CBCS SCHEME

USN | | | | | | | | | | **BCS303**

Third Semester B.E/B.Tech. Degree Examination, Dec.2025/Jan.2026

Operating Systems

Time: 3 hrs.   Max. Marks:100

Note: *1. Answer any FIVE full questions, choosing ONE full question from each module.*
2. M : Marks , L: Bloom's level , C: Course outcomes.

			M	L	C
		Module – 1			
1	a.	Explain the various types of system calls with an example for each.	8	L2	CO1
	b.	Explain cloud computing its types and their services it offers.	8	L2	CO1
	c.	What is dual mode operation and what is the need of it?	4	L2	CO1
		OR			
2	a.	Explain the different architecture of OS starting from Simple Structure, Layered Structure, Micro Kernels, Modules and Hybrid Systems.	8	L4	CO1
	b.	Discuss the essential properties of the following types of systems : i. Time sharing system ii. Multi-programmed batch systems.	6 6	L2	CO1
		Module – 2			
3	a.	Explain Inter Process Communication.	6	L2	CO2
	b.	Discuss Multilevel Queue Scheduling Algorithm.	6	L4	CO2
	c.	Consider the set of 3 processes whose arrival time and burst time are given below. Process Id / Arrival Time / Burst Time: P1 / 0 / 9 P2 / 1 / 4 P3 / 2 / 9 If the CPU scheduling policy is SRTF, calculate the average waiting time and average turnaround time.	8	L3	CO2

Table for 3(c):

Process Id	Arrival Time	Burst Time
P1	0	9
P2	1	4
P3	2	9

OR

4	a.	Compare User Level Threads and Kernel Level threads.	4	L4	CO2
	b.	Illustrate with a neat sketch, Process States and Process Control Block (PCB).	8	L2	CO2
	c.	Consider the set of 6 processes whose arrival time and burst time are given below. If the CPU scheduling policy is Round Robin with time quantum = 3, calculate Average Waiting time and Turnaround time.	8	L3	CO2

Process ID	Arrival Time	Burst Time
P_1	5	5
P_2	4	6
P_3	3	7
P_4	1	9
P_5	2	2
P_6	6	3

Module – 3

5	a.	Discuss in detail the critical section problem and write the algorithm for producer consumer problem.	10	L2	CO3
	b.	Consider the following system using data structures in the Bankers Algorithm with resource type ABC Maximum instance present in the system A = 10, B = 5, C = 7. i. Calculate Need Matrix ii. Check whether system is safe or not.	10	L3	CO3

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			

OR

6	a.	Outline the solutions of Dinning –Philosopher problem.	5	L2	CO3
	b.	Describe a resource allocation graph with an example.	5	L4	CO3
	c.	Using Bankers algorithm, solve the following problem : i. Calculate the Need Matrix ii. Check whether system is safe or not.	10	L2	CO3

Process	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P_0	0	0	1	2	0	0	1	2	1	5	2	0
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				

Q.No		Question	Marks	Level	CO
		Module – 4			
7	a.	Discuss the given memory management technique with diagram. i. Paging ii. Translation Look-Aside Buffer.	 6 6	L2	CO4
	b.	Discuss about Contiguous Memory Allocation with a neat diagram.	8	L2	CO4
		OR			
8	a.	Consider the reference string : 6, 1, 1, 2, 0, 3, 4, 6, 0, 2, 1, 2, 1, 2, 0, 3, 2, 1, 2, 0 For a memory with three frames and calculate number of page faults by using i. LRU replacement ii. FIFO replacement.	10	L3	CO4
	b.	Describe the process of demand paging in OS.	10	L2	CO4
		Module – 5			
9	a.	Explain in detail about directory and disc structure.	6	L2	CO5
	b.	Analyze the file system implementation.	6	L4	CO5
	c.	The requested tracks, in the order received are {176, 79, 34, 60, 92, 11, 41, 114} Apply the following disk scheduling algorithms starting track at 50. i) FCFS ii) SSTF. Calculate the total seek time.	8	L3	CO5
		OR			
10	a.	Explain Free Space Management with an example.	6	L2	CO2
	b.	Explain the Access Matrix method of system protection with the domain as objects and its implementation.	6	L2	CO2
	c.	The requested tracks, the order received are {176, 79, 34, 60, 92, 11, 41, 114} Apply the following disk scheduling algorithms starting track at 50. i) Look ii) C – Look. Calculate the total seek time.	8	L3	CO3

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