CBCS SCHEME

USN | | | | | | | | | | |

BCS654B

Sixth Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Fundamentals of 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.

		Module – 1	M	L	C
Q.1	a.	Define Operating System. Explain modern computer system with suitable block diagram.	10	L2	CO1
	b.	Discuss various services provided by operating system.	10	L2	CO1
		OR			
Q.2	a.	Explain multiprogramming, multiprocessing and multitasking.	10	L2	CO1
	b.	What is a System Call? Explain different types of system calls.	10	L2	CO1
		Module – 2			
Q.3	a.	Define a Process. Explain various states of a process with its diagram.	10	L2	CO2
	b.	Discuss different types of CPU schedulers.	10	L2	CO2
		OR			
Q.4	a.	Define Thread. Explain the benefits of multithreaded programming.	10	L2	CO2
	b.	Discuss different multithreading models.	10	L2	CO2
		Module – 3			
Q.5	a.	List CPU scheduling criteria. Explain with an example.	10	L2	CO3
	b.	Apply FCFS and scheduling algorithm for the given problem and calculate Average Waiting Time and Average Turnaround time.	10	L3	CO3

Process ID	Arrival Time	Burst Time
P1	2	2
P2	5	6
P3	0	4
P4	0	7
P5	7	4

		OR	M	L	C
Q.6	a.	Define critical section problem. Explain with a suitable diagram.	5	L2	CO3
	b.	Write and explain Peterson's solution by taking an example.	10	L2	CO3
	c.	Explain how semaphores can be used to solve dining Philosopher's problem.	5	L2	CO3

		Module – 4			
Q.7	a.	What is a Deadlock? List and explain necessary conditions for deadlock situation.	10	L2	CO4
	b.	Consider the following snapshot of the system – Apply Bankers safety algorithm. (tables below) i. Calculate need matrix ii. Is the system in safe state? If so mention safe sequence.	10	L3	CO4

	Allocation Matrix				Max Matrix		
	A	B	C		A	B	C
P0	1	0	1	P0	2	1	1
P1	2	1	2	P1	5	4	4
P2	3	0	0	P2	3	1	1
P3	1	0	1	P3	1	1	1

Available Matrix

A	B	C
2	1	1

i. Calculate need matrix
ii. Is the system in safe state? If so mention safe sequence.

OR

Q.8	a.	What are First-Fit, Best-Fit and Worst-Fit in memory allocation? Explain with suitable example.	10	L2	CO4
	b.	Why Paging? Explain paging hardware with its block diagram.	10	L2	CO4

Module – 5

Q.9	a.	What is a page fault? Explain steps involved in handling page fault.	10	L2	CO5
	b.	Consider the page reference string 7, 0, 1, 2, 0, 3, 0, 4, 2, 3 for a memory with frame size 3. Determine the page faults using FIFO algorithm. i. Calculate Hit ratio ii. Calculate Miss ratio.	10	L3	CO5

OR

Q.10	a.	Define File. List and explain file attributes.	5	L2	CO5
	b.	Explain various operations on File.	10	L2	CO5
	c.	Write a note on file access methods.	5	L2	CO5

* * * * *