

**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: **04**
    - (1) mkdir
    - (2) touch
    - (3) cat
    - (4) rm
  - (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**

\*\*\*\*\*