SILVER OAK UNIVERSITY
EDUCATION TO INNOVATION

Enrollment No. _____

College of Technology
Constituent Institutes of Silver Oak University

Semester:	IV	Programme :	B.Tech - CE /IT/CE-MLAI /CSE-CS/CSBS
Mid Semester Examination (Summer 2023)			
Subject Code:	1010043218	Subject Name:	Operating System
Date:	12/04/2023	Time:	12:45PM to 02:15PM
Duration	90 Minutes	Total Marks:	50

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		Marks
Q.1	1. Explain the functions of operating systems.	3
	2. List the types of operating systems and explain any one in detail.	3
	3. Draw and Explain process state diagram.	3
	4. Define the following: (1) First Fit (2) Best Fit (3) Worst Fit	3
	5. Explain functions of following UNIX commands: mkdir, cat, cal, ls.	2
Q.2 (A)	Explain Critical section Problem and List out the requirement to solve it.	3

OR

Q.2 (A)	Explain any two Hardware approach mechanisms for achieving mutual exclusion with busy waiting.	3
Q.2 (B)	What is Semaphore? Give the implementation of Bounded Buffer Producer Consumer Problem using Semaphore. Write pseudo code for the same.	3

OR

Q.2 (B)	What is Monitor? Write Solution to Dining-Philosopher problem Using monitor.	3
Q.2 (C)	Consider the following set of processes with the length of the CPU burst time given in milliseconds.	6

Process	Arrival Time	Burst Time
P1	0	7
P2	1	2
P3	2	3
P4	3	1
P5	4	4

Draw a Gantt Chart and find out average waiting time and average turnaround time for following Non Preemptive scheduling algorithms. (i) FCFS (ii) SJF and Preemptive Algorithm Round Robin (TS = 2).

OR

Q.2 (C)	Consider Five Processes P1 to P5 arrived at same time. Draw a Gantt Chart and find out average waiting time and average turnaround time for following Non Preemptive scheduling algorithms. (i) FCFS (ii) SJF and (iii) Priority	6

Process	Arrival Time	Burst Time	Priority
P1	0	10	1
P2	1	2	3
P3	2	6	2
P4	3	8	5
P5	4	4	4

Q.3 (A)	Explain file editing commands in Linux.	3
Q.3 (B)	Explain following: (1) Pipes (2) Signals (3) Message passing	3
Q.3 (C)		6

	Allocation				Max			
	A	B	C	D	A	B	C	D
P_0	0	0	1	2	0	0	1	2
P_1	1	0	0	0	1	7	5	0
P_2	1	3	5	4	2	3	5	6
P_3	0	6	3	2	0	6	5	2
P_4	0	0	1	4	0	6	5	6

Consider the snapshot of the system with Five Processes and Four types of resources A, B, C, D. Currently Available set of resources is(1,5,2,0). Answer the following Questions using banker's algorithm. 1) Find the content of Need Matrix. 2) Is the System in Safe State? 3) If request from Process P1 arrives for (0,4,2,0) can the request be granted immediately.

OR

Q.3 (A)	Write a Shell script to check given number is ODD or EVEN.	3
Q.3 (B)	Explain Principles of Concurrency.	3
Q.3 (C)	Considering a system with five processes P_0 through P_4 and three resources of type A, B, C. Resource type A has 10 instances, B has 5 instances and type C has 7 instances. Suppose at time t_0 following snapshot of the system has been taken:	6

Process	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P_0	0	1	0	7	5	3	3	3	2
P_1	2	0	0	3	2	2			
P_2	3	0	2	9	0	2			
P_3	2	1	1	2	2	2			
P_4	0	0	2	4	3	3			

1) What will be the content of the Need matrix? 2) Is the system in a safe state? If Yes, then what is the safe sequence?

Q.4	**Attempt any 4 out of 6 (Each Question of 3 Marks)**	12

1) Explain PCB.
2) Explain the following in brief: Multi programming with Fixed Partitions and Multi programming with Variable Partitions.
3) Give the implementation of Readers-Writers Problem using Semaphore.
4) List out Different Multi-threading models and explain any one.
5) Define the following: Race Condition, Mutual Exclusion, and Throughput.
6) Explain Characteristics of Deadlock.