requests for each of the following disk-scheduling algorithms ? (CO4)

(i) FCFS

(ii) SSTF

(iii) SCAN

(iv) C-LOOK.

5. (a) What are the various types of files in LINUX operating system ? Explain. (CO5)

(b) Explain the command structure used in LINUX. Write a shell script to check the given number is a prime number or not a prime number. (CO5)

(c) Explain various design principles and components of a LINUX operating system. (CO5)

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TCS–502

B. TECH. (CSE)

(FIFTH SEMESTER) END SEMESTER EXAMINATION, Jan., 2023

OPERATING SYSTEM

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each sub-question carries 10 marks.

1. (a) What is system call and its various types ? Also explain its dual mode of operation. (CO1)

(b) Explain the following : (CO1)

(i) Batch Operating System

(ii) Distributed Operating System

(iii) Multiprocessing Operating system

(iv) Real Time Operating System

(c) Explain various components of an operating system in detail. (CO1)

2. (a) Explain Shortest Remaining Time First (SRTF) CPU Scheduling algorithm. Consider the processes, CPU burst time and arrival time given below : (CO2)

Processes	CPU Burst Time (ns)	Arrival Time
P_1	8	2
P_2	1	7
P_3	2	6
P_4	6	3
P_5	4	5
P_6	2	3

Draw the Gantt chart and calculate the following by using SRTF and Round Robin (Time Quantum = 2 ns) CPU scheduling algorithms :

(i) Average waiting time

(ii) Average turnaround time

(iii) CPU utilization

(iv) CPU idleness

(b) What is Critical Section Problem ? State Reader-Writer problem and describe its solution using semaphores. (CO2)

(c) Explain process state diagram with the help of a suitable diagram. (CO2)

3. (a) Explain paging scheme using translation look aside buffer (TLB). In a paging scheme using TLB, the TLB access takes 10 ns and a main memory access takes 50 ns. What is the effective access time (in ns) if the TLB hit ratio is 90% and there is no page fault. (CO3)

(b) Consider the following snapshot of a system : (CO3)

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P_0	2	0	0	1	4	2	1	2	3	3	2	1
P_1	3	1	2	1	5	2	5	2				
P_2	2	1	0	3	2	3	1	6				
P_3	1	3	1	2	1	4	2	4				
P_4	1	4	3	2	3	6	6	5				

Answer the following questions using the Banker's algorithm :

(i) Illustrate that the system is in a safe state by demonstrating an order in which the processes may complete.

(ii) If a request from process P_1 arrives for (1, 1, 0, 0), can the request be granted immediately ?

(iii) If a request from process P_4 arrives for (0, 0, 2, 0), can the request be granted immediately ?

(c) Given free memory partitions of 100 K, 500 K, 200 K, 300 K and 600 K (in order), how would each of the First-fit, Best-fit and Worst fit algorithms place processes of 212 K, 417 K, 112 K and 426 K (in order) ? (CO3)

4. (a) Describe the most common schemes for defining the logical structure of a directory. (CO4)

(b) Explain contiguous and linked allocation methods of file storage. (CO4)

(c) A disk drive has 200 cylinders, numbered 0 to 199. The drive is currently serving a request at cylinder 53. The queue of pending requests, in FIFO order, is 98, 183, 37, 122, 14, 124, 65, 67. Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending