Roll No.												

PRESIDENCY UNIVERSITY

BENGALURU

End - Term Examinations – December 2025

Date: 13 – 12-2025 **Time:** 09:30am – 12:30pm

School: SOIS	**Program:** BCA	
Course Code: CSA2506	**Course Name:** Operating Systems and Unix Programming	
Semester: III	**Max Marks**: 100	**Weightage**: 50%

CO - Levels	CO1	CO2	CO3	CO4	CO5
Marks	26	26	24	24	--

Instructions:

(i) Read all questions carefully and answer accordingly.

(ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks. 10Q x 2M=20M

1.	List any three functions of an Operating System.	**2 Marks**	**L1**	**CO1**
2.	Differentiate Program and Process.	**2 Marks**	**L1**	**CO1**
3.	What is multitasking? Give an example.	**2 Marks**	**L1**	**CO1**
4.	Discuss about process control block (PCB)?	**2 Marks**	**L1**	**CO2**
5.	What is a thread? How is it different from a Kernel?	**2 Marks**	**L1**	**CO2**
6.	Define preemptive scheduling algorithm?	**2 Marks**	**L1**	**CO2**
7.	Differentiate between internal and external fragmentation.	**2 Marks**	**L1**	**CO3**
8.	Define virtual memory? How is it implemented?	**2 Marks**	**L1**	**CO3**
9.	What is a page fault and page hit?	**2 Marks**	**L1**	**CO4**
10.	Describe the necessary condition of deadlock?	**2 Marks**	**L1**	**CO4**

Part B

Answer the Questions. **Total Marks 80M**

11.	**a.**	Explain the major operations of an Operating System in detail.	**10 Marks**	**L1**	**CO1**
	b.	What is operating system? Explain different types of operating system in detail.	**10 Marks**	**L1**	**CO1**
		Or			
12.	**a.**	Demonstrate the services of the operating system that are helpful for the user and the system.	**10 Marks**	**L1**	**CO1**
	b.	Explain different operating system structures with neat sketch.	**10 Marks**	**L1**	**CO1**

13.	**a.**	Apply **FCFS** Algorithm and Consider the following table of arrival time and burst time for three processes P1, P2 and P3 **Process** / **Arrival Time** / **Burst Time** **P1** / 2 / 6 **P2** / 0 / 4 **P3** / 1 / 9 Calculate Average Waiting Time, Average Completion Time and Average Turn Around Time.	**10 Marks**	**L3**	**CO2**
	b.	Explain in detail the multithreading model, its advantages and disadvantages with suitable illustration.	**10 Marks**	**L1**	**CO2**
		Or			
14.	**a.**	What is Interprocess Communication (IPC)? Explain different models of IPC in detail.	**10 Marks**	**L1**	**CO2**
	b.	Explain the Process states with suitable diagram.	**10 Marks**	**L1**	**CO2**

15.	**a.**	Explain in detail the different memory allocation techniques used by operating systems.	**10 Marks**	**L1**	**CO3**
	b.	Write short notes on: (i) Memory fragmentation (ii) Compaction	**10 Marks**	**L1**	**CO3**
		Or			

<table>
<tr><td>16.</td><td>a.</td><td>Apply page reference string 1, 3, 0, 3, 5, 6, 3 with 3-page frames. Find the number of page faults and page hit using FIFO Page Replacement Algorithm.</td><td>10 Marks</td><td>L3</td><td>CO3</td></tr>
<tr><td></td><td>b.</td><td>Explain the concept of virtual memory and its implementation.</td><td>10 Marks</td><td>L1</td><td>CO3</td></tr>
</table>

<table>
<tr><td>17.</td><td>a.</td><td>Discuss the Strategies for Handling Deadlock in an Operating System. Explain Each Strategy in Detail.</td><td>10 Marks</td><td>L1</td><td>CO4</td></tr>
<tr><td></td><td>b.</td><td>Applying a system with five processes P0 through P4 and three resources of type A, B, C. Resource type A has 10 instances, B has 5 instances and type C has 7 instances. Suppose at time t0 following snapshot of the system has been taken:
<table>
<tr><th>Process</th><th>Allocation</th><th>Max</th><th>Available</th></tr>
<tr><td></td><td>A B C</td><td>A B C</td><td>A B C</td></tr>
<tr><td>P_0</td><td>0 1 0</td><td>7 5 3</td><td>3 3 2</td></tr>
<tr><td>P_1</td><td>2 0 0</td><td>3 2 2</td><td></td></tr>
<tr><td>P_2</td><td>3 0 2</td><td>9 0 2</td><td></td></tr>
<tr><td>P_3</td><td>2 1 1</td><td>2 2 2</td><td></td></tr>
<tr><td>P_4</td><td>0 0 2</td><td>4 3 3</td><td></td></tr>
</table>
Q1. What will be the content of the Need matrix?
Q2. Is the system in a safe state? If yes, then what is the safe sequence?</td><td>10 Marks</td><td>L3</td><td>CO4</td></tr>
<tr><td colspan="6">Or</td></tr>
<tr><td>18.</td><td>a.</td><td>Explain the methods for handling deadlocks in an operating system.</td><td>10 Marks</td><td>L1</td><td>CO4</td></tr>
<tr><td></td><td>b.</td><td>Explain Monitors and How They Differ from Semaphores.</td><td>10 Marks</td><td>L1</td><td>CO4</td></tr>
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