Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–IV (NEW) EXAMINATION – WINTER 2024

Subject Code:3140702 Date:19-11-2024

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. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	What is Operating System? Explain basic functions of OS.	**03**
	(b)	Explain Virtual Machine architecture of OS.	**04**
	(c)	Differentiate Multiprogramming, Multitasking, Multiprocessing OS.	**07**
Q.2	**(a)**	Explain Advantages of using threads in Process.	**03**
	(b)	Explain how System call is handled in OS with example.	**04**
	(c)	Differentiate process and thread. Explain process state diagram.	**07**
		OR	
	(c)	Explain Peterson's Solution to achieve mutual exclusion.	**07**
Q.3	**(a)**	Differentiate Pre-emptive and Non-Preemptive process scheduling.	**03**
	(b)	Explain the difference between internal and external fragmentation.	**04**
	(c)	What is semaphore? Solve the producer consumer problem with Semaphore.	**07**
		OR	
Q.3	**(a)**	What is deadlock? List the conditions that lead to deadlock.	**03**
	(b)	Explain Monitor construct to achieve mutual exclusion.	**04**
	(c)	Solve the Dining philosopher problem with semaphore.	**07**
Q.4	**(a)**	Explain the difference between logical and physical addresses.	**03**
	(b)	What is TLB(Translation Lookaside Buffer), and what is use of it?	**04**
	(c)	Explain following process scheduling algorithms. i) First Come First Serve ii) Non-preemptive Shortest Job First iii) Shortest Remaining Time Next iv) Round Robin	**07**
		OR	
Q.4	**(a)**	What is virtualization? Explain the benefits of virtualization.	**03**
	(b)	Define Virtual Memory. Explain the process of converting virtual addresses to physical addresses with a neat diagram.	**04**
	(c)	Consider a Swapping system in which memory consists of the following hole sizes(in MB) in memory order: 10, 4,20,18,7,9,12,15. Which hole is taken for successive segment request of 12 MB and 10 MB for First fit, Best fit, Worst fit and Next fit.	**07**
Q.5	**(a)**	What is Inode? Explain it's usage.	**03**
	(b)	List Advantages of LINUX/UNIX operating system over Windows.	**04**
	(c)	Explain various Page Replacement Algorithms.	**07**

OR

Q.5	**(a)**	Explain I/O buffering in brief.	**03**
	(b)	Explain Disk arm scheduling algorithms.	**04**
	(c)	Explain the Banker's algorithm for deadlock avoidance with an example.	**07**

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