

(Time: 3 Hours)

[Total Marks : 80]

- N.B. :**
- 1) Question No.1 is **compulsory**.
  - 2) Attempt any **three** from the remaining **five** questions.

Write a short note on following (any Four)

1. (a) Dispatcher (5)
- (b) Wait() and Signal() operation (5)
- (c) Problem of Memory Partitioning (5)
- (d) File Metadata (5)
- (e) Authentication VS. Authorization (5)
2. (a) Define a Process. Explain different process states and the transitions between them using a process state diagram. (10)
- (b) Suppose a disk drive has 100 cylinders, numbered 0 to 99. The disk head has just finished a request at track 87 and is currently at track 0. The queue of pending request in FIFO order is: - (10)  
87,23,11,7,98,99,12,67,57  
Starting from the current head position, what is the total distance in cylinders that the disk arm moves to satisfy all pending request for each of the following disk scheduling algorithm?  
1)SSTF 2)FCFS 3)SCAN
3. (a) For the process listed in table, draw a Gantt chart and find their average waiting time and average turnaround time using (10)
  - i. FCFS
  - ii. Round Robin (quantum=4)
  - iii. SJF (preemptive)

| Process | Arrival Time | Processing Time |
|---------|--------------|-----------------|
| P1      | 1            | 4               |
| P2      | 1            | 2               |
| P3      | 1            | 7               |
| P4      | 1            | 2               |

- (b) What are monitors in concurrency control? How do they help in synchronization? Give a real-world example. (10)
4. (a) Explain security problem. Mention any four common security threats in operating systems. (10)
- (b) Discuss different directory structures used in file systems. Provide advantages and disadvantages for each. (10)

- 5 (a) Explain the difference between deadlock and starvation. How can starvation be prevented in a concurrent system? (10)
- (b) Describe the working of virtual memory with a neat diagram. How does it help in efficient memory utilization? (10)
- 6 (a) Discuss in detail how swap-space is managed. Compare swap space allocation with memory allocation. (10)
- (b) What is multithreading? How does it differ from multiprocessing? Explain the benefits and challenges of multithreading. (10)
-