CBCS SCHEME

USN [redacted] BCS303

Third Semester B.E./B.Tech. Degree Examination, Dec.2023/Jan.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.

			M	L	C
		Module – 1			
Q.1	a.	Define Operating System. Explain dual mode of OS with a neat diagram.	5	L1, L2	CO1
	b.	Distinguish between the following terms: i) Multiprogramming and Multitasking ii) Multiprocessor system and clustered system.	10	L2	CO1
	c.	With a neat diagram, explain the concept the concept of VM-WARE architecture.	5	L1, L2	CO1
		OR			
Q.2	a.	Explain the operating system services with respect to programs and users.	5	L2	CO1
	b.	List and explain the different computing environments.	5	L1, L2	CO1
	c.	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.	8	L1, L2	CO1
	b.	What is IPC? Explain direct and indirect communication with respect to message passing.	8	L1, L2	CO2
	c.	Explain context-switching.	4	L2	CO2
		OR			
Q.4	a.	What is multi-threaded process? Explain the four benefits of multithreaded programming.	6	L2	CO2
	b.	Calculate the average waiting time and average turn around time by drawing the Gantt-chart using FCFS, SJF-non preemptive, SRTF, RR(q = 2ms) and porosity algorithms.	14	L3	CO2

Process	Arrival time	Burst time	Porosity
P1	0	9	3
P2	1	4	2
P3	2	9	1
P4	3	5	4

		Module – 3			
Q.5	a.	What is critical section? What are the requirements for the solution to critical section problem? Explain Peaterson's solution.	8	L1, L2	CO3
	b.	Explain Reader's-Writer's problem using semaphores.	12	L2	CO3

OR

Q.6	a.	What is deadlock? What are the necessary conditions for the deadlock to occur?	6	L1, L2	CO3
	b.	Consider the following snap-shot of a system: Answer the following using Banker's algorithm: i) Is the system in safe state? If so give the safe sequence. ii) If process P2 requests (0, 1, 1, 3) resource can it be granted immediately.	14	L3	CO3

Process	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	2	0	0	1	4	2	1	2	3	3	2	1
P1	3	1	2	1	5	2	5	2				
P2	2	1	0	3	2	3	1	6				
P3	1	3	1	2	1	4	2	4				
P4	1	4	3	2	3	6	6	5				

Module – 4

Q.7	a.	What is paging? Explain with neat diagram paging hardware with TLB?	10	L1, L2	CO4
	b.	What are the commonly used strategies to select a free hole from the available holes?	6	L1	CO4
	c.	Explain fragmentation in detail.	4	L2	CO4

OR

Q.8	a.	With a neat diagram? Describe the steps in handling the page fault.	8	L2	CO4
	b.	Consider the page reference string: 1, 0, 7, 1, 0, 2, 1, 2, 3, 0, 3, 2, 4, 0, 3, 6, 2, 1 for a memory with 3 frames. Determine the number of page faults using F1, F0, optimal and LRU replacement algorithms which algorithm is more efficient.	12	L3	CO4

Module – 5

Q.9	a.	Define file. List and explain the different file attributes and operations.	10	L1	CO5
	b.	Explain the different allocation methods.	10	L2	CO5

OR

Q.10	a.	What is Access Matrix? Explain Access Matrix method of system protection with domain as objects and its implementation.	10	L1, L2	CO5
	b.	A drive has 5000 cylinders numbered 0 to 4999. The drive is currently serving a request 143 and previously serviced a request at 125. The queue of pending requests in FIFO order is: 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130 starting from current head position. What is the total distance travelled (in cylinders) by disk arm to satisfy the requests using FCFS, SSTF, SCAN, LOOK and C-LOOK algorithm.	10	L3	CO5

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