

(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

1 a) Consider following snapshot of the system:- 10

Processes	Allocation			Max			Available		
	R1	R2	R3	R1	R2	R3	R1	R2	R3
P0	0	1	0	7	5	3	3	3	2
P1	0	0	0	3	2	2			
P2	3	0	2	9	0	2			
P3	2	1	1	2	2	2			
P4	0	0	2	4	3	3			

Using Bankers algorithm answer the following:-

- i) What are the contents of need matrix?
- ii) Find if the system is in safe state? If it is, find the safe sequence.
- iii) If the request from process P1 arrives for (1,0,2), can the request be granted immediately

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

2 a) Consider the head of a moving hard disk with 200 tracks is currently serving a request at track 100. If the queue of request in FIFO order is 55, 58, 39, 18, 19, 160, 150, 38, 184. What is the total head movement under the following scheduling algorithms. 10

1)SSTF 2)SCAN 3)FCFS 4)C-SCAN

b) What is fragmentation. Explain Internal and External Fragmentation. How can it be tackled? 10

3 a) What is a domain of protection? Explain Access Matrix model of Protection. Describe the various methods of implementing Access Matrix. 10

b) 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=3)
- iii. SJF(both preemptive and non-preemptive)

Process	Arrival Time	Processing Time
P1	0	5
P2	1	3
P3	1	4
P4	2	2

- 4 a) What is Segmentation? Explain the segmentation hardware with an example. 10
 b) Given a reference string to the following pages by a program 10
 6,0,1,2,0,4,3,0,2,6,3,2,0,1,6.
 How many page faults will occur for the following page replacement algorithm
 assuming four frames
 a) FIFO
 b) Optimal Replacement
 c) LRU
- 5 a) Describe the differences among short-term, medium-term and long-term 10
 schedulers.
 b) What is a process? Draw the five state process model and explain each state 10
 transition in it. Also Explain the process of Context Switching.
- 6 Write notes on any four 20
 a) OS services and components
 b) thrashing
 c) Process Control block
 d) Linker and loader
 e) Multi threading