CBCS SCHEME

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BCS654B

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
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.

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		Module – 1	M	L	C
Q.1	a.	Define Operating System. Explain dual mode of operating system with a neat diagram.	10	L1 L2	CO1
	b.	Explain the different computer system architectures.	10	L2	CO1
		OR			
Q.2	a.	List and explain the services of the operating system with respect to programs and the users.	10	L2	CO1
	b.	What are system calls? List and explain the different types of system calls.	10	L1 L2	CO1
		Module – 2			
Q.3	a.	Define Process. Explain different states of a process with state diagram.	10	L1 L2	CO1
	b.	Define IPC. Explain shared memory and message passing mechanisms.	10	L1 L2	CO1
		OR			
Q.4	a.	Explain the following : i) Context switching ii) Process creation iii) Process termination	10	L2	CO1
	b.	Describe the various multithreading models and discuss the benefits of multithreaded programming.	10	L2	CO1
		Module – 3			
Q.5	a.	Define Turn-around time, Response time and CPU utilization.	06	L1	CO2
	b.	Calculate the average waiting time and average turn around time by drawing Gantt-chart using FCFS, SJF, Priority (lowest number has higher priority) and RR (Q = 2 ms) Process | Burst Time | Priority P_1 | 10 | 3 P_2 | 1 | 2 P_3 | 2 | 1 P_4 | 4 | 4	14	L3	CO2
		OR			
Q.6	a.	What is critical section? What are the requirements for the solution to critical section problem? Explain Peterson's solution.	10	L1 L2	CO3
	b.	What is semaphore? Discuss the solution to the classical dinning philosopher problem using semaphore.	10	L1 L2	CO3

Module – 4

			Marks	Level	CO
Q.7	a.	What is a Deadlock? What are the necessary conditions for the deadlock to occur?	10	L1 L2	CO3
	b.	Consider the following snap shot of the system: (table below) Apply Banker's algorithm to answer the following : i) What is the content of the need matrix? ii) Is the system in a safe state? If so, find a safe sequence.	10	L3	CO3

Process	Allocation			Max			Available		
	R_1	R_2	R_3	R_1	R_2	R_3	R_1	R_2	R_3
P_1	0	1	0	7	5	3	3	2	2
P_2	2	0	0	3	2	2			
P_3	3	0	2	9	0	2			
P_4	2	1	1	2	2	2			
P_5	0	0	2	4	3	3			

Apply Banker's algorithm to answer the following :

i) What is the content of the need matrix?

ii) Is the system in a safe state? If so, find a safe sequence.

OR

			Marks	Level	CO
Q.8	a.	What is paging? Explain TLB in detail with a simple paging system and neat diagram.	10	L1 L2	CO4
	b.	What is fragmentation? Differentiate internal fragmentation and external fragmentation.	10	L1 L4	CO4

Module – 5

			Marks	Level	CO
Q.9	a.	What is page fault? With a neat diagram explain steps in handling page fault.	10	L1 L2	CO4
	b.	Consider the page reference string for a memory with three frames. Determine the number of page faults using FIFO and LRU page replacement algorithms. 7, 0, 1, 2, 0, 3, 0, 4, 2, 3 ; 0, 3, 2, 1, 2, 0, 1, 7, 0, 1	10	L3	CO4

OR

			Marks	Level	CO
Q.10	a.	Define file. Explain the different file allocation methods.	10	L1 L2	CO5
	b.	Explain the following : i) Protection ii) File sharing iii) File system mounting	10	L2	CO5

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