CBCS SCHEME

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BCS303

Third Semester B.E./B.Tech. Degree Examination, June/July 2024
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.	Explain multi programming and time sharing systems.	07	L3	CO1
	b.	Explain the dual mode operation in operating systems with a neat block diagram.	07	L3	CO1
	c.	What are virtual machines? Explain with a neat figure.	06	L3	CO1
		OR			
Q.2	a.	What are system calls? Briefly explain different types of system calls.	07	L3	CO1
	b.	List and explain the services provided by OS for the user in efficient operation of a system.	07	L3	CO1
	c.	What are micro kernels? With a neat figure, explain the micro kernel structure? Point out their advantages over layered approach.	06	L3	CO1
		Module – 2			
Q.3	a.	What is process? Explain different states of the process with state transition diagram and process control block.	08	L2	CO2
	b.	What is Interprocess communication? Explain.	06	L2	CO2
	c.	What is thread? How it is different from process? Discuss various multithreading models with suitable illustration.	06	L2	CO2
		OR			
Q.4	a.	Consider the following processes where smaller the number has higher priority. Draw the Gantt chart compute the waiting time and average turnaround time by using FCFS, SRTF, preemptive priority scheduling.	12	L2	CO2
	b.	Discuss the benefits of multithreaded programming. Explain the threading issues in detail.	08	L2	CO2
		Module – 3			
Q.5	a.	What are the requirements that must be satisfied by a solution to the critical section problem? Illustrate with an example the Peterson's solution for critical section problem.	08	L3	CO3
	b.	What is critical section problem and solutions to the problem? How to solve using semaphores?	06	L3	CO3
	c.	Explain the classical bounded buffer problem of synchronization. Give the solution	06	L3	CO3
		OR			
Q.6	a.	What is dead lock? What are the necessary conditions for the deadlock to occur? How to recover from deadlocks.	10	L3	CO3

Processes	Arrival times	Burst time	Priority
P_1	0	7	4
P_2	3	5	2
P_3	3	3	6
P_4	5	5	3

	b.	Assume that there are 5 processes P_0 to P_4 and 4 types of resources. At time T_0 the system has following: Apply the bankers algorithm to answer following: (i) What is the content of need matrix? (ii) Is the system in a safe state? (iii) If the request from P_1(2, 1, 1, 0) arrives can it be granted?	**10**	**L3**	**CO3**

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

Module – 4

Q.7	**a.**	What is paging? Differentiate between paging and segmentation.	**06**	**L3**	**CO4**
	b.	What are TLB? Explain TLB in detail with a simple paging system and neat diagram.	**08**	**L3**	**CO4**
	c.	Given the memory partitions of 100K, 500K, 200K, 300K and 600K, apply first fit, best fit and worst fit algorithms to place 212K, 417K, 112K and 426K.	**06**	**L3**	**CO4**
		OR			
Q.8	**a.**	What is page fault? With a neat diagram, explain the steps in handling page fault.	**08**	**L3**	**CO4**
	b.	Illustrate how demand paging affects system performance. What is thrashing how it can be controlled?	**06**	**L3**	**CO4**
	c.	Consider the following sequence: 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1 Assuming frame size of 4, apply LRU, FIFO and optimal algorithm to find the page faults. Find out which algorithm is most efficiency.	**06**	**L3**	**CO4**
		Module – 5			
Q.9	**a.**	Explain various file attributes and operations of files.	**06**	**L3**	**CO5** **CO6**
	b.	With a neat diagram, explain two level and tree structured directory structure.	**08**	**L3**	**CO5** **CO6**
	c.	What is file? Explain the file mounting.	**06**	**L3**	**CO5** **CO6**
		OR			
Q.10	**a.**	Give the following sequence: 95, 180, 34, 119, 11, 123, 62, 64 with the head initially at 50 and ending at track 199. What is the total disk travelled by the disk drum to satisfy request using FCFS, SSTF, LOOK and CLOOK algorithms.	**12**	**L3**	**CO5** **CO6**
	b.	Explain the access matrix model of implementing protection on OS.	**08**	**L3**	**CO5** **CO6**

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