U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

January / February 2025 Semester End Main Examinations

Programme: B.E. **Semester: III**
Branch: Computer Science and Business Systems **Duration: 3 hrs.**
Course Code: 23BS3PCOPS **Max Marks: 100**
Course: OPERATING SYSTEMS

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			UNIT - I	CO	PO	Marks
1	a)	With a neat block diagram explain dual operation in operating system.		*CO1*	*PO1*	**7**
	b)	List and explain the services provided by OS for the user and efficient operation of system.		*CO1*	*PO1*	**7**
	c)	Briefly explain types of system call.		*CO1*	*PO1*	**6**
		OR				
2	a)	Compare and contrast different types of computer system architectures. Provide examples of each type.		*CO1*	*PO2*	**10**
	b)	Explain the concept of computing environments. Discuss different types of computing environments and their impact on operating system design.		*CO1*	*PO2*	**10**
		UNIT - II				
3	a)	Illustrate with a neat sketch the process state and process control block.		*CO1*	*PO1*	**10**
	b)	Compare between Process and Thread. List the benefits of Multithreaded Programming.		*CO1*	*PO2*	**10**
		OR				
4	a)	Discuss the basic concepts of CPU scheduling. What are the key criteria used to evaluate scheduling algorithms?		*CO2*	*PO2*	**10**
	b)	Compare between shared memory and message passing in inter process communication. Explain the Producer-Consumer problem using shared memory.		*CO2*	*PO2*	**10**
		UNIT - III				
5	a)	Explain the critical section problem in process synchronization. How does Peterson's solution address this problem?		*CO2*	*PO2*	**10**

		b)	Consider the following snapshot of system **Given Matrices** **Allocation** / **Maximum Resources** / **Available Resources** **A B C D** / **A B C D** / **A B C D** **P0** 0 1 1 0 / 0 2 1 0 / 1 5 2 0 **P1** 1 2 3 1 / 1 6 5 2 **P2** 1 3 6 5 / 2 3 6 6 **P3** 0 6 3 2 / 0 6 5 2 **P4** 0 0 1 4 / 0 6 5 6 Find the need matrix and calculate safe sequence using bankers algorithm –mention the above is safe or not safe	*CO2*	*PO3*	**10**
			OR			
	6	a)	Describe the techniques used for deadlock prevention. How do these techniques ensure that deadlocks do not occur?	*CO2*	*PO2*	**10**
		b)	What is Semaphore? State a dining philosopher problem give a solution using semaphore.	*CO2*	*PO2*	**10**
			UNIT - IV			
	7	a)	What is Demand paging? Discuss with a neat diagram steps to handle page fault.	*CO2*	*PO2*	**10**
		b)	Describe how copy–on –write used to optimize memory utilization. Consider the reference stream 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6. Find number of page faults using FCFS (Frames =3)	*CO2*	*PO3*	**10**
			OR			
	8	a)	Consider the page reference string 6, 1, 1, 2, 0, 3, 4, 6, 0, 2, 1, 2, 1, 2, 0, 3, 2, 1, 2, 0 for a memory with three frames and calculate number of page faults by using FIFO (First In First Out) and LRU Page replacement algorithms. Which algorithm is most efficient	*CO3*	*PO3*	**12**
		b)	Outline segmentation. Explain the basic method of segmentation with an example. Mention its advantages and disadvantages.	*CO3*	*PO2*	**8**
			UNIT - V			
	9	a)	Explain various disk scheduling algorithm in detail.	*CO3*	*PO2*	**10**
		b)	Discuss rotational optimization techniques and their impact on disk performance.	*CO2*	*PO2*	**10**
			OR			
	10	a)	Describe free space management strategies in file systems. Which method is most efficient and why?	*CO2*	*PO2*	**10**
		b)	Explain file access control mechanisms. Discuss its advantages and disadvantages.	*CO2*	*PO2*	**10**

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