

## **Question Bank OS for Mid Sem:**

2 marks Question:

1. Define an Operating System.
2. What is the function of a Batch System?
3. Differentiate between Multiprogramming and Multitasking.
4. What is Time-Sharing? Give one example.
5. Define Parallel Systems with an example.
6. What are Distributed Systems?
7. What is Real-Time Operating System (RTOS)?
8. Explain "OS as a Resource Manager."
9. Define Virtual Memory.
10. What is Thrashing in demand paging?
11. Differentiate between demand paging and segmentation.
12. Explain Overlay technique with a simple example.
13. Compare simple batch systems and multiprogrammed systems.
14. Explain the impact of page replacement policies on performance.
15. Which page replacement algorithm gives the best performance and why?
16. Define Process.
17. What are the different process states?
18. Define Thread. How is it different from a process?
19. What is Preemptive Scheduling?
20. Write two objectives of CPU Scheduling.
21. Define Mutual Exclusion.
22. What is a Semaphore?
23. Write a short note on Critical Section Problem.
24. What is a context switch?
25. Define Inter-Process Communication (IPC).
26. Differentiate between preemptive and non-preemptive scheduling.
27. Compare demand scheduling and real-time scheduling.
28. Explain the significance of priorities in scheduling.

29. What problem does the Dining Philosopher illustrate?

30. In the Barbershop problem, what synchronization tool is used to avoid deadlock?

#### **4 Marks Question:**

1. Explain the main objectives of an Operating System.
2. Describe the architecture of a Time-Sharing System.
3. Write short notes on Parallel Systems with real-life applications.
4. Explain Distributed Systems with suitable examples.
5. Compare Batch Systems and Time-Sharing Systems.
6. Differentiate between Real-Time Systems and General-Purpose Systems with examples.
7. Explain the concept of Virtual Memory. Why is it needed?
8. Discuss the working of Demand Paging with an example.
9. Compare FIFO and LRU page replacement algorithms with examples.
10. Explain the concept of Thrashing. How can it be controlled?
11. Evaluate the role of the OS as a Resource Manager.
12. Propose an example where Overlay is necessary in a system.
13. Analyze the performance issues caused by poor page replacement policies.
14. Evaluate the advantages and disadvantages of Segmentation over Paging.
15. Design a small scenario to illustrate the need for Demand Segmentation.
16. Explain the different states of a process with a neat diagram.
17. Describe Inter-Process Communication (IPC) methods.
18. Discuss different threading models.
19. Explain the difference between User-level threads and Kernel-level threads.
20. Write a short note on Scheduling Objectives and Criteria.
21. Differentiate between Preemptive and Non-Preemptive Scheduling with examples.
22. Apply Round-Robin Scheduling to 3 processes with time Quantum 2ms (burst time : 3, 5, 8 and Arrival time : 0, 2, 4) and show Gantt chart.
23. Compare FCFS, SJF, and Priority scheduling algorithms.
24. Analyze the role of Priorities in Real-Time Scheduling.
25. Discuss the use of Semaphores to solve the Critical Section Problem.

26. Explain the Dining Philosopher Problem and give a semaphore-based solution outline.
27. Evaluate the Producer–Consumer problem as a case of process synchronization.
28. Compare software and hardware solutions to Mutual Exclusion.
29. Analyze the Barbershop Problem and propose a semaphore-based solution.
30. Justify why deadlock avoidance is important in process synchronization.

### 5 marks Questions:

1. Explain the functions of an Operating System with examples.
2. Discuss different types of Operating Systems .
3. With a neat diagram, explain the concept of Virtual Memory.
4. Explain the working of the LRU page replacement algorithm with an example (1,2,3,4,1,2,5,1,2,3,4,5).
5. Analyze the performance of Demand Paging. What factors affect it?
6. Evaluate the differences between Paging, Segmentation, and Demand Segmentation.
7. Propose a scenario where Thrashing may occur. Suggest strategies to prevent it.
8. With a neat diagram, explain the Process Control Block (PCB) and its components.
9. Describe different thread models (Many-to-One, One-to-One, Many-to-Many) with diagrams.
10. Given 4 processes with burst times (8,6,5,2) and arrival (all 0ms) apply **Shortest Job First (SJF)** scheduling and calculate average waiting time & turnaround time.
11. Apply **Round Robin Scheduling** for 3 processes with time Quantum 2ms (burst time : 3, 5, 8 and Arrival time : 0, 2, 4) Average waiting time, and Average turnaround time.
12. Analyze the role of Semaphores in solving synchronization problems. Give one example.
13. Explain the Dining Philosopher Problem. Propose a semaphore-based solution to avoid deadlock.
14. Critically evaluate Preemptive vs Non-Preemptive scheduling in Real-Time Systems.
15. Design a solution for the Producer–Consumer problem using semaphores.

**Note: Numerical Digits can Be Changed in Algorithms. In scheduling algorithm and Page Replacement Algorithm any other algorithm also can be asked.**

