

- 8 MAR 2025 (A)

NCU/FRM/2.6/ACAD/027

	Question paper for Minor Test	Review Date:
	School of Engineering & Technology	Session: Jan-Jun' 2025
	Programme Name: MCA	Maximum Marks: 50
	Course Name: Operating System	Duration: 1.5hrs
	Course Code: MCL 504	Sheet 1 of 3
	Semester: Even, 2nd Sem	

Note:

1. All the questions are compulsory.
2. Marks and COs are indicated against the questions.

CO1: Identify Operating Systems based on their features and functions to select them based on modern system and network.

CO2: Compare and classify Process Scheduling Algorithms to apply them to real world problems.

CO3: Discuss various Deadlock Avoidance & Recovery techniques to evaluate them in various scenarios.

SECTION A (20 marks)

Q. No.	Question	Marks	CO's
Q1.	In a mission-critical application requiring real-time processing, which OS would be recommended and why?	1+3	CO2
Q2.	What is Deadlock? What are the necessary and sufficient conditions for Deadlock?	2+2	CO3
Q3.	With the help of an example and diagram explain the functioning of "Process Control Block"	4	CO2
Q4.	How do multi-processor operating systems differ from multi-programming operating systems?	4	CO1
Q5.	Differentiate between a) non-pre-emptive and pre-emptive types of scheduling b) long, medium, and short-term process-scheduling	2+2	CO2

SECTION B (20 marks)

Q6.	Consider a system with the following information. Determine whether the system is in a deadlock situation.	5	CO3
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Date:	Date:

	Total Res <table><tr><td>R1</td><td>R2</td><td>R3</td></tr><tr><td>8</td><td>5</td><td>7</td></tr></table> <table><tr><th rowspan="2">Process</th><th colspan="3">Alloc</th><th colspan="3">Req</th></tr><tr><th>R1</th><th>R2</th><th>R3</th><th>R1</th><th>R2</th><th>R3</th></tr><tr><td>P1</td><td>1</td><td>0</td><td>2</td><td>1</td><td>0</td><td>0</td></tr><tr><td>P2</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td></tr><tr><td>P3</td><td>2</td><td>1</td><td>1</td><td>2</td><td>0</td><td>0</td></tr><tr><td>P4</td><td>1</td><td>1</td><td>0</td><td>1</td><td>0</td><td>1</td></tr><tr><td>P5</td><td>2</td><td>2</td><td>2</td><td>1</td><td>1</td><td>0</td></tr></table>	R1	R2	R3	8	5	7	Process	Alloc			Req			R1	R2	R3	R1	R2	R3	P1	1	0	2	1	0	0	P2	0	0	0	0	1	1	P3	2	1	1	2	0	0	P4	1	1	0	1	0	1	P5	2	2	2	1	1	0		
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P5	2	2	2	1	1	0																																																			
Q7.	Explain following UNIX commands with proper use, syntax and examples: i) grep ii) ps iii) fork iv) chmod v) du	5	CO1																																																						
Q8.	a) There are six processes named as P1, P2, P3, P4, P5 and P6. Their arrival time and burst time are given below in the table. The time quantum of the system is 4 units. <table><tr><td>Process</td><td>Arrival time</td><td>Burst Time</td></tr><tr><td>P1</td><td>0</td><td>5</td></tr><tr><td>P2</td><td>1</td><td>6</td></tr><tr><td>P3</td><td>2</td><td>3</td></tr><tr><td>P4</td><td>3</td><td>1</td></tr><tr><td>P5</td><td>4</td><td>5</td></tr><tr><td>P6</td><td>6</td><td>4</td></tr></table> Draw the Gantt chart for the execution of the processes, showing their start time and end time using RR. Calculate turnaround time, waiting time for each process and average turnaround time, and average waiting time for the system. b) How many Context Switching's are required in the above process execution? Show.	Process	Arrival time	Burst Time	P1	0	5	P2	1	6	P3	2	3	P4	3	1	P5	4	5	P6	6	4	4+1=5	CO2																																	
Process	Arrival time	Burst Time																																																							
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P5	4	5																																																							
P6	6	4																																																							
Q9.	In a system, the following state of processes and resources is given: R2→P1, P1→R2, P2→R3, R1→P2, R3→P3, P3→R4, P4→R3, R4→P4, P4→R1, R1→P5	2+2+1=5	CO3																																																						

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