JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2025

B.Tech-4th Semester (CSE)

COURSE CODE (CREDITS): 18B1CI411 (3) MAX. MARKS: 15

COURSE NAME: Operating System

COURSE INSTRUCTORS: ATA, SMA, PTK, PDN

MAX. TIME: 1 Hour

Note: *(All questions are compulsory.*

Q.No	Question	CO	Marks

Q1	How many processes will be created after the successful execution of the following code? Draw a tree showing the hierarchy of parent-child processes with brief explanation. Also write down the output produced by this code.
	`#include<stdio.h>`
	`#include<unistd.h>`
	`int main ( )`
	`{`
	`if (fork ( ) || fork ( ))`
	`{`
	`if(fork ( ) && fork ( ))`
	`{`
	`fork ( );`
	`}`
	`}`
	`printf("JUIT\n");`
		2	1+1+1

Q2	Differentiate between User-Level Threads and Kernel-Level Threads with an example for each. List key benefits of using threads in an operating system.	2	2+1
Q3	Consider the set of 5 processes whose arrival time and burst time are given below	3	3

	<table><tr><th>Process Id</th><th>Arrival time</th><th>Burst time</th><th>Priority</th></tr><tr><td>P1</td><td>0</td><td>4</td><td>2</td></tr><tr><td>P2</td><td>1</td><td>3</td><td>3</td></tr><tr><td>P3</td><td>2</td><td>1</td><td>4</td></tr><tr><td>P4</td><td>3</td><td>5</td><td>5</td></tr><tr><td>P5</td><td>4</td><td>2</td><td>5</td></tr></table> If the CPU scheduling policy is priority preemptive, calculate the average waiting time and average turn around time. (Higher number represents higher priority).		
Q4	Consider four processes scheduled on a CPU as per round robin algorithm with a time quantum of 4. The processes arrive in the order P Q R and S all at a time t=0. There is exactly one context switch from S to Q, exactly one context switch from R to Q and exactly two context switches from Q to R. There is no context switch from S to P. Switching to a ready process after the termination of another process is also considered a context switch. Which one of the following is not possible as CPU burst time (in time units) of these processes? A. $P = 4, Q = 10, R = 6, S = 2$ B. $P = 2, Q = 9, R = 5, S = 1$ C. $P = 4, Q = 12, R = 5, S = 4$ D. $P = 3, Q = 7, R = 7, S = 3$	3	3
Q5	a. How does the operating system use the PCB to track the state of each process? b. In a multi-core processor system, how does the operating system handle context switching across multiple cores	1	1.5*2

ALL THE BEST