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	[5]
		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 Preemptive).   [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 Dinning 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   [10]
           Interrupt driven IO over programmed IO.

      b. Discuss various disk scheduling methods.   [10]

6.   a. Discuss various File Allocation Mechanism and their   [10]
           advantages.

                                                        [10]

      b. Explain Unix iNode Structure in detail.

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