USN ☐☐☐☐☐☐☐☐☐☐ **BCS303**

Third Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025
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 dual mode of operating systems with a neat diagram.	06	L1 L2	CO1
	b.	Distinguish between the following terms: i) Multiprogramming and Multitasking ii) Multiprocessor and Clustered system	06	L2	CO1
	c.	Explain with a neat diagram VM-WARE Architecture.	08	L1 L2	CO1
		OR			
Q.2	a.	List and explain the services provided by OS for the user and efficient operation of system.	06	L2	CO1
	b.	Explain the different computing equipments.	06	L2	CO1
	c.	What are systems calls? List and explain the different types of systems calls.	08	L1 L2	CO1
		Module – 2			
Q.3	a.	What is process? Explain process state diagram and process control block with a neat diagram.	10	L1 L2	CO2
	b.	What is interprocess communication? Explain direct and indirect communication with respect to message passing system.	10	L1 L2	CO2
		OR			
Q.4	a.	List and explain the different types of multithreading models.	06	L1 L2	CO2
	b.	Calculate the average waiting time and average turnaround time by drawing the Gantt-chart using FCFS, SJF, RR (Q = 4ms) and priority scheduling (Higher Number is having highest priority).	14	L3	CO2
		Module – 3			
Q.5	a.	What is critical section? Give the Peterson's solution to 2 processes critical section problem.	05	L1 L2	CO3
	b.	Explain Reader's and Writer's problem in detail.	07	L2	CO3
	c.	What is semaphore? Discuss the solution to the classical dinning philosopher problem.	08	L1 L2	CO3

For Q.4 b:

Process	B.T. (ms)	Priority
P_1	24	1
P_2	03	2
P_3	03	3

		OR			
Q.6	a.	What is a Deadlock? What are the necessary conditions for the deadlock to occur?	06	L1 L2	CO3
	b.	Consider the following snap shot of the system.	14	L3	CO2

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

Answer the following questions:
i)   What is the content of the matrix need?
ii) Is the system on a safe state? If so, find safe sequence.
iii) If P_1 requirements for (1, 0, 2) additional resources can P_1 be granted.

		Module – 4			
Q.7	a.	What is paging? Explain with a neat diagram paging hardware with TLB.	10	L1 L2	CO4
	b.	Explain the different strategies used to select a free hole from available holes.	05	L1	CO4
	c.	What is Fragmentation? List and explain its types.	05	L2	CO4
		OR			
Q.8	a.	What is page fault? With a neat diagram explain steps in handling page fault.	08	L2	CO4
	b.	Consider the page reference string for a memory with 3 frames determine the number of page faults using FIFO, optimal and LRU replacement algorithms. Which algorithms is more efficient? 7 0 1 2 0 3 0 4 2 3 0 3 2 1 2 0 1 7 0 1	12	L3	CO4
		Module – 5			
Q.9	a.	Define File. List and explain different file operations and file attributes.	10	L1	CO5
	b.	Explain the different file allocation methods.	10	L2	CO5
		OR			
Q.10	a.	What is Access Matrix? Explain the implementation of Access Matrix.	10	L2	CO5
	b.	A drive has 5000 cylinders numbered 0 to 4999. The drive is currently servicing at a request 143 and previously served a request at 125. The queue of pending request in FIFO order. 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130 starting from current head position. What is the total distance travelled (in cylinders) by a disk arm to satisfy the request using FCFS, SSTF, SCAN, LOOK and C-Look algorithm	10	L3	CO5

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