



- Notes :
1. All questions carry marks as indicated.
 2. Solve Question 1 OR Questions No.2.
 3. Solve Question 3 OR Questions No.4.
 4. Solve Question 5 OR Questions No.6.
 5. Solve Question 7 OR Questions No.8.
 6. Solve Question 9 OR Questions No.10.
 7. Solve Question 11 OR Questions No.12.
 8. Due credit will be given to neatness and adequate dimensions.
 9. Assume suitable data whenever necessary.
 10. Illustrate your answers whenever necessary with help of neat sketches.

1. a) Define 'Operating system'. Write functions of operating system as a manager of the resources. 6
 - b) Define essential properties of the following types of operating system? 8
 - i) Batch.
 - ii) Interactive.
 - iii) Timesharing.
 - iv) Real time.
- OR**
2. a) Describe the difference between symmetric and asymmetric multiprocessing. What are advantages and disadvantages of multiprocessor systems? 5
 - b) Give reasons why caches are useful. If cache can be made as large as the device for what it is caching, why not make it that large and eliminate the device. 5
 - c) What are the differences between trap and an interrupt? What is the use of each function. 4
3. a) Suppose a disk drive has 300 cylinder numbered 0 to 299. The drive is currently serving a request at cylinder 127. The queue of pending request in FIFO order is 76, 94, 99, 130, 187, 213, 289, and 295. 9
Starting from the current head position, what is the total distance (in cylinder) that the disk arm moves to satisfy the entire pending request for each of the following disk scheduling algorithm FCFS, SSTF, SCAN, C-SCAN, LOOK, C-LOOK
 - b) What are the pieces of information associated with open file? Explain each of them. 4
- OR**
4. a) Explain various directory structures in detail. 7
 - b) Explain different disk space allocation strategies. 6
5. a) Explain the long-term, short-term and medium term schedulers. 5
 - b) Differentiate between process and a thread by taking a suitable example. 4
 - c) What is PCB? Describe in brief. 4
- OR**
6. a) Explain different CPU scheduling criteria's. 4

- b) Consider the following set of process with length of CPU burst time gives in millisecond. 9

Process	Arrival time	Burst time	Priority
1	0	15	2
2	2	3	1
3	5	5	5
4	6	8	4
5	7	12	3

Give Gantt chart and calculate the average waiting time for.

- i) FCFS. ii) SJF.
 iii) Round Robin (Slice = 4 ms) iv) Priority scheduling algorithm.

7. a) Write short notes on : i) Belady's Anomaly. ii) Thrashing. 6

- b) Consider the page reference string. 7

1 2 3 4 5 3 4 1 6 7 8 7 8 9 7 8 9 5 4 5 9 2

Assume page frame size = 4, find out the algorithm having. Minimum page fault rate.

- i) FIFO ii) LRU iii) Optimal.

OR

8. a) Explain segmentation as a non contiguous memory allocation scheme. 7

- b) What is physical address and logical address? How the mapping is done in between them? 6

9. Define the following. 13

- i) Race condition. ii) Mutual Exclusion.
 iii) Semaphore. iv) Busy waiting.

OR

10. a) Explain any two classical problem of synchronizations. 8

- b) Discuss conditional critical regions and monitors. 5

11. a) Consider the following snapshot of a system: 10

Allocation				MAX					
	A	B	C	D		A	B	C	D
P ₁	0	0	1	4	P ₁	0	6	5	6
P ₂	0	6	3	2	P ₂	0	6	5	2
P ₃	0	0	1	2	P ₃	0	0	1	2
P ₄	1	0	0	0	P ₄	1	7	5	0
P ₅	1	3	5	4	P ₅	2	3	5	6

Available

A B C D

1 6 2 0

Answer the following for Banker's algorithm:

- i) What is the content of matrix Need? ii) Is the system in safe state.
 iii) If the request from P₁ arrives for (0,5,2,0), can request be granted immediately?

- b) Explain Resource Allocation Graph (RAG) with an example. 4

OR

12. Explain the following. 14

- i) Goal of production and security. ii) Access list and capability list.
 iii) Schemes for implementing revocation for capability.
 iv) Advantages of encrypting data in computer system.
