GUJARAT TECHNOLOGICAL UNIVERSITY
M.SC(IT)- INTEGRATED – SEMESTER III- EXAMINATION –SUMMER-2025

Subject Code: 1330503   **Date: 14/05/2025**
Subject Name: Operating System
Time:02:30 PM TO 05:00 PM   **Total Marks: 70**
Instructions:

1. Attempt all questions.
2. Make Suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Use of simple calculators and non-programmable scientific calculators are permitted.

			Marks
Q.1	**(a)**	What are the primary functions of an operating system? Briefly describe any two of them.	**03**
	(b)	Explain the need for an operating system in modern computing. What challenges does it address?	**04**
	(c)	Discuss the different types of operating systems. Compare at least two types in terms of their architecture and use cases.	**07**
Q.2	**(a)**	Define a process and explain its key attributes.	**03**
	(b)	Describe the critical section problem and its significance in process management.	**04**
	(c)	Discuss the different algorithms used for process scheduling. Compare at least two algorithms in terms of efficiency.	**07**
		OR	
	(c)	Explain the deadlock characteristics and the strategies for deadlock prevention with examples.	**07**
Q.3	**(a)**	Differentiate physical and logical address space.	**03**
	(b)	Explain contiguous allocation and its advantages and disadvantages in memory management.	**04**
	(c)	Discuss the various page replacement policies. Compare at least two policies.	**07**
		OR	
Q.3	**(a)**	Define paging in the context of memory management. Why is it used?	**03**
	(b)	Describe the concept of demand paging and how it differs from traditional paging.	**04**
	(c)	Explain segmentation and its benefits over paging. Provide examples of scenarios where segmentation might be preferred.	**07**
Q.4	**(a)**	What is file management in an operating system, and why is it important?	**03**
	(b)	Explain the role of the kernel I/O subsystem in managing input/output operations.	**04**
	(c)	Discuss the structure of mass storage and how it impacts data management in an operating system. Include an explanation of disk structure.	**07**

OR

Q.4 **(a)** Define disk scheduling and mention two common disk scheduling algorithms. — **03**

(b) What are the main characteristics of device hardware that an operating system must manage? — **04**

(c) Explain the concept of STREAMS in the context of application I/O interfaces. How do they facilitate communication between applications and device drivers? — **07**

Q.5 **(a)** What are system calls in Unix/Linux, and why are they important? — **03**

(b) Discuss the role and function of the kernel in a Unix/Linux operating system. — **04**

(c) Trace the development of Unix/Linux, highlighting key milestones and contributions to operating system design. — **07**

OR

Q.5 **(a)** List and briefly describe two elementary Linux commands. — **03**

(b) Explain the directory structure of Unix/Linux systems and its significance. — **04**

(c) Compare and contrast system administration in Linux and Windows operating systems, focusing on tools and approaches used for managing system resources. — **07**