



**K. K. Wagh Institute of Engineering Education & Research, Nashik**  
(An Autonomous Institute From A.Y. 2022-23)

SUMMER-2024	
Exam Seat No.:	
Academic Year:2023-2024	Semester:IV
Class:SY	Program:B.Tech
Branch Code:ADS/COM/CSD	Pattern:2022
Name of Course:Operating Systems	Course Code:COM222013
Max. Marks:60	Duration:2.30 Hrs.

**Instructions:** Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 3 page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

**Question No. 1 Attempt following Question**

- 1 Demonstrate the use of priority scheduling for following set of processes, with the length of the CPU burst given in milliseconds: (6) CO1

Process	Burst Time	Priority
P1	2	2
P2	1	1
P3	8	4
P4	4	2
P5	5	3

The processes are assumed to have arrived in the order P1, P2, P3, P4 and P5, all at time 0.

- a. Illustrate the execution of these processes using the non preemptive priority (a larger priority number implies a higher priority) scheduling algorithm. Draw Gantt chart.
- b. What is the turnaround time of each process?
- c. What is the waiting time of each process?

**Question No. 2 Attempt following Question**

- 2 Explain Switch Case control statement in shell script with Program. (6) CO2

**Question No. 3 Attempt following Question**

- 3.a) Explain critical section problem. Describe Three requirements of the solution for critical section problems. (6) CO3

**OR**

- 3.b) Explain semaphore with its types. (6) CO3
- 3.c) Explain bounded buffer/Producer -Consumer problem in detail. Write the function for producer and consumer including semaphores used. (5) CO3

**OR**

- 3.d) Explain the deadlock. Describe the sequence in which a process may utilize a resource. (5) CO3
- 3.e) Explain the use of Bankers algorithm. Enlist and explain the data structures required to implement the Bankers algorithm. (5) CO3

**OR**

- 3.f) Explain resource allocation-graph with a deadlock and a cycle with no deadlock. (5) CO3

**Question No. 4 Attempt following Question**

- 4.a) Explain FIFO page replacement with the help of suitable example. (6) CO4

**OR**

- 4.b) Illustrate the use of first-fit and worst-fit algorithms with the help of given algorithm. (6) CO4

Given five memory partitions of 100 KB, 500 KB, 200 KB, 300 KB, and 600 KB (ill order), first-fit and worst-fit algorithms place processes of 212 KB, 417 KB, 112 KB, and 426 KB (in order)? Which algorithm makes the most efficient use of memory?

- 4.c) Explain segmentation with the suitable diagram of segmentation hardware. (5) CO4

**OR**

- 4.d) Illustrate the use of LRU and Optimal page replacement algorithms and solve the following. (5) CO4

Given page reference string: 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 six memory frames? Remember that all frames are initially empty, so your first unique pages will cost one fault each.

- 4.e) Explain the role of the Translation Lookaside Buffer(TLB) . (5) CO4

**OR**

- 4.f) Explain hierarchical paging structure of the page table with suitable diagram. (5) CO4

**Question No. 5 Attempt following Question**

- 5.a) Explain need of disk scheduling algorithms with the following terms. (6) CO5

1. Seek Time    2. Rational Latency    3. Transfer Time

**OR**

- 5.b) A disk has 200 cylinders, numbered 0-199. The drive is currently serving the request at cylinder 63. The queue of pending requests in FIFO order is 27, 129, 110, 186, 147, 41, 10, 64, 120. Starting from the current head position what is the total distance that disk arm moves to satisfy all the pending requests for the following disk scheduling algorithm. (6) CO5

ii) C- SCAN

5.c) Explain FCFS disk scheduling algorithm with example (5) CO5

**OR**

5.d) Explain the types of external I/O devices and with example. (5) CO5

5.e) Summarize the Linux File System. (5) CO5

**OR**

5.f) Explain the use of redirection and join commands in Linux. Explain any 3 commands for each type with syntax. (5) CO5

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