

Time: 3 Hours

Marks: 80

1. Question 1 is compulsory.
2. Attempt any **three** from remaining five questions.
3. Assume suitable data where required.

- 1
  - a. Discuss Operating System as a Resource Manager. [5]
  - b. Draw process state diagram and explain the following states: [5]
    1. New [5]
    2. Ready
    3. Running
    4. Wait
    5. Suspended ready
    6. Suspended wait
  - c. Describe Microkernel with a diagram.
  - d. Discuss the importance of "Multithreading". Differentiate between kernel and user thread.

- 2
  - a. Differentiate between short term, medium term and long term scheduler with a diagram. [10]

- b. Calculate AWT, ATAT, Response Time and Throughput of the following processes using Shortest job first (Non Pre-emptive). [10]

Process	Arrival Time (ms)	Burst Time (ms)
P1	1	7
P2	2	5
P3	3	1
P4	4	2
P5	5	8

- 3
  - a. What are Semaphores? Differentiate between Counting and Binary Semaphores. Discuss Dining Philosopher problem. [10]

- b. What do you understand by a deadlock? Explain deadlock avoidance method. [10]

- 4
  - a. Explain different types of memory fragmentation. [8]

- b. Compare the performance of FIFO, LRU and Optimal based on number of page hit for the following string. Frame size = 3; String (pages): 1 2 3 4 5 2 1 3 3 2 4 5 [12]

5. a. Explain Interrupt driven IO and discuss the advantages of Interrupt driven IO over programmed IO. [10]
- b. Discuss various disk scheduling methods. [10]
6. a. Discuss various File Allocation Mechanism and their advantages. [10]
- b. Explain Unix iNode Structure in detail. [10]
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