

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 [5]
 3. Running [5]
 4. Wait [5]
 5. Suspended ready [5]
 6. Suspended wait [5]
 - c. Describe Microkernel with a diagram. [5]
 - d. Discuss the importance of "Multithreading". Differentiate between kernel and user thread. [5]

- 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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