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

Autonomous Institute Affiliated to VTU

September / October 2023 Semester End Main Examinations

Programme: B.E. **Semester: IV**
Branch: Information Science and Engineering **Duration: 3 hrs.**
Course Code: 22IS4PCOPS **Max Marks: 100**
Course: OPERATING SYSTEM

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)	The service and functions provided by an operating system can be divided into two main categories. Briefly describe the two categories and discuss how they differ.	CO1	PO1	**10**
	b)	In what ways is the modular kernel approach similar to the layered approach? In what ways does it differ from the layered approach?	CO1	PO1	**05**
	c)	Discuss about different system calls.	CO1	PO1	**05**
		UNIT - II			
2	a)	Describe the following i. Process and their states ii. PCB iii. Cooperating processes	CO1	PO1	**06**
	b)	State critical section problem? Discuss three solutions to solve the critical section problem	CO2	PO2	**08**
	c)	Analyze the inter-process communication scheme where mailboxes are used a) Suppose a process P wants to wait for two messages, one from mailbox A and one from mailbox B. What sequence of send and receive should it execute? b) What sequence of send and receive should p execute if P wants to wait for one message from mailbox A or from mailbox B (or from both)?	CO2	PO2	**06**
		UNIT - III			
3	a)	Consider the following set of processes with a length of the CPU burst time given in milliseconds. (Lower numbers have higher priority)	CO2	PO2	**10**

Process	Arrival time	Burst time	Priority
P1	0	4	2
P2	1	2	4
P3	2	3	6
P4	3	5	10
P5	4	1	8
P6	5	4	12
P7	6	6	9

			Consider the Preemptive priority, Round Robin (RR) (quantum=10ms) scheduling algorithms. Illustrate the scheduling using Gantt chart. Which algorithm will give the minimum average waiting time? Discuss.			
		b)	How can deadlock be detected? Explain.	CO1	PO1	**05**
		c)	Outline about multiple-processor scheduling and real-time scheduling.	CO1	PO1	**05**
			UNIT - IV			
	4	a)	Given free memory partitions of 400 K, 700 K, 200 K, 300 K, and 600K (in order), how would each of the First-fit, Best-fit, and Worst-fit algorithms place processes of 212 K, 517 K, 312 K, and 526 K (inorder)?	CO2	PO2	**10**
		b)	Explain the differences between internal and external fragmentation.	CO1	PO1	**04**
		c)	Define Swapping. Justify the need of swapping in memory management.	CO2	PO2	**06**
			OR			
	5	a)	What are the differences between: a) Logical and physical address b) Page table and segment table c) First-fit placement and best-fit placement d) Contiguous and non – contiguous storage allocation e) Multiple contiguous fixed partitions (MFT) and multiple contiguous variable partitions (MVT).	CO2	PO2	**10**
		b)	With the help of a neat diagram explain the basic paging scheme of memory management, also provide the significance of Valid/Invalid bit, Read-only bit, dirty bit, Copy-on-write bit.	CO1	PO1	**10**
			UNIT - V			
	6	a)	What are files? Explain the access methods for files.	CO1	PO1	**05**
		b)	Interpret about directory structure.	CO1	PO1	**05**
		c)	Compare the functionalities of FCFS, SSTF, C-SCAN and CLOOK disk scheduling algorithms with example.	CO2	PO2	**10**
			OR			
	7	a)	Outline about free space management with example.	CO1	PO1	**10**
		b)	Consider a file system where a file can be deleted and the disk space reclaimed while the links to that file still exist. What problems may occur if a new file is created in the same storage area or with the same absolute path name? How this problem can be avoided?	CO2	PO2	**05**
		c)	Define file system access control list. Explain in brief.	CO1	PO1	**05**

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