27 MAR 2025 (M)

NCU/FRM/2.6/ACAD/027

THE NORTHCAP UNIVERSITY	**Question paper for Re-Minor Test** **School of Engineering & Technology**	**Review Date:**
	Programme Name: B.Tech **Course Name: Operating System** **Course Code: MCL 504** **Semester: even, 2nd Semester**	**Session: Jan-June 2025** **Maximum Marks: 50** **Duration: 90 mins** **Sheet 1 of 2**

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.	a) What are the three categories of users for file permissions in Linux, and how do they differ? b) What is an operating system? Explain its characteristics.	2.5+2.5 = 5	CO 1

Q2.	a) What will be the output of the following code segment? Explain the step wise execution.
	`int i;`
	`cout<<"Hello"<<endl;`
	`for (i=1; i<3; i++)`
	`fork();`
	`cout<<"Over"<<endl;`
	b) Explain how process are created and terminated.
		2.5+2.5 = 5	CO2

Q3.	How do multi-processor operating systems differ from multi-programming operating systems?	5	CO1
Q4.	Differentiate between a) non-pre-emptive and pre-emptive types of scheduling b) long, medium, and short-term process-scheduling	5	CO3

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	SECTION B (20 marks)		
Q7.	Consider the following data with burst time given in milliseconds: The process has arrived in the order p1, p2, p3, p4, p5 all at time 0. Draw Gantt charts for the execution of these processes using FCFS, SJF, a non-preemptive priority (lower no = higher priority) and RR (quantum=1) scheduling. What is the turnaround time and waiting time for each process? For each of the scheduling algorithm	10	CO2
Q8.	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 Draw a RAG and wait-for graph for the system, and check the deadlock condition. Also comment of deadlock avoidance, prevention and recovery methods.	5+5	CO3
	SECTION C (10 marks)		
Q11	Answer the following questions using Banker's algorithm. i) Illustrate the system is in a safe state by demonstrating an order in which the processes may complete. ii) If a request from a process P1 arrives for (1,1,0,0) can the request be granted immediately? How? iii) If the request from p4 arrives for (0,0,2,0) can the request be granted immediately? How?	4+4+2	CO4

Process	Burst Time	Priority
P0	10	3
P1	1	1
P2	2	3
P3	1	4
P4	5	2

Processes	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				

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