Enrollment No./Seat No.:

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA - SEMESTER - II EXAMINATION - SUMMER 2025

Subject Code: MC02094021 **Date: 31-05-2025**

Subject Name: Operating System

Time: 10:30 AM TO 01:00 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)**	Answer the following: **1**. Define kernel. **2**. List the characteristics of system call. **3**. Data cannot be written to secondary storage unless written within a _____. **(File/Directory)** **4**. A system has 3 processes sharing 4 resources. If each process needs a maximum of 2 units then, deadlock will not occur. **(True/False)** **5**. Define swapping. **6**. _____ scheduler is also called as job scheduler. **(Long term/Short Term/Medium Term)** **7.** Define unsafe state of process.	**07**
	(b)	Explain different service provided by operating system in brief.	**07**
Q.2	**(a)**	Consider the following scenario of processes for Round Robin Scheduling with time quantum 3.	**07**

Process	**Arrival Time**	**Burst Time**
P1	0	8
P2	5	2
P3	1	7
P4	6	3
P5	8	5

Draw the Gantt chart for the execution of processes, showing their start time and end time. Calculate average turnaround time and average waiting time of the processes.

	(b)	Define Semaphore. Give the implementation of Bounded Buffer (Producer Consumer) Problem using Semaphore.	**07**

OR

	(b)	Explain how Dining philosopher problem can be solved using Semaphore.	**07**
Q.3	**(a)**	Write Banker's Algorithm for avoiding Deadlock for allocation of multiple instances of resource type. Explain with example.	**07**
	(b)	Define Paging. Explain the logical to physical address translation mechanism in paging with example	**07**

OR

(a) Define Deadlock. Discuss the necessary and sufficient conditions for a Deadlock to occur. **07**

(b) Explain first fit, best fit and worst fit memory allocation strategies with suitable example. **07**

Q.4 **(a)** Calculate the number of page faults for the following reference string using FIFO page replacement algorithm with frame size as 3. **07**

7 0 1 2 0 3 0 4 2 3 0 3 2 1 2 0 7 1

(b) Define PCB. Discuss its major fields. **07**

OR

(a) Explain the following Commands with example: **07**

1. grep **2**. chmod **3**. uname **4**. head

(b) Explain working of Translation Look-Aside Buffer. **07**

Q.5 **(a)** Consider the following disk request sequence for a disk with 100 tracks. Head pointer is at 50. Calculate head movement for the algorithms: **1**. SCAN **2**. SSTF **07**

45, 21, 67, 90, 4, 50, 89, 52, 61, 87, 25

(b) Discuss Direct Memory Access (DMA) for performing I/O. **07**

OR

(a) Explain free space management using bit vector and linked list. **07**

(b) Write short note on: **07**

1. FAT
2. Boot block

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