Enrolment No. /Seat No.: _____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.SC(IT)- INTEGRATED– SEMESTER III- EXAMINATION –SUMMER-2024

Subject Code: 1330503 **Date: 02/05/2024**

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. **Use of simple calculators and non-programmable scientific calculators are permitted.**

			Marks
Q.1	**(a)**	What is an Operating System? explain any one type of operating system.	**03**
	(b)	Difference between process and thread.	**04**
	(c)	Explain the Thread Life Cycle with a diagram.	**07**
Q.2	**(a)**	Define the following term. 1) Critical Section 2) Waiting Time 3) Race condition	**03**
	(b)	Write short note: 1) Semaphores 2) Monitors	**04**
	(c)	Explain Swapping and Fragmentation in detail.	**07**
		OR	
	(c)	What are the necessary conditions for a Deadlock? Explain Deadlock recovery in brief.	**07**
Q.3	**(a)**	If the machine is a 32-bit machine with a page size of 4 KB, then find out the page number and page offset.	**03**
	(b)	Explain the IPC Problem known as the Dining Philosopher Problem.	**04**
	(c)	Define the terms Scheduler, Scheduling, and Scheduling Algorithm with examples.	**07**
		OR	
Q.3	**(a)**	What is Mutual exclusion? Explain Peterson's solution for the mutual exclusion problem.	**03**
	(b)	Explain Context Switching. Discuss performance evaluation of FCFS (First Come First Serve) & RR (Round Robin) scheduling.	**04**
	(c)	Define the following terms. 1. Throughput 2. Waiting Time 3. Turnaround Time 4. Response Time 5. Granularity 6. Short Term Scheduler 7. CPU Utilization	**07**
Q.4	**(a)**	Differentiate between preemptive and non-preemptive scheduling.	**03**
	(b)	Explain the following allocation algorithms: 1) First-fit 2) Best-fit 3) Worst-fit	**04**
	(c)	What is Paging? Explain the paging mechanism in MMU with an example.	**07**
		OR	
Q.4	**(a)**	Briefly describe SCAN.	**03**
	(b)	Write a short note: RAID levels.	**04**
	(c)	Consider the following reference string. Calculate the page fault rates for below page replacement algorithm. Assume the memory size is 4 page frame. 1,2,3,4,5,3,4,1,6,7,8,7,8,9,7,8,9,5,4,5,4,2 1. FIFO 2. OPTIMAL	**07**

Q.5	**(a)**	What is called TLB? How does it help to speed up paging?	**03**
	(b)	Explain the Linux kernel and its functions in brief.	**04**
	(c)	Explain the following commands in UNIX: 7 grep, chmod, man, finger, ls, cat, ps	**07**

OR

Q.5	**(a)**	What is I-node? Explain in detail.	**03**
	(b)	List the different file implementation methods and explain them in detail.	**04**
	(c)	Suppose the Disk drive has 300 cylinders. The current position of head is 90. The queue of pending request is 36,79,15,120,199,270,89,170 Calculate head movement for the following algorithms. 1. FCFS 2. SSTF	**07**
