Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–IV (NEW) EXAMINATION – WINTER 2020

Subject Code:3140702 Date:09/02/2021

Subject Name:Operating System

Time:02:30 PM TO 04:30 PM Total Marks:56

Instructions:

1. **Attempt any FOUR questions out of EIGHT questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			Marks
Q.1	**(a)**	Explain structure of Operating System.	**03**
	(b)	Draw and explain five state Process State Transition Diagram.	**04**
	(c)	Solve following example by FCFS and SJF CPU scheduling algorithm. Draw Gantt Chart and calculate Average Waiting Time and Average Turnaround time.	**07**

Process	Arrival Time	Burst Time
P0	0	10
P1	1	6
P2	3	2
P3	5	4

Q.2	**(a)**	State features of distributed operating system.	**03**
	(b)	Explain principle of concurrency in brief.	**04**
	(c)	Explain Dining philosopher problem and its solution using semaphore.	**07**
Q.3	**(a)**	Explain pure virtualization in brief.	**03**
	(b)	What is deadlock? List the conditions that lead to deadlock.	**04**
	(c)	State the need of demand paging. Explain the steps to handle a page fault using demand paging.	**07**
Q.4	**(a)**	Explain Access Control List in brief.	**03**
	(b)	Write a Shell script to find Factorial of a given number.	**04**
	(c)	Disk requests come in to the disk driver for cylinders 10, 22, 20, 2, 40, 6, and 38, in that order. A seek takes 6 msec per cylinder moved. How much seek time is needed for (a) First-come, first served. (b) Closest cylinder next. In all cases, the arm is initially at cylinder 20.	**07**
Q.5	**(a)**	Explain different services provided by operating system.	**03**
	(b)	Explain process control block with diagram.	**04**
	(c)	Explain Thread Scheduling with suitable example.	**07**
Q.6	**(a)**	Give the difference between multitasking OS and multiprogramming OS.	**03**
	(b)	Explain Mutual Exclusion in brief.	**04**

	(c)	Explain producer-consumer problem and solve it using semaphore. Write pseudo code for the same.	**07**
Q.7	**(a)**	Explain need of Virtual Machines.	**03**
	(b)	How Resource Trajectories can be helpful in avoiding the deadlock?	**04**
	(c)	Given memory partitions of 100 KB, 500 KB, 200 KB, 300 KB and 600 KB (in order), how would each of the first-fit, best-fit and worst-fit algorithms place processes of 212 KB, 417 KB, 112 KB and 426 KB (in that order) ? Which algorithm makes the most efficient use of memory?	**07**
Q.8	**(a)**	Write a note on Generic Security Attacks.	**03**
	(b)	Explain Unix Commands – grep, sort, cat, chmod.	**04**
	(c)	Explain RAID level system in detail.	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV (NEW) EXAMINATION – WINTER 2021

Subject Code:3140702 Date:31/12/2021

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.**

Q.1 **(a)** Define the followings: **03**

(1) System bus

(2) Auxiliary memory

(b) What do you mean by cache memory? Explain the cache read operation. **04**

(c) What is process? Explain the process creation and termination. **07**

Q.2 **(a)** Define the term critical section. **03**

(b) Difference between user level and kernel level thread. **04**

(c) Consider following processes with length of CPU burst time in milliseconds **07**

Process	Burst time
P1	5
P2	10
P3	2
P4	1

All process arrived in order p1, p2, p3, p4 all time zero.

(1) Draw gantt charts illustrating execution of these processes for SJF and round robin (quantum=1)

(2) Calculate waiting time for each process for each scheduling algorithm

(3) Calculate average waiting time for each scheduling algorithm

OR

(c) What are various criteria for a good process scheduling algorithm? Explain any two preemptive scheduling algorithms in brief. **07**

Q.3 **(a)** What is meant priority inversion? **03**

(b) What is the criterion used to select the time quantum in case of round-robin scheduling algorithm? Explain it with a suitable example. **04**

(c) What is Semaphore? Give the implementation of Bounded Buffer Producer Consumer Problem using Semaphore. **07**

OR

Q.3 **(a)** What is Deadlock? List the conditions that lead to deadlock. **03**

(b) List criterions used to evaluate the performance of CPU scheduling algorithms. **04**

(c) What is advantage of using Monitor? Give the implementation of Bounded Buffer Producer Consumer Problem using Monitor. **07**

Q.4 **(a)** What is resource allocation graph? **03**

(b) Explain paging technique. **04**

(c) Explain the following allocation algorithms: **07**

(1) First-fit
(2) Best-fit
(3) Worst-fit

OR

Q.4	**(a)**	When is a system in a safe state?	**03**
	(b)	Explain segmentation.	**04**
	(c)	What is fragmentation? Explain the difference between internal and external fragmentation.	**07**
Q.5	**(a)**	Explain RAID. How it is helpful to increase CPU performance?	**03**
	(b)	Explain the following Linux commands: (1) mkdir (2) touch (3) cat (4) rm	**04**
	(c)	What do you mean by security? Discuss in brief access control list.	**07**

OR

Q.5	**(a)**	Explain i/o buffering.	**03**
	(b)	What is virtualization? Explain the benefits of virtualization.	**04**
	(c)	Why is segmented paging important (as compared to a paging system)? What are the different pieces of the virtual address in a segmented paging?	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV (NEW) EXAMINATION – SUMMER 2021

Subject Code:3140702 Date:03/09/2021

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.**

Q.1	**(a)**	Define the essential properties of the following types of operating systems: (1) Batch (2) Time-sharing (3) Real-time	**03**
	(b)	What are the advantages of multiprogramming?	**04**
	(c)	What is the thread? What are the difference between user-level threads and kernel-supported threads? Under what circumstances is one type "better" than the other?	**07**
Q.2	**(a)**	What is Process? Give the difference between a process and a program.	**03**
	(b)	What is Process State? Explain different states of a process with various queues generated at each stage.	**04**
	(c)	Write a bounded-buffer monitor in which the buffers (portions) are embedded within the monitor itself.	**07**
		OR	
	(c)	What is Semaphore? Give the implementation of Readers-Writers Problem using Semaphore.	**07**
Q.3	**(a)**	Define the difference between preemptive and nonpreemptive scheduling.	**03**
	(b)	What are the Allocation Methods of a Disk Space?	**04**
	(c)	What is deadlock? Explain deadlock prevention in detail.	**07**
		OR	
Q.3	**(a)**	What are the disadvantages of FCFS scheduling algorithm as compared to shortest job first (SJF) scheduling?	**03**
	(b)	Distinguish between CPU bounded, I/O bounded processes.	**04**
	(c)	What is deadlock? Explain deadlock Avoidance in detail.	**07**
Q.4	**(a)**	What is Access control?	**03**
	(b)	What are Pages and Frames? What is the basic method of Segmentation?	**04**
	(c)	Briefly explain and compare, fixed and dynamic memory partitioning schemes.	**07**
		OR	
Q.4	**(a)**	Explain difference between Security and Protection?	**03**
	(b)	Differentiate external fragmentation with internal fragmentation.	**04**
	(c)	Explain the best fit, first fit and worst fit algorithm.	**07**
Q.5	**(a)**	Explain the concept of virtual machines.	**03**
	(b)	Compare virtual machine and non virtual machine.	**04**
	(c)	What is "inode"? Explain File and Directory Management of Unix Operating System.	**07**
		OR	
Q.5	**(a)**	What is marshalling and unmarshalling?	**03**
	(b)	What are components of Linux systems?	**04**
	(c)	Explain Disk arm scheduling algorithm.	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV (NEW) EXAMINATION – SUMMER 2022

Subject Code:3140702 Date:23-06-2022

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)**	List any four functions of operating system?	**03**
	(b)	Explain the essential properties of i) Batch system ii) Time sharing iii) Real time iv) Distribute	**04**
	(c)	Explain process states and process control block in details.	**07**
Q.2	**(a)**	What are the various criteria for a good process scheduling algorithm?	**03**
	(b)	What is thread? Explain classical thread model.	**04**
	(c)	How semaphores can be used to deal with n-process critical section problem? Explain.	**07**
		OR	
	(c)	What is monitor? Explain solution for producer-consumer problem using monitor.	**07**
Q.3	**(a)**	Define preemption and nonpreemption.	**03**
	(b)	Explain the terms related to IPC: i) Race condition ii) Critical section iii) Mutual exclusion iv) Semaphores	**04**
	(c)	How does deadlock avoidance differ from deadlock prevention? Write about deadlock avoidance algorithm in detail.	**07**
		OR	
Q.3	**(a)**	Give the Difference between Thread and Process.	**03**
	(b)	Explain the Priority scheduling algorithm.	**04**
	(c)	How to characterize the structure of deadlock? Explain the two solutions of recovery from deadlock.	**07**
Q.4	**(a)**	List out the seven RAID levels.	**03**
	(b)	Write short note on: Relocation problem for multiprogramming with fixed partitions.	**04**
	(c)	What is paging? Discuss basic paging technique in details.	**07**
		OR	
Q.4	**(a)**	What is the difference between logical I/O and device I/O?	**03**
	(b)	Write the first, best fit memory allocation techniques.	**04**
	(c)	Define Virtual Memory. Explain the process of converting virtual addresses to physical addresses with a neat diagram.	**07**
Q.5	**(a)**	Explain access control list.	**03**
	(b)	Differentiate between Windows and Linux file system.	**04**
	(c)	Write about Least Recently Used page replacement algorithm all its variants with an example.	**07**

OR

Q.5	**(a)**	Explain domain protection mechanism.	**03**
	(b)	Write a short note: Unix kernel.	**04**
	(c)	Describe in detail about variety of techniques used to improve the efficiency and performance of secondary storage.	**07**

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