GYANMANJARI INNOVATIVE UNIVERSITY

GYANMANJARI INSTITUTE OF TECHNOLOGY

B.Tech.-Mid Semester Examination (MSE)-S2026

Enrollment No.:_____

Subject Code: BETCE14305 **Date: 17/03/2026**

Subject Name: Operating System **Semester: 04**

Time:2:30 PM To 4:30 PM **Total Marks: 60**

Instructions:

1. **Question No. 1 is compulsory.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			Marks
Q.1	(a)	Explain monolithic kernel architecture in detail.	05
	(b)	What is system call? Write different types of system call.	05
	(c)	State different types of operating system. Explain any three of them.	10
Q.2	(a)	Write the different states a process can hold. Explain the types of events that lead to each state transition for a process.	05
	(b)	Explain producer-consumer problem and solve it using semaphore. Write pseudo code for the same.	05

OR

	(b)	What do you mean by scheduling? Discuss in brief types of scheduler.	05
	(c)	Solve following by SJF Non-Preemptive and RR scheduling with time quantum 2. Draw Gantt Chart, Average Waiting Time and Average Turnaround Time. Examine the effect if Time Quantum is too large and too small.	10

Process	Arrival time	Burst time
P1	0	6
P2	2	4
P3	4	5
P4	6	2

OR

	(c)	Solve following by FCFS, Preemptive SJF, Preemptive priority (a smaller number implies a higher priority) scheduling Algorithm. Draw Gantt Chart, Average Waiting Time and Average Turnaround Time. Which one is better as per average turnaround time?	10

Process	Arrival time	Burst time	Priority
P1	0	7	3
P2	2	4	1
P3	4	2	2
P4	8	1	4

Q.3	(a)	Write about various multithreading model.	05
	(b)	What is Deadlock? List the conditions that lead to deadlock. How Deadlock can be prevented?	05
	(c)	What is Mutual exclusion? What Critical Section Problem? Write Dekker's Solution and Peterson's Solution for the same.	10

OR

Q.3 **(a)** Explain how Dining philosopher problem can be solved using Semaphore. **05**

(b) Write a Shell Script to find Fibonacci series of given number. **05**

(c) Consider the following snapshot of a system. Determine whether the system is in safe state. If not in safe state, give reasons. If the system is in safe state, find the safe sequence of processes. Consider Need assuming Maximum Allocation. Total Resources (22) **10**

Total Resources of R1 type – 10
Total Resources of R2 type – 5
Total Resources of R3 type – 7

Process	MAX			ALLOCATION		
	R1	R2	R3	R1	R2	R3
P0	7	5	3	0	1	0
P1	3	2	2	2	0	0
P2	9	0	2	3	0	2
P3	2	2	2	2	1	1
P4	4	3	3	0	0	2