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<br>(a) First-come, first served.<br>(b) Closest cylinder next.<br>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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# 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:<br>(1) mkdir<br>(2) touch<br>(3) cat<br>(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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# 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<br>i) Batch system ii) Time sharing<br>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:<br>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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