

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER-IV EXAMINATION – WINTER 2025****Subject Code:3140702****Date:13-11-2025****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. Simple and non-programmable scientific calculators are allowed.

		MARKS
Q.1	(a) Explain the uses of Operating system.	03
	(b) Explain multiprogramming and multiprocessing operating system.	04
	(c) What is process? Explain process state transition diagram.	07
Q.2	(a) What is thread? Explain user level and kernel level thread.	03
	(b) What is critical section? Explain race condition with example.	04
	(c) What is Semaphore? Solve dining philosopher problem using semaphore.	07
	OR	
	(c) What is Binary Semaphore? Solve Reader and Writer problem using semaphore.	07
Q.3	(a) Differentiate between preemptive and non preemptive scheduling algorithm.	03
	(b) Explain Principles of Concurrency with example.	04
	(c) Explain Round robin scheduling algorithm with example.	07
	OR	
Q.3	(a) Explain the scheduling criteria for a good scheduling algorithm.	03
	(b) Explain segmentation with example.	04
	(c) Explain Shortest Job scheduling algorithm with example.	07
Q.4	(a) Explain page fault.	03
	(b) What is deadlock? Explain the condition that leads to deadlock.	04
	(c) Explain Banker algorithm for deadlock avoidance with example.	07
	OR	
Q.4	(a) Explain Resource allocation graph.	03
	(b) Explain different paging techniques.	04
	(c) Differentiate between External Fragmentation and Internal Fragmentation.	07
Q.5	(a) Explain major goals of I/O software.	03
	(b) Differentiate between fixed and variable partitioning technique for memory management.	04
	(c) Explain Disk arm scheduling algorithm.	07

OR

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| Q.5 | (a) | Explain DMA with block diagram. | 03 |
| | (b) | Explain swapping in operating system. | 04 |
| | (c) | Explain RAID level system. | 07 |

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER-IV (NEW) EXAMINATION – WINTER 2024****Subject Code:3140702****Date:19-11-2024****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. Simple and non-programmable scientific calculators are allowed.

		MARKS
Q.1	(a) What is Operating System? Explain basic functions of OS.	03
	(b) Explain Virtual Machine architecture of OS.	04
	(c) Differentiate Multiprogramming, Multitasking, Multiprocessing OS.	07
Q.2	(a) Explain Advantages of using threads in Process.	03
	(b) Explain how System call is handled in OS with example.	04
	(c) Differentiate process and thread. Explain process state diagram.	07
	OR	
	(c) Explain Peterson's Solution to achieve mutual exclusion.	07
Q.3	(a) Differentiate Pre-emptive and Non-Preemptive process scheduling.	03
	(b) Explain the difference between internal and external fragmentation.	04
	(c) What is semaphore? Solve the producer consumer problem with Semaphore.	07
	OR	
Q.3	(a) What is deadlock? List the conditions that lead to deadlock.	03
	(b) Explain Monitor construct to achieve mutual exclusion.	04
	(c) Solve the Dining philosopher problem with semaphore.	07
Q.4	(a) Explain the difference between logical and physical addresses.	03
	(b) What is TLB(Translation Lookaside Buffer), and what is use of it?	04
	(c) Explain following process scheduling algorithms.	07
	i) First Come First Serve	
	ii) Non-preemptive Shortest Job First	
	iii) Shortest Remaining Time Next	
	iv) Round Robin	
	OR	
Q.4	(a) What is virtualization? Explain the benefits of virtualization.	03
	(b) Define Virtual Memory. Explain the process of converting virtual addresses to physical addresses with a neat diagram.	04
	(c) Consider a Swapping system in which memory consists of the following hole sizes(in MB) in memory order: 10, 4,20,18,7,9,12,15.	07
	Which hole is taken for successive segment request of 12 MB and 10 MB for First fit, Best fit, Worst fit and Next fit.	
Q.5	(a) What is Inode? Explain it's usage.	03
	(b) List Advantages of LINUX/UNIX operating system over Windows.	04
	(c) Explain various Page Replacement Algorithms.	07

OR

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| Q.5 | (a) Explain I/O buffering in brief. | 03 |
| | (b) Explain Disk arm scheduling algorithms. | 04 |
| | (c) Explain the Banker's algorithm for deadlock avoidance with an example. | 07 |

