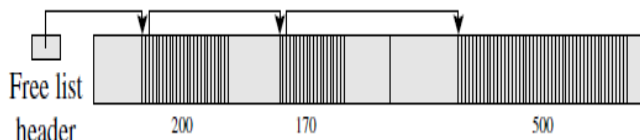| U.S.N.										

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

Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

Programme: B.E.   **Semester: V**

Branch: Electronics and Communication Engineering   **Duration: 3 hrs.**

Course Code: 23EC5PE1OS / 22EC5PE1OS   **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.

				CO	PO	Marks
			UNIT - I	*CO*	*PO*	**Marks**
1	a)		Describe the classes of operating system.	*CO 1*	*PO 1*	**10**
	b)		In a timesharing system Processes *P*1 and *P*2 follow a cyclic behavior pattern. Each cycle contains a burst of CPU activity to service a subrequest and a burst of I/O activity to report its result, followed by a wait until the next subrequest is submitted to it. The CPU bursts of processes *P*1 and *P*2 are 15 and 30 ms, respectively, while the I/O bursts are 100 and 60 ms, respectively. Illustrate the operation by drawing a timing chart. Find the response time of the processes assuming the time slice to be 10ms.	*CO 1*	*PO 1*	**10**
			OR			
2	a)		Differentiate the types of computing environment with example	*CO 1*	*PO 1*	**10**
	b)		Consider two programs p1 and p2 to be executed in a multiprogramming operating system. P1 has 1ms CPU burst and 2ms I/O burst whereas p2 has 5.5ms CPU burst and 2.5ms I/O burst. Assign priorities to the programs and draw the time chart.	*CO 1*	*PO 1*	**10**
			UNIT - II			
3	a)		Write a program in C language to create 4 child process. Let the parent create 4 child processes. Make them execute ls, ls –l, pwd and date commands.	*CO 2*	*PO 2*	**10**
	b)		What are the fundamental process states? Explain the process state transitions with flow diagram.	*CO 2*	*PO 2*	**10**
			OR			
4	a)		Create a child process that displays its process ID and parent process ID. let the child execute ls and ls -l command.	*CO 2*	*PO 2*	**10**

				CO2	PO2	10
		b)	A system administrator observes that two processes with the same priority are behaving differently during context switching. Explain how the Process Control Block (PCB) influences this behavior. Provide a detailed explanation of the PCB's role in context switching.	CO2	PO2	10

UNIT - III

5	a)	Consider the following set of processes. Analyze and compute the average waiting time and turnaround time using the First-Come-First-Served (FCFS) scheduling algorithm.	CO 2	PO 2	10

Process	Arrival Time	Burst Time
P1	0 ms	5 ms
P2	2 ms	3 ms
P3	4 ms	8 ms

	b)	Differentiate Race condition and critical section with example	CO 2	PO 2	10

OR

6	a)	Analyze the performance of Round Robin (RR) scheduling with a time quantum of 2 ms for the following processes. Compute the average waiting time and turnaround time.	CO 2	PO 2	10

Process	Arrival Time	Burst Time
P1	0 ms	5 ms
P2	1 ms	4 ms
P3	2 ms	2 ms

	b)	Differentiate preemptive and non preemptive scheduling with example for each.	CO 2	PO 2	10

UNIT - IV

7	a)	Compare contiguous and non-contiguous memory allocation.	CO 2	PO 2	8
	b)	Consider the free list given in Figure 1	CO 2	PO 2	12

Figure 1

Using the First, Best, and Next-Fit memory allocation techniques, show how memory allocation is done for the process requesting 100, 50, and 400 bytes. Justify your answer by an appropriate description.

OR

	8	a)	Compare internal fragmentation and external fragmentation in details.	CO 2	PO 2	8
		b)	Four free memory area starting at addresses 100K,300K,450K,and 600K,whereK=1024,with sizes of 50KB,30KB,80KB and 40KB respectively, are present in memory. Process P consists of P-1,P-2,P-3 with sizes of 50KB,30KB,qnd 60KB respectively which has a size requirement of 140KB. Show how these processes can be loaded in to free memory areas and explain the process of address calculation and memory allocation in non-continuous memory..	CO 2	PO 2	12
			UNIT - V			
	9	a)	Explain the purpose of a file system in an operating system. How does it contribute to the management of data and storage devices?.	CO 2	PO 1	10
		b)	Explain the concept of buffering in IOCS and its advantages.	CO 2	PO 2	10
			OR			
	10	a)	Explain the role of metadata in file systems.	CO 2	PO 2	10
		b)	Describe the role of a directory structure in a file system. How does a directory differ from a file?	CO 2	PO1	10

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