

Seat No./Enrollment No.: _____

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 4 – EXAMINATION – SUMMER 2026

Subject Code: 3141601

Date: 19/05/2026

Subject Name: Operating System and Virtualization

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.**

- Q.1**
- (a) Briefly explain: System calls** **03**
 - (b) Differentiate between Multiprogramming and Multitasking.** **04**
 - (c) Draw Process state transition diagram and explain each state in brief.** **07**

- Q.2**
- (a) Differentiate between Process and Thread** **03**
 - (b) Explain: Semaphores** **04**
 - (c) Consider following data and calculate Average Waiting Time and Average Turn Around Time if Shortest Job First (SJF) scheduling is applied.** **07**
Process Arrival Time Burst Time

P1	0	6
P2	1	8
P3	2	7
P4	3	3

OR

- Q.2**
- (c) Consider following data and calculate Average Waiting Time and Average Turn Around Time if First Come First Serve (FCFS) scheduling is applied.** **07**
Process Arrival Time Burst Time

P1	0	6
P2	1	8
P3	2	7
P4	3	3

- Q.3**
- (a) Differentiate between Deadlock and starvation.** **03**
 - (b) Explain the four necessary conditions of deadlock.** **04**
 - (c) What conditions must be satisfied for effective Inter-Process Communication (IPC)? Explain briefly.** **07**

OR

- Q.3**
- (a) Explain Race condition with an explain.** **03**
 - (b) Explain resource allocation graph in deadlock.** **04**
 - (c) Give the solution of Dining Philosopher Problem.** **07**

Q.4

- (a) Briefly explain Swapping. **03**
(b) Explain: Paging **04**
(c) Consider the following page reference string: 2, 0, 1, 2, 3, 3, 6, 1, 2, 5, 0, 3, 2, 5, 2, 6, 1, 4, 0, 4. How many page faults and page replacement would occur for FIFO and Optimal page replacement algorithms, considering 3 free frames? **07**

OR

- Q.4** (a) Explain the concept of Demand paging. **03**
(b) Explain: Segmentation **04**
(c) Consider a paging system with TLB in which 70% TLB hit occurs. If system takes 30 nanoseconds to search a page from TLB and 150 nanoseconds to access memory what is the effective access time? **07**

- Q.5** (a) Write a shell script to check that the entered number is EVEN or ODD. **03**
(b) Differentiate between ESX server and VMware server. **04**
(c) Explain the working of Direct memory access (DMA). **07**

OR

- Q.5** (a) Explain role and functionality of Kernel. **03**
(b) Briefly explain Virtualization. **04**
(c) Explain: RAID **07**