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-IV (NEW) EXAMINATION – WINTER 2023****Subject Code:3140702****Date:11-01-2024****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
Q.1	(a) Define true virtualization with example.	03
	(b) Write a shell script to find factorial of a user-defined natural number.	04
	(c) Draw and explain seven state process state transition diagram in detail.	07
Q.2	(a) Explain the main function of a dispatcher in brief.	03
	(b) List and briefly define four classes of real-time scheduling algorithms.	04
	(c) Five batch jobs A, B, C, D and E arrive at same time. They have estimated running times 10, 6, 3, 4 and 8 ms. For each of the following algorithm determine mean process turnaround time. Consider process swapping overhead is 1 ms.	07
	1) FCFS	
	2) Round-Robin (Time quantum = 2 ms)	
	OR	
	(c) Five batch jobs P1, P2, P3, P4 and P5 arrive at 0, 1, 2, 3 and 4 ms. They have estimated running times 14, 12, 8, 3 and 6 ms. Their priorities are 3, 5, 2, 1 and 4 respectively with 5 being highest priority. For each of the following algorithm determine mean process turnaround time. Consider process swapping overhead is 0.5 ms.	07
	1) SJF (Non-preemptive)	
	2) Priority Scheduling (Preemptive)	
Q.3	(a) Give the difference between weak semaphore and strong semaphore.	03
	(b) Briefly explain critical section.	04
	(c) Explain producer-consumer problem and solve it using semaphore. Write pseudo code for the same.	07
	OR	
Q.3	(a) Give the key difference between a mutex and a binary semaphore.	03
	(b) List the requirements for mutual exclusion.	04
	(c) Explain Dining philosopher problem and its solution using semaphore.	07
Q.4	(a) Explain I/O buffering in brief.	03
	(b) Write a short note on Access Control List.	04
	(c) Write and explain Banker's Algorithm for deadlock avoidance with suitable example.	07
	OR	
Q.4	(a) Compare RAID level 3 with RAID level 4.	03
	(b) Write a short note on design principles of OS security.	04
	(c) Write and explain deadlock detection algorithm with suitable example.	07

- Q.5 (a)** Explain concept of thrashing. **03**
- (b)** Given the following track requests in the disk queue, compute for the Total Head Movement (THM) of the read/write head and seek time needed for SSTF Disk Scheduling approach:
86, 147, 91, 230, 94, 168, 270, 30
Consider that the read/write head is positioned at location 150. A seek takes 3 ms per cylinder move. Consider a disk drive with 300 cylinders. **04**
- (c)** Explain any three memory placement algorithms with suitable example. **07**
- OR**
- Q.5 (a)** Compare and contrast paging with fragmentation. **03**
- (b)** Given the following track requests in the disk queue, compute for the Total Head Movement (THM) of the read/write head and seek time needed for C-SCAN Disk Scheduling approach:
95, 180, 34, 119, 11, 123, 62, 64
Consider that the read/write head is positioned at location 50. A seek takes 5 ms per cylinder move. Consider a disk drive with 200 cylinders. **04**
- (c)** Explain any three page replacement algorithms with suitable example. **07**

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-IV(NEW) EXAMINATION – WINTER 2022****Subject Code:3140702****Date:13-12-2022****Subject Name:Operating System****Time:10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
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MARKS

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|------------|---|-----------|
| Q.1 | (a) Differentiate multiprocessing and multiprogramming operating system. | 03 |
| | (b) Write the functions of operating system. | 04 |
| | (c) What is process? Explain process control block with all parameters. | 07 |
| Q.2 | (a) Differentiate user level and kernel level thread. | 03 |
| | (b) What is scheduling? Explain the types of schedulers. | 04 |
| | (c) List out various criteria for good process scheduling algorithms. Illustrate non-preemptive priority scheduling algorithm. | 07 |
| | OR | |
| | (c) Differentiate process and thread. Explain process state diagram. | 07 |
| Q.3 | (a) Define following terms:
(i)Critical section (ii) Mutual exclusion (iii) Bounded waiting | 03 |
| | (b) Define deadlock. Describe deadlock prevention in detail. | 04 |
| | (c) Illustrate Readers and Writers IPC problem with solution. | 07 |
| | OR | |
| Q.3 | (a) Explain Resource allocation graph. | 03 |
| | (b) What is deadlock? List the conditions that lead to deadlock. | 04 |
| | (c) Explain the Banker's algorithm for deadlock avoidance with an example. | 07 |
| Q.4 | (a) Explain segmentation. | 03 |
| | (b) What is external fragmentation? Explain the solution to external fragmentation. | 04 |
| | (c) Explain paging hardware with TLB. | 07 |
| | OR | |
| Q.4 | (a) Explain address binding. | 03 |
| | (b) Explain following allocation algorithm 1) First Fit 2) Best Fit. | 04 |
| | (c) What is page fault? Explain steps to handle page fault with diagram. | 07 |
| Q.5 | (a) Discuss the major goals of I/O software. | 03 |
| | (b) What is virtualization? Explain the benefits of virtualization. | 04 |
| | (c) Draw the block diagram for DMA. Write steps for DMA data transfer. | 07 |
| | OR | |
| Q.5 | (a) Differentiate block and character devices. | 03 |
| | (b) Explain following Unix command: grep, sort, chmod, mkdir. | 04 |
| | (c) Write short note on RAID levels. | 07 |
