

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE- SEMESTER– IV EXAMINATION – SUMMER 2026****Subject Code:3140702****Date:19-05-2026****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. Simple and non-programmable scientific calculators are allowed.

**Marks**

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|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Q.1</b> | (a) List any four functions of operating system?                                                                                                                            | <b>03</b> |
|            | (b) Explain the essential properties of i) Batch system ii) Time sharing<br>iii) Real time iv) Distribute i) Batch system ii) Time sharing<br>iii) Real time iv) Distribute | <b>04</b> |
|            | (c) What is Semaphore? Give the implementation of Bounded Buffer Producer Consumer Problem using Semaphore.                                                                 | <b>07</b> |
| <b>Q.2</b> | (a) Discuss the major goals of I/O software                                                                                                                                 | <b>03</b> |
|            | (b) What is scheduling? Explain the types of schedulers.                                                                                                                    | <b>04</b> |
|            | (c) List out various criteria for good process scheduling algorithms. Illustrate non-preemptive priority scheduling algorithm.                                              | <b>07</b> |
|            | <b>OR</b>                                                                                                                                                                   |           |
|            | (c) What is monitor? Explain solution for producer-consumer problem using monitor.                                                                                          | <b>07</b> |
| <b>Q.3</b> | (a) What is Process? Give the difference between a process and a program.                                                                                                   | <b>03</b> |
|            | (b) What is Process State? Explain different states of a process with various queues generated at each stage.                                                               | <b>04</b> |
|            | (c) Briefly explain and compare, fixed and dynamic memory partitioning schemes.                                                                                             | <b>07</b> |
|            | <b>OR</b>                                                                                                                                                                   |           |
| <b>Q.3</b> | (a) Define the difference between preemptive and nonpreemptive scheduling.                                                                                                  | <b>03</b> |
|            | (b) Differentiate user level and kernel level thread.                                                                                                                       | <b>04</b> |
|            | (c) Write a bounded-buffer monitor in which the buffers (portions) are embedded within the monitor itself.                                                                  | <b>07</b> |
| <b>Q.4</b> | (a) What is thread? Explain classical thread model.                                                                                                                         | <b>03</b> |
|            | (b) What is external fragmentation? Explain the solution to external fragmentation.                                                                                         | <b>04</b> |
|            | (c) Illustrate Readers and Writers IPC problem with solution.                                                                                                               | <b>07</b> |
|            | <b>OR</b>                                                                                                                                                                   |           |
| <b>Q.4</b> | (a) Discuss the major goals of I/O software                                                                                                                                 | <b>03</b> |
|            | (b) Explain the terms related to IPC:<br>i) Race condition ii) Critical section iii) Mutual exclusion iv) Semaphores                                                        | <b>04</b> |
|            | (c) Write short note on RAID levels.                                                                                                                                        | <b>07</b> |
| <b>Q.5</b> | (a) Write a short note: Unix kernel.                                                                                                                                        | <b>03</b> |
|            | (b) What are components of Linux systems?                                                                                                                                   | <b>04</b> |
|            | (c) Explain process control block with all parameters.                                                                                                                      | <b>07</b> |
|            | <b>OR</b>                                                                                                                                                                   |           |
| <b>Q.5</b> | (a) What is deadlock? List the conditions that lead to deadlock.                                                                                                            | <b>03</b> |
|            | (b) Compare virtual machine and non virtual machine.                                                                                                                        | <b>04</b> |
|            | (c) Explain Disk arm scheduling algorithm.                                                                                                                                  | <b>07</b> |

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