Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3141601 Date:09/02/2021

Subject Name:Operating System and Virtualization

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)**	Write Various Process State.	**03**
	(b)	Write about Process Control Block.	**04**
	(c)	Write Various Operating System Services.	**07**
Q.2	**(a)**	What is the requirement to solve Critical Section Problem?	**03**
	(b)	Write about Priority Inversion Problem.	**04**
	(c)	Write various multithreading models.	**07**
Q.3	**(a)**	Discuss preemptive scheduling.	**03**
	(b)	Write benefits of Virtual Machines.	**04**
	(c)	Consider the following set of processes with the length of the CPU burst given in milliseconds:	**07**

Process	Burst Time	Priority
P1	10	3
P2	29	1
P3	3	3
P4	7	4
P5	12	2

The processes are assumed to have arrived in the order P1,P2,P3,P4,P5 all at time 0.

a.) Draw four Gantt charts that illustrate the execution of these processes using the following scheduling algorithms: FCFS, SF, non preemptive priority(a smaller priority number implies a higher priority), and RR(quantum=10 millisecond).

b.) What is the turnaround time and Waiting time of each process for each of the scheduling algorithms in part a?

c.) What is the average turnaround time and waiting time of each process for each of the scheduling algorithms in part a?

Q.4	**(a)**	Write about Semaphores.	**03**
	(b)	Write necessary conditions for arise of Deadlock.	**04**
	(c)	Explain Dining-philosophers Solution Using Monitors.	**07**

Q.5	**(a)**	How logical Address is mapped to physical address. Explain with diagram.	**03**
	(b)	Discuss Demand Paging.	**04**
	(c)	Write Banker's Algorithm.	**07**
Q.6	**(a)**	Explain Fragmentation.	**03**
	(b)	Write about TLB.	**04**
	(c)	Write Second Chance LRU approximation page replacement algorithm in detail. Also write enhanced LRU approximation algorithm.	**07**
Q.7	**(a)**	Write about RAID level 0 and RAID level 1.	**03**
	(b)	Write about Resource Allocation Graph algorithm.	**04**
	(c)	Consider the following page reference string: 1, 2, 3, 4, 5, 3, 4, 1, 6, 7, 8, 7, 8, 9, 7, 8, 9, 5, 4, 5, 4, 2 How many page faults would occur for following page replacement algorithm, considering 3 frames and 4 frames. i) FIFO ii) LRU iii) Optimal	**07**
Q.8	**(a)**	Write about I/O buffering.	**03**
	(b)	Write about RAID level 4.	**04**
	(c)	Suppose that a disk drive has 5000 cylinders. Numbered 0 to 4999. The drive is currently serving at cylinder 143 and previous request was at cylinder 125. The queue of pending requests in FIFO order is 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130 Starting from the current head position what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for each of following disk scheduling algorithms. a) FCFS b) SSTF c) SCAN d) LOOK e) C-SCAN f) C-LOOK	**07**

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