

PARUL UNIVERSITY
FACULTY OF IT & COMPUTER SCIENCE
B.Sc.(IT) /BCA Summer 2022-23 Examination

Semester: 03/04

Subject Code: 05101252

Subject Name: Operating Systems

Date: 25/03/2023

Time: 10.30am to 1.00pm

Total Marks: 60

Q.1 Answer the followings.**A. Do as directed.****(05)**

1. What is Preemptive scheduling?
2. List out features of OS.
3. Define Mutual Exclusion.
4. Write down Characteristics of RAID.
5. Write a full form of: FCFS, SJF.

B. Do as directed. (Each of 01 marks)**(10)**

1. A set of resources' allocations such that the system can allocate resources to each process in some order, and still avoid a deadlock is called _____.
 - a) Unsafe State
 - b) Deadlock
 - c) Starvation
 - d) Safe State
2. The address of the next instruction to be executed by the current process is provided by the _____.
 - a) Program Counter
 - b) Pipe
 - c) Offset
 - d) None
3. A PCB stands for _____.
 - a) Process Center Block
 - b) Process Control Block
 - c) Program Control Block
 - d) Program Center Block
4. A thread can be:
 - a) Single Threaded
 - b) Multi-Threaded
 - c) Both
 - d) None
5. _____ is allows many users to share computer resources.
 - a) Time Sharing OS
 - b) Batch OS
 - c) Real Time OS
 - d) None
6. A _____ is a program object that prevents simultaneous access to a shared resource.
 - a) Race Condition
 - b) Starvation
 - c) Mutual Exclusion
 - d) No Preemption
7. _____ device sends information to a computer system for processing.
 - a) Output
 - b) Input
 - c) Both
 - d) None

8. _____ is not a true member of RAID Family.
- RAID - 0
 - RAID - 5
 - RAID - 3
 - RAID - 1
9. File type can be represented by _____.
- File Name
 - File Extension
 - File Identifier
 - None
10. Semaphore is _____ to solve the critical section problem.
- Hardware
 - Software
 - Integer Value
 - None

Q.2 Attempt any five. (3 Marks Questions.)

(15)

- List out different types of file organization. Explain any one in detail.
- Write a short note on Time Sharing Operating System.
- Write down difference between User Level Thread & Kernel Level Thread.
- List out different types of partitioning. Explain fixed size partition in detail.
- Write a shell script to check whether given number is prime or not.
- What is Real Time Scheduling? Explain Soft & Hard Real Time System.

Q.3 Attempt any three. (5 Marks Questions)

(15)

- What is RAID? Explain any two types of RAID in detail.
- Explain Least Recently Used Page Replacement Algorithm with example.
- What is Deadlock? Explain various conditions for deadlock.
- Explain two state process model with diagram.

Q.4 Answer the following in detail.

A. Explain following with Bankers Algorithm.

(05)

The total amount of resources R1, R2, and R3 are 9, 3, and 6 units.

| | R1 | R2 | R3 |
|----|----|----|----|
| P1 | 3 | 2 | 2 |
| P2 | 6 | 1 | 3 |
| P3 | 3 | 1 | 4 |
| P4 | 4 | 2 | 2 |

Claim matrix C

| | R1 | R2 | R3 |
|----|----|----|----|
| P1 | 1 | 0 | 0 |
| P2 | 6 | 1 | 2 |
| P3 | 2 | 1 | 1 |
| P4 | 0 | 0 | 2 |

Allocation matrix A

| | R1 | R2 | R3 |
|-------------------|----|----|----|
| Resource vector R | 9 | 3 | 6 |

B.(1) Explain various elements of Process Control Block.

(05)

B.(2) List out essential managers of Operating System. Explain any one in detail.

(05)

OR

B.(1) Explain the syntax and working of following commands with example.

(05)

- who
- cal (display current year calendar)
- ls
- cp
- mkdir

B.(2) Consider the set of 5 processes whose arrival time and burst time are given below.

(05)

| Process Id | Arrival time | Burst time |
|------------|--------------|------------|
| P1 | 3 | 1 |
| P2 | 1 | 4 |
| P3 | 4 | 2 |
| P4 | 0 | 6 |
| P5 | 2 | 3 |

If the CPU scheduling policy is SJF non-preemptive, calculate the average waiting time and average turnaround time.