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**1801E1199**

Candidate's Seat No : \_\_\_\_\_

**MCA (Rep) Sem.-2 Examination  
Operating Systems  
January-2025**

**Time : 3-00 Hours]**

**[Max. Marks : 50**

**Instructions:**

- **Write both the Sections in the separate answer book.**
- **Both Sections having equal weightage.**
- **Draw Diagrams wherever necessary.**
- **Make Assumptions wherever necessary.**

**SECTION – I**

- Q-1 Answer the following. 9**
- 1) Define an operating system and explain its primary role in a computing environment.
  - 2) Discuss the significance of resource management in operating systems. Provide two examples of resources managed by the operating system.
  - 3) Explain the concept of virtualization and how it benefits modern computing.
- Q-2 Attempt the following. 8**
- 1) What is page replacement? Briefly describe any two page replacement algorithms.
  - 2) Compare and contrast multithreading and multiprocessing. Provide one advantage of each approach.

**OR**

- Q-2 Attempt the following.**
- 1) Explain the difference between preemptive and non-preemptive scheduling with examples.
  - 2) Describe the role of Interprocess communication (IPC) in client-server systems.
- Q-3 Attempt the following. (Any Two) 8**
- 1) Explain the critical-section problem in process synchronization. Why is it important to address this critical-section problem?
  - 2) Discuss how semaphores and mutex locks are used as synchronization tools. Provide a simple example for each.
  - 3) Define deadlock. Explain the four necessary conditions for a deadlock to occur.

**(P.T.O)**

## SECTION – II

**Q-4 Answer the following. 09**

- 1) Explain the concept of paging and its significance in memory management.
- 2) What is demand paging? Mention the importance of demand paging.
- 3) What is thrashing? How can it be mitigated?

**Q-5 Attempt the following.(Any Two) 08**

- 1) Process and its corresponding burst time and arrival time is given. Mention the Gantt Chart and Find the average turnaround time and average waiting time for FCFS, SJF(Preemptive and Non-preemptive) and Round Robin(Quantum Time = 2ms) algorithm. Also mention which algorithm will be best.

Process    Arrival Time    Burst Time

|    |   |   |
|----|---|---|
| P1 | 0 | 5 |
| P2 | 2 | 4 |
| P3 | 4 | 3 |
| P4 | 5 | 2 |

- 2) Why disk scheduling algorithm is required? Write about any two disk scheduling algorithm.
- 3) Describe the RAID structure. Compare RAID 0 and RAID 5 in terms of performance and reliability.

**Q-6 Attempt the following. (Any Two) 08**

- 1) What is text processing? Write about any two text processing commands.
- 2) What is Direct Memory Access? Explain process of Direct Memory Access.
- 3) Write a note on file allocation methods.

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