

(3 Hours)

[Total Marks: 100]

NB:

- 1) Q1 is compulsory
- 2) Attempt any 4 from Q.2 to 7.
- 3) Assumptions should be made whenever required and should be clearly stated.
- 4) Answers to sub questions should be answered together.
- 5) Draw neat diagram whenever required.

Q1(a) For the processes listed below the table, draw Gantt chart and calculate (12)
average waiting time and average turnaround time using :-

- i) FCFS (first come first serve)
- ii) SJF (Shortest Job First) in both condition preemptive and non-preemptive
- iii) Round – robin (Quantum = 2)

Processes	Arrival Time(ms)	Burst Time(ms)
P1	0	5
P2	1	7
P3	2	2
P4	4	1

Q1(b) What is process? Explain about five-state Process model in detail. (08)

Q2(a) Which criteria's are important in choosing a file organization? List and (10)
briefly explain any three file organizations.

Q2(b) Differentiate between (10)

- i) Paging and Segmentation
- ii) Monolithic kernel and Micro kernel

Q3(a) Suppose a disk drive has 200 cylinders, numbered 0 to 199. The driver is (10)
currently serving request at cylinder 50 and previous request was a
cylinder 100. The queue is pending request in FIFO order is: -
95, 180, 34, 119, 11, 123, 62, 64

What is the total head movement under following scheduling algorithm?

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

Q3(b) What is Dynamic and Fixed Partitioning? What are the problems with them (10)
and how can we solve these problems? Explain.

Q4(a) What do you mean by concurrency control? Explain the use of semaphore (10)
and monitors in concurrency control with example.

Q4(b) Given a reference string to the following pages by a program (10)

2, 3, 4, 1, 2, 3, 0, 3, 2, 4, 1, 5, 3, 2, 1

How many page faults will occur for the following page replacement algorithms, assuming four frames?

- LRU replacement
- FIFO replacement
- Optimal replacement

Q5(a) Consider the following snapshot of the system: (10)

Processes	Allocation			Max			Available		
	R1	R2	R3	R1	R2	R3	R1	R2	R3
P0	2	1	0	2	1	1	0	1	1
P1	1	2	0	2	4	2			
P2	0	1	1	1	4	2			
P3	0	0	1	2	0	1			

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 (1,0,0). Can the request be immediately granted?

Q5(b) Explain the access matrix model of protection. How does it serve a useful abstraction for reasoning about protection mechanisms in a computer system? (10)

Q6(a) What is deadlock? Explain in brief deadlock prevention methods. (10)

Q6(b) What is the principle of locality? What is the purpose of Translation Look aside buffer? How to calculate number of bits in logical address and physical address when logical address space of 8 pages of 1024 word each, mapped to physical memory of 32 frames? (10)

Q7 Write short notes on **any four** (20)

- Process Control Block
- Buffering
- Multiprogramming, Multitasking, Multiprocessing
- Clock Hardware and clock software
- Features of LINUX operating system
- Password selection strategies