1512N979

Candidate's Seat No:____

IMSc (CA&IT) Sem.-3 Examination
Concept of Operating System
December-2025

Time : 2.30 Hours] **[Max.Marks : 70**

Question 1:

(1) Explain the basic elements of an Operating System. (2)

(2) What are processor registers? Explain their role in instruction execution. (5)

(3)

A) Describe the evolution of operating systems from serial processing to time-sharing systems. Explain how OS functions have improved over generations. (7)

OR

B) What are interrupts? Explain different types of interrupts and how the OS handles an interrupt-driven I/O system. (7)

Question 2:

(1) What is mutual exclusion? Why is it needed? (2)

(2) Explain monitors and message passing mechanisms for achieving process synchronization. (5)

(3)

A) What is Deadlock Avoidance? Explain Banker's Algorithm with an example. (7)

OR

B) Explain the Dining Philosophers Problem and how deadlock or starvation can occur. Suggest at least one solution strategy. (7)

Question 3:

(1) What is virtual memory? (2)

(2) Explain segmentation. How is it different from paging? (5)

(3)

A) Explain the concept of virtual memory management. Describe demand paging and the role of page tables. (7)

OR

B) Consider the following reference string and apply FIFO & LRU page replacement algorithms. Calculate page faults.
Reference String: 3, 1, 2, 1, 5, 3, 2, 4, 1, 2, 3
Frames: 3 (7)

Question 4:

(1) What are threads? How are they different from processes. (2)

(2) Explain preemptive and non-preemptive scheduling with examples. (5)

(3)

A) Explain File Allocation method in Detail. (7)

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OR

B) What is internal and external fragmentation? Explain how paging and segmentation help in removing fragmentation. (7)

Question 5:

(1) What are I/O buffers? Explain single and double buffering. (2)

(2) Discuss RAID architecture. Explain RAID levels 0, 1, and 5 with diagrams. (5)

(3)

A) Describe various file organization methods. Explain how B-Trees are used for indexing files. (7)

OR

B) Disk Scheduling Numerical:

Given disk requests:

98, 183, 41, 122, 14, 65, 67

Use FCFS, SSTF, and SCAN to calculate total head movement.

Initial head position = 53 (7) (7)

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