

(Time: 3 hours)

Total marks: 80

Note:

1. Q1 is compulsory
2. Attempt any three from remaining questions
3. Answers to sub questions should be answered together
4. Illustrate answers with diagram wherever necessary

Consider the following snapshot:

(10)

Q1(a)

Processes	Allocation				Max				Available			
	R1	R2	R3	R4	R1	R2	R3	R4	R1	R2	R3	R4
P0	0	0	1	2	0	0	1	2	1	5	2	0
P1	1	0	0	0	1	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

Using Banker's algorithm

- What is the context of matrix need?
- Is the system in safe state? Give the sequence.
- Consider the request from process P1 arrives for (0, 4, 2, 0).
- Can the request be immediately granted?

(b) Describe the differences among short-term, medium-term and long-term schedulers. (10)

Q2(a) What do you mean by concurrency control? Explain the use of semaphore and monitors in concurrency control with example. (10)

(b) What is an operating system? What are its services and components? (10)

Q3(a) Given a reference string to the following pages by a program (10)
2,1,3,3,2,8,7,8,1,2,3,1,4,1,5,6,2,6,3,5,6,7,8,7,8,3,5,3,8,4,4,3,4. How many page faults will occur for the following page replacement algorithms, assuming three frames?

- LRU replacement
- FIFO replacement
- Optimal replacement

(b) Explain the Access Matrix model of protection. How does it serve a useful abstraction for reasoning about protection mechanism in a computer system? (10)

Q4(a) Suppose a disk drive has 200 cylinders, numbered 0 to 199. The driver is currently serving request at cylinder 140 and previous request was a cylinder 150. The queue is pending request in FIFO order is :- (10)
148, 65, 15, 58, 60, 33, 165, 175

What is the total head movement under following scheduling algorithm?

- (i)FCFS ii) SSTF iii) SCAN iv) C-SCAN

(b) What is thread? Explain various kinds of threads in detail. (10)

- Q5(a) For the processes listed below the table, draw Gantt chart and calculate average waiting time and average turnaround time using :- (10)
- FCFS (first come first serve)
 - SJF (Shortest Job First) in both condition preemptive and non-preemptive
 - Round – robin (Quantum = 2)

Processes	Arrival time(ms)	Burst time(ms)
P1	0	9
P2	1	5
P3	2	7
P4	3	3

- (b) Explain the different method of file access. Explain the mechanisms of free space management. (10)

- Q6 Write short notes on: (Any four) (20)
- Buffering and Spooling
 - Process Control Block
 - Clock Hardware and clock software
 - Linker and Loader
 - Swap-space management