO4	L1	5M

UNIT-V

10	a	Explain the different access methods for files. Give suitable examples for each method.	CO5	L1	5M
	b	What are the main file system operations? Explain how they interact with the directory and storage structure.	CO5	L1	5M

OR

11	a	Describe the various directory structures supported by file systems. Mention their advantages and disadvantages.	CO5	L1	5M
	b	What is an access matrix? How is it used in protection? Explain with an example showing different access rights.	CO5	L1	5M

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