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Daffodil International University

Department of Software Engineering
Faculty of Science & Information Technology
Midterm Examination, Fall 2024
Course Code: SE 232; Course Title: Operating System & System Program
Sections & Teachers: 40(A-I), BH, IS, SSD

Time: 1 Hour 30 Mins **Marks: 25**

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1. You are the lead systems architect at **QuantumTech**, a company that's developing a new class of smart drones. These drones are equipped with sophisticated hardware, including real-time image processing units. The drones operate on a custom-built, real-time operating system that employs dual-mode operation to manage system resources and handle critical tasks such as flight control, real-time image processing, and communication with ground stations.

a)	**Describe** how the dual-transition mode of an operating system works for the task.	[Marks-5]	**CLO-1** *Level-1*
b)	**State** how many queues are maintained to represent the process scheduling?	[Marks-5]	

2. *a)* You're a software developer working on a new project, simultaneously using your computer for multiple tasks. Each task gets enough fixed CPU time