Reg. No.:

Name :

VIT

Vellore Institute of Technology

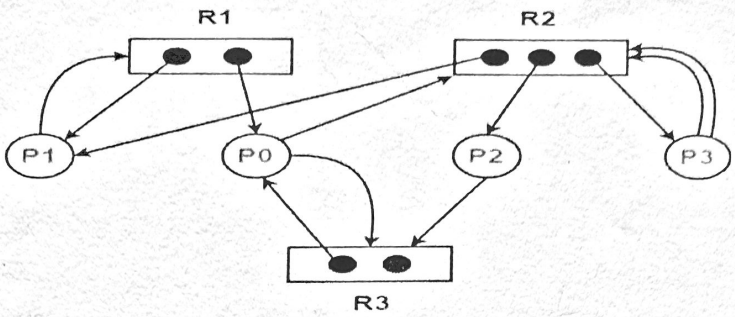
(Deemed to be University under section 3 of UGC Act, 1956)

Continuous Assessment Test 1 – September 2023

Programme	:	B.Tech. CSE B.Tech. CSE (AI&ML) B.Tech. CSE (CPS) B.Tech. CSE (AIR)	Semester	Fall 2023-24
Course Code	:	BCSE303L	Class Nbr(s)	CH2023240100694 CH2023240100695
Course Title	:	Operating Systems		
Faculty(s)	:	Dr. K. Vallidevi Dr. Afruza Begam	Slot	F1+TF1
Time	:	90 Minutes	Max. Marks	50

Answer all the Questions

Q. No.	Sub-division	Question Text	Marks
1.	A	What do you mean by the term "multitasking" in operating system? How do these concepts contribute to efficient resource utilization and improved user experience in modern operating systems?	4
	B	Explain the transition procedure from user mode to kernel mode. Write down the System call sequences to copy the contents of one file to another file.	6
2.	A	Consider a process P1 that forks P2, P2 forks P3, and P3 forks P4. P1 and P2 continue to execute while P3 terminates. Now, when P4 terminates, which process must wait for and reap P4? Explain the scenario with the psuedocode and a neat diagram	5
	B	Consider a scenario where two task T2 and T3 request for the CPU burst while the task T1 is being executed by the CPU. It is assumed that the task T2 has the highest priority, followed by T3 and then T1. Explain the mechanism of execution of all the three tasks in case of pre-emptive process scheduling with the help of a Gantt chart. Also mention the processes completion sequence at the end of the execution of three task.	5

3.	A	Find the system is deadlock or not? If not find the safe sequence?  	7
	B	Consider a system with **N** process with a single resource **R** with **10** instances. If each process requires **2** instance of **R** to complete its execution. What is the maximum value of **N** to ensure dead lock free operation?	3
4.		Imagine that you have multi-core processor with 3 cores, and you need to schedule a set of processes on these cores. Each process has a specific execution time and a priority. The goal is to use a Round Robin (RR) scheduling algorithm with a time quantum of 4 units and ensure that each process gets a fair share of CPU time while maximizing overall throughput. The details of the processes are: Process ID | Execution Time | Arrival Time | Priority P1 | 10 | 1 | 2 P2 | 6 | 2 | 1 P3 | 8 | 3 | 3 P4 | 5 | 4 | 2 P5 | 7 | 5 | 1 Implement the Round Robin Scheduling algorithm with a time quantum of 4 units and show the scheduling on the 3 cores. Process with the higher number will get the higher priority. The CUP scheduler maintains a single common ready queue. Calculate the average turn-around time, completion time and waiting time of the processes.	10
5.		Consider a computer system with two user-level processes, Process A and Process B, both running on the same operating system. Process A tries to access a sensitive file located in the system's protected directory. Process B, on the other hand, is responsible for authenticating users and managing user accounts. • Explain the concept of process isolation and how it applies to this scenario. • Identify potential security risks that might arise if Process A and Process B were not properly isolated. • Describe a technique or mechanism that could be used to enforce process isolation and prevent unauthorized access to sensitive files.	10

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