Roll No.											

PRESIDENCY UNIVERSITY

BENGALURU

End - Term Examinations –December 2025

Date: 10- 12- 2025 **Time:** 1.00pm to 04.00pm

School: SOCSE	**Program:** B.Tech.,	
Course Code: CSE2269	**Course Name:** Operating Systems	
Semester: V	**Max Marks**:100	**Weightage**: 50%

CO - Levels	CO1	CO2	CO3	CO4	CO5
Marks	12	26	26	26	20

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.	Define Operating System.	**2 Marks**	**L1**	**CO1**
2.	Differentiate Loader and Linker.	**2 Marks**	**L2**	**CO1**
3.	How is the program differed from the process?	**2 Marks**	**L2**	**CO2**
4.	Define Thread. Give its types.	**2 Marks**	**L1**	**CO2**
5.	State the key requirements of a critical-section.	**2 Marks**	**L1**	**CO3**
6.	List out the necessary conditions for deadlock.	**2 Marks**	**L1**	**CO3**
7.	Define Deadlock. Give an example.	**2 Marks**	**L1**	**CO3**
8.	Differentiate base and limit register.	**2 Marks**	**L2**	**CO4**
9.	What is dynamic loading?	**2 Marks**	**L1**	**CO4**
10.	Define page fault.	**2 Marks**	**L1**	**CO4**

Part B

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

<table>
<tr><td>11.</td><td>a.</td><td>Explain in detail about the operating system services.</td><td>10 Marks</td><td>L2</td><td>CO1</td></tr>
<tr><td></td><td>b.</td><td>Discuss in detail about the operating system operations with neat diagram.</td><td>10 Marks</td><td>L2</td><td>CO1</td></tr>
<tr><td colspan="6">Or</td></tr>
<tr><td>12.</td><td>a.</td><td>What is system call? Explain its types in detail.</td><td>10 Marks</td><td>L2</td><td>CO1</td></tr>
<tr><td></td><td>b.</td><td>Describe the operating system structure in detail with neat diagram.</td><td>10 Marks</td><td>L2</td><td>CO1</td></tr>
</table>

<table>
<tr><td>13.</td><td>a.</td><td>Discuss the Process States and Process Control Block (PCB) with neat diagram.</td><td>10 Marks</td><td>L2</td><td>CO2</td></tr>
<tr><td></td><td>b.</td><td>Apply FCFS and SJF (non-preemptive) scheduling to find the average turnaround time and average waiting time for each algorithm. Show the Gantt chart for both schedules.
<table>
<tr><th>Process No</th><th>Arrival Time</th><th>Burst Time</th></tr>
<tr><td>P1</td><td>0</td><td>7</td></tr>
<tr><td>P2</td><td>2</td><td>4</td></tr>
<tr><td>P3</td><td>4</td><td>1</td></tr>
<tr><td>P4</td><td>5</td><td>4</td></tr>
<tr><td>P5</td><td>6</td><td>3</td></tr>
</table>
For each algorithm:
1. Draw the Gantt chart.
2. Compute completion time, turnaround time, and waiting time for every process.
3. Report the average turnaround time and average waiting time.</td><td>10 Marks</td><td>L3</td><td>CO2</td></tr>
<tr><td colspan="6">Or</td></tr>
<tr><td>14.</td><td>a.</td><td>Explain in detail about the Inter Process Communication.</td><td>10 Marks</td><td>L2</td><td>CO2</td></tr>
<tr><td></td><td>b.</td><td>Apply Round Robin (RR) Scheduling (Time Quantum = 4 ms) and Priority Scheduling (non-preemptive) to find the average turnaround time and average waiting time. Show the Gantt chart for both algorithms.
<table>
<tr><th>Process No</th><th>Arrival Time (ms)</th><th>Burst Time (ms)</th><th>Priority (lower value = higher priority)</th></tr>
<tr><td>P1</td><td>0</td><td>9</td><td>2</td></tr>
<tr><td>P2</td><td>1</td><td>5</td><td>1</td></tr>
<tr><td>P3</td><td>2</td><td>7</td><td>3</td></tr>
<tr><td>P4</td><td>3</td><td>4</td><td>2</td></tr>
</table>
For each scheduling algorithm:
1. Draw the Gantt chart.
2. Compute Completion Time, Turnaround Time, and Waiting Time for every process.
Report the average turnaround time and average waiting time.</td><td>10 Marks</td><td>L3</td><td>CO2</td></tr>
</table>

<table>
<tr><td>15.</td><td>a.</td><td>Apply the Peterson’s solution to solve the critical section problem.</td><td>10 Marks</td><td>L3</td><td>CO3</td></tr>
<tr><td></td><td>b.</td><td>Solve the Readers and Writers Problems using semaphore.</td><td>10 Marks</td><td>L3</td><td>CO4</td></tr>
<tr><td colspan="6" align="center">Or</td></tr>
<tr><td>16.</td><td>a.</td><td>Explain the methods how deadlock can be avoided? Assume that there are 5 processes from P0 through P4. There are 3 resources types: A(10 instances), B(4 instances), and C(7 instances). Snapshot at time T_0:
<table>
<tr><td rowspan="2">Process</td><td colspan="3">Allocation</td><td colspan="3">Max</td></tr>
<tr><td>A</td><td>B</td><td>C</td><td>A</td><td>B</td><td>C</td></tr>
<tr><td>P0</td><td>1</td><td>0</td><td>2</td><td>3</td><td>2</td><td>2</td></tr>
<tr><td>P1</td><td>2</td><td>1</td><td>1</td><td>4</td><td>2</td><td>2</td></tr>
<tr><td>P2</td><td>3</td><td>0</td><td>2</td><td>5</td><td>2</td><td>4</td></tr>
<tr><td>P3</td><td>1</td><td>1</td><td>0</td><td>3</td><td>3</td><td>1</td></tr>
<tr><td>P4</td><td>0</td><td>1</td><td>1</td><td>4</td><td>2</td><td>3</td></tr>
</table>
Available = (3, 1, 1)
Use Banker’s algorithm to check whether the system is in a safe state or not.</td><td>10 Marks</td><td>L3</td><td>CO3</td></tr>
<tr><td></td><td>b.</td><td>Discuss about the Resource allocation graph in detail with an example. Discuss the methods for handling deadlock in detail.</td><td>10 Marks</td><td>L3</td><td>CO4</td></tr>
</table>

<table>
<tr><td>17.</td><td>a.</td><td>Describe in detail about
1. Address binding
2. Swapping</td><td>10 Marks</td><td>L2</td><td>CO5</td></tr>
<tr><td></td><td>b.</td><td>Discuss in detail about the paging and structure of the page table.</td><td>10 Marks</td><td>L2</td><td>CO5</td></tr>
<tr><td colspan="6" align="center">Or</td></tr>
<tr><td>18.</td><td>a.</td><td>Assume that there are 3 page frames which are initially empty. If the page reference string is 2, 4, 1, 3, 5, 2, 4, 6, 1, 3, and 7, find the number of page faults using the optimal replacement policy.</td><td>10 Marks</td><td>L3</td><td>CO5</td></tr>
<tr><td></td><td>b.</td><td>Describe in detail about
1. Segmentation
2. Pure Demand Paging</td><td>10 Marks</td><td>L2</td><td>CO5</td></tr>
</table>