

-1 AUG 2025 (M)

NCU/FRM/2.6/ACAD/027

	Question paper for Summer Semester Major Test 2025	Review Date:
	School of Engineering & Technology	Session: (June-July 2025)
	Programme Name: BCA Course Name: Operating System Course Code: BCL 204 Semester: VI	Maximum Marks: 100 Duration: 3 hours
		Sheet 1 of 2

Note:

1. All the questions are compulsory.
2. Marks and COs are indicated against the questions.
3. Calculator and Statistics data tables are permitted.

CO 1: Identify Operating Systems based on their features and functions based on modern system and network.

CO 2: Compare and classify Process Scheduling Algorithms with application to real world problems.

CO 3: Discuss and evaluate various Deadlock Avoidance & Recovery techniques.

CO 4: Discuss and assess various Memory Management Techniques and disk scheduling algorithms.

CO 5: Discuss various Disk management and file allocation methods and select which is suitable in different situations.

SECTION A (25 marks)

Q. No.	Question	Marks	CO's
Q1.	What is system calls and how do they relate to Operating System services? Illustrate with examples.	5	CO1
Q2.	Discuss the role of the Process Control Block (PCB) in process management	5	CO2
Q3.	What is a deadlock in an operating system? Explain the necessary conditions for a deadlock to occur.	5	CO3
Q4.	Differentiate between logical and physical address space in the context of memory management. Explain the concept of virtual memory and how demand paging works.	5	CO4
Q5.	Explain the different file allocation methods used in file system implementation. Compare any two methods in terms of efficiency and access speed.	5	CO5

SECTION B (60 marks)

Q6.	Differentiate between the following types of Operating Systems with suitable examples: i. Real-time OS ii. Multiprogramming OS iii. Batch Processing OS	4+4+4	CO1
Q7.	Define Process. Explain various steps involved in change of a process state with neat transition diagram.	12	CO2
Q8.	i. What is a deadlock? Discuss the necessary conditions for deadlock with examples. ii. Describe Banker's algorithm for safe allocation.	6+6	CO3
Q.9	Explain the following and illustrate the page-replacement algorithms (i) FIFO (ii) Optimal Page Replacement	12	CO4

	Use the reference string 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1 for a memory with three frames.		
Q.10	A hard disk having 2000 cylinders, numbered from 0 to 1999. The drive is currently serving the request at cylinder 143, and the previous request was at cylinder 125. The status of the queue is as follows 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130 What is the total distance (in cylinders) that the disk arm moves to satisfy the entire pending request for each of the following disk-scheduling algorithms? (i) SSTF (ii) FCFS	12	CO5

SECTION C (15 marks)

Q11.	a. Consider the following process: <table border="1"><thead><tr><th>Process</th><th>Arrival Time</th><th>Burst Time</th></tr></thead><tbody><tr><td>P1</td><td>0</td><td>8</td></tr><tr><td>P2</td><td>1</td><td>4</td></tr><tr><td>P3</td><td>2</td><td>9</td></tr><tr><td>P4</td><td>3</td><td>5</td></tr></tbody></table> Draw Gantt chart and find the average waiting time and average turnaround time: (i) FCFS Scheduling (ii) SRTF Scheduling b. Consider the following process: <table border="1"><thead><tr><th>Process</th><th>Arrival Time</th><th>Burst Time</th><th>Priority</th></tr></thead><tbody><tr><td>P1</td><td>0</td><td>6</td><td>3</td></tr><tr><td>P2</td><td>1</td><td>4</td><td>1</td></tr><tr><td>P3</td><td>2</td><td>5</td><td>2</td></tr><tr><td>P4</td><td>3</td><td>8</td><td>4</td></tr></tbody></table> Draw Gantt chart and find the average waiting time and average turnaround time: (i) SRTF Scheduling (ii) Round robin (time quantum:3)	Process	Arrival Time	Burst Time	P1	0	8	P2	1	4	P3	2	9	P4	3	5	Process	Arrival Time	Burst Time	Priority	P1	0	6	3	P2	1	4	1	P3	2	5	2	P4	3	8	4	7.5+7.5	CO2
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