



University of Engineering & Management, Kolkata

Term - II Examination, October - November, 2021

Programme Name: B.Tech in Computer Science

Semester: 5th

Paper Name: Operating Systems

Paper Code: PCC CS501

Full Marks: 100

Time: 3 hours

GROUP A (20 Marks)

Answer the following questions. Each question is of 2 marks.

1.

- i. Define CPU utilization?
- ii. Explain what is lock based protocol in process synchronization?
- iii. Define atomic operations.
- iv. Define semaphore.
- v. State the difference between binary semaphore and counting semaphore
- vi. Explain principles of locality. What are the types of locality?
- vii. Explain logical and physical address space.
- viii. Explain types of address binding.
- ix. Define thrashing. What is the reason of thrashing?
- x. Explain different types of fragmentation.

GROUP B (30 Marks)

Answer the following questions. Each question is of 5 marks.

2. Discuss Peterson's solution for two-process synchronization Solution.
3. Discuss the drawbacks of RR scheduling algorithm with a suitable example.
4. Illustrate how do you use deadlock avoidance with a single instance of resource type?
5. A. Illustrate the difference between a process and a thread?
OR
B. Explain the message passing system for process communication.
6. A. Describe Belady's anomaly? Which algorithm may lead to Belady's anomaly?
OR

B. Consider page reference string 1, 3, 0, 3, 5, 6, 1, 0, 6 with 3 page frames. Find number of page faults using FIFO algorithm.

7. A. Discuss about memory management requirements.

OR

B. Discuss dynamic partitioning. What are the advantages of dynamic partitioning?

GROUP C (50 Marks)

Answer the following questions. Each question is of 10 marks.

8. Write down and describe the algorithm for Deadlock detection with multiple instances of resources.
9. “Co-operating processes need IPC”—illustrate.
10. A. Consider a system with the following information. Determine the order of processes such that the system is in safe state.

R1	R2	R3
15	8	8

Process	Max			Allocation		
	R1	R2	R3	R1	R2	R3
P1	5	6	3	2	1	0
P2	8	5	6	3	2	3
P3	4	9	2	3	0	2
P4	7	4	3	3	2	0
P5	4	3	3	1	0	1

OR

B. Describe the types of cryptography, brief on each with proper example and algorithm names.

- 11.** A. Let the page fault service time be 10 ms in a computer with average memory access time being 20 ns. If one page fault is generated for every 10^6 memory accesses, what is the effective access time for the memory?

OR

B. Discuss paging system with block diagram. Explain the steps of logical to physical address conversion in simple paging scheme.

- 12.** A. Describe different type of security services

OR

B. Describe different types of passive attacks
