

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-IV (NEW) EXAMINATION – SUMMER 2022

Subject Code: 3141601

Date: 23-06-2022

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.

MARKS

- Q.1** (a) Define (i) Operating systems (ii) Tightly coupled Systems (iii) Loosely Coupled Systems. **03**
- (b) Define Process. And Write various states of process with diagram. **04**
- (c) Describe the services an Operating System provides to users, processors and other systems. **07**

- Q.2** (a) Define Thread. And write usage of threads. **03**
- (b) Write about Process Control block. **04**
- (c) Define Scheduler. Discuss Types of Schedulers. **07**

OR

- (c) Write about Multithreading models. **07**

- Q.3** (a) What is buffering? Write various types of buffers. **03**
- (b) Write about various Scheduling criteria. **04**
- (c) Consider the following set of processes with the length of the CPU burst given in milliseconds: **07**

<u>Process</u>	<u>Arrival Time</u>	<u>Burst Time</u>	<u>Priority</u>
P1	0	7	3
P2	2	4	1
P3	4	2	2
P4	8	1	4

- a.) Draw Gantt charts that illustrate the execution of these processes using the following scheduling algorithms: FCFS, Non Preemptive SJF, Preemptive priority (a smaller number implies a higher priority)
- 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?

OR

- Q.3** (a) Define Mutual Exclusion, Critical Section and Race Condition. **03**
- (b) Write Peterson's Solution for avoiding race condition. **04**
- (c) Explain how Dining philosopher problem can be solved using monitor. **07**

- Q.4** (a) Discuss priority Inversion problem. **03**
- (b) Define Deadlock. And also write condition responsible for deadlock. **04**
- (c) Write Banker's Algorithm for avoiding Deadlock for allocation of multiple instances of resource type. **07**

OR

- Q.4** (a) Define Internal and External Fragmentation. **03**

- (b) Write about Resource allocation graph algorithm. **04**
- (c) Explain second chance LRU approximation algorithm with proper example. Also write about enhanced LRU approximation algorithm. **07**

- Q.5**
- (a) Explain Usages of following Linux Commands with proper example. **03**
 - (i) grep
 - (ii) wc
 - (iii) diff
 - (b) Discuss paging in Detail. **04**
 - (c) Write a Linux Shell Script to find out all prime numbers between given range. **07**

OR

- Q.5**
- (a) Define Virtualization and explain it with diagram. **03**
 - (b) Discuss TLB. **04**
 - (c) Suppose that a disk drive has 200 cylinders. Numbered 0 to 199. The drive is currently serving at cylinder 60 and previous request was at cylinder 35. The queue of pending requests in FIFO order is **07**
 - 70, 140, 50, 125, 30, 25, 160Starting 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
