JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2025

M.Tech-2nd Semester (CSE/IT)

COURSE CODE (CREDITS): 10M11CI212(3) MAX. MARKS: 25

COURSE NAME: ADVANCED OPERATING SYSTEMS

COURSE INSTRUCTORS: Dr. Pankaj Dhiman MAX. TIME: 1 Hour 30 Min

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Note: *(a) All questions are compulsory.*

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

<table>
<tr><th>Q.No</th><th>Question</th><th>CO</th><th>Marks</th></tr>
<tr><td>Q1</td><td>Consider the following processes with Time Quantum = 2. Compute average Completion Time (CT), Turnaround Time (TAT), and Waiting Time (WT) for each process. Explain which time quantum performs better and why?

<table>
<tr><th>Process</th><th>Arrival Time (ms)</th><th>Arrival Time (ms)</th></tr>
<tr><td>P1</td><td>0</td><td>10</td></tr>
<tr><td>P2</td><td>0</td><td>6</td></tr>
<tr><td>P3</td><td>1</td><td>7</td></tr>
<tr><td>P4</td><td>3</td><td>4</td></tr>
<tr><td>P5</td><td>5</td><td>5</td></tr>
</table></td><td>2</td><td>7</td></tr>
<tr><td>Q2</td><td>What is a critical section problem in IPC? Explain how a race condition occurs in a multi-threaded environment?</td><td>3</td><td>4</td></tr>
<tr><td>Q3</td><td>Why does Peterson's Algorithm work only for two processes? Can it be extended for more than two processes?</td><td>3</td><td>4</td></tr>
<tr><td>Q4</td><td>Consider this program and compute the total number of processes created (Child and Parent process).
<pre>#include <stdio.h>
#include <unistd.h>
int main() {
    for (int i = 0; i < 3; i++) {
        fork();
    }
    printf("Hello\n");
    return 0;
}</pre></td><td>1</td><td>3</td></tr>
<tr><td>Q5</td><td>Consider the following processes with burst times and arrival times: Apply the Shortest Remaining Time First (SRTF) scheduling algorithm. Compute average Completion Time (CT), Turnaround</td><td>2</td><td>7</td></tr>
</table>

Time (TAT), and Waiting Time (WT) for each process.

Process	Arrival Time (ms)	Arrival Time (ms)
P1	0	12
P2	2	4
P3	3	6
P4	5	5
P5	8	2