Enrollment No./Seat No.: _____

# GUJARAT TECHNOLOGICAL UNIVERSITY
## MCA - SEMESTER - II EXAMINATION - WINTER 2025

**Subject Code: MC02094021**                                    **Date: 15-11-2025**

**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) | Explain Operating System and discuss three main objectives of operating system. | 07 |
|     | (b) | What is Deadlock? Discuss the necessary and sufficient conditions for a deadlock to occur. | 07 |
|     |     |                                                                                  |    |
| Q.2 | (a) | Explain PCB and context switching in detail..                                   | 07 |
|     | (b) | What is scheduling algorithm, discuss RR in detail.                             | 07 |
|     |     | **OR**                                                                          |    |
|     | (b) | What is Thread? Discuss different states of thread in detail.                   | 07 |
| Q.3 | (a) | Explain Dining Philosopher Problem.                                             | 07 |
|     | (b) | Define semaphore with binary semaphore.                                         | 07 |
|     |     | **OR**                                                                          |    |
|     | (a) | What is Mutual Exclusion? Discuss in detail.                                    | 07 |
|     | (b) | Discuss Direct Memory Access (DMA) for performing I/O.                          | 07 |
| Q.4 | (a) | Differentiate between Internal and External Fragmentation in detail.           | 07 |
|     | (b) | Explain FIFO and SCAN in detail.                                               | 07 |
|     |     | **OR**                                                                          |    |
|     | (a) | Explain logical memory and physical memory in detail.                          | 07 |
|     | (b) | Explain paging and demand paging in detail                                     | 07 |
| Q.5 | (a) | Explain File Allocation Methods in detail.                                      | 07 |
|     | (b) | What is boot block, discuss with its pros and cons.                            | 07 |
|     |     | **OR**                                                                          |    |
|     | (a) | Discuss bad block with its causes and types.                                   | 07 |
|     | (b) | What is Directory? Explain with its structure.                                 | 07 |

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