**Duration: 3hrs** **[Max Marks:80]**

N.B. : (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

1 Attempt any FOUR [20]
a Define Operating System. Briefly explain the services of Operating System.
b Explain File access methods in brief.
c Explain RAID structure.
d What is deadlock? State the four necessary conditions for deadlock.
e Compare Short term and Long term scheduler.

2 a Explain reader writer problem and write solution for it. [10]
b What is thread? Explain the types of threads and multithreading model. [10]

3 a Explain Working of Deadlock Prevention algorithm with example. [10]
b Explain five state process model with the help of a diagram. [10]

4 a Consider a reference string: 4, 7, 6, 1, 7, 6, 1, 2, 7, 2. the number of frames in the memory is 3.Find out the number of page faults respective to: [10]
1. Optimal 2. LRU 3. FIFO
b Illustrate process synchronization using Bounded-Buffer/ Producer Consumer Problem [10]

5 a Explain in detail static and dynamic partition with example. Compare them. [10]
b Consider the following processes with their given arrival and burst time in ms: [10]

| Process | Arrival time | Burst Time | Priority |
|---|---|---|---|
| P1 | 1 ms | 10 ms | 2 |
| P2 | 2 ms | 4 ms | 3 |
| P3 | 3 ms | 5 ms | 2 |
| P4 | 4 ms | 3 ms | 1 |

Calculate Average Waiting Time and Average Turnaround Time :
1. Using FCFS scheduling.
2. Using pre-emptive priority scheduling.
3. Using Round robin scheduling (q=2).

6 a Explain in detail segmentation and paging with example? Compare them. [10]
b Suppose that a disk drive has 500 cylinders, numbered 0 t0 499 . The drive is currently servicing a request at cylinder 143 and the previous request was at cylinder 125. The queue of pending requests, in FIFO order 86, 170, 13, 174, 498, 150, 102, 155, 130. Starting from the current head position, what is total distance (in Cylinders) that the disk arm moves to satisfy all the pending requests for each of the following disk scheduling algorithms? [10]
(i) CSCAN
(ii) FCFS.

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