

Note : Q1 is compulsory.

Attempt any THREE out of the remaining questions.

Q1. Attempt any 4 sub questions

- a) What are the characteristics of modern operating systems. (5 M)
 b) What is internal and external fragmentation? (5 M)
 c) What is a Process Control Block (PCB) ? (5 M)
 d) Define the terms critical section and race condition. (5 M)
 e) Draw and explain process state transition diagram. (5 M)
- Q2. a) Explain the conditions for deadlock. Also explain how the deadlock can be determined with the help of resource allocation graph. (10 M)
 b) Explain different kernel architectures in detail (10 M)
- Q3 a) On a disk with 1000 cylinders, number 0-999. Compute the number of tracks the disk arm must move to satisfy all request in the disk queue. (10 M)
 Assume the last request received was at track 345 and the head is moving towards track 0. The queue in FIFO order contains request for the following tracks. 123, 874, 692, 475, 105, 376.
 Perform the computation for the following scheduling algorithms.
 i. FIFO ii. SSTF iii. SCAN.
- b) Explain different types of schedulers. (10 M)
- Q4 a) Explain File Allocation methods in detail. (10 M)
 b) Consider the following page reference string (10 M)
 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6
 how many page faults would occur for the following replacement algorithms assuming three, five frames for i. RU, FIFO and Optimal Replacement.
- Q5. a) Brief the evolution of an OS
 b) Consider the given snap of the system (10 M)

	Allocation				Max				Avallable			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	2	1	2	0	3	2	2	2	5	3	2
P1	1	1	0	2	2	7	5	2				
P2	2	2	5	4	2	3	7	6				
P3	0	3	1	2	1	6	4	2				
P4	2	4	1	4	3	6	5	8				

Answer the following questions using Banker's algorithm

- (i) What is the content of Matrix *need*?
- (ii) Is the system in safe state?
- (iii) If a request from process P1 arrives for (1,3,2,1) can the request be granted immediately?

Q6 Write notes on (any two)

(20 M)

- a) Multithreading
- b) Linux File system
- c) Producer Consumer Problem.
- d) RAID.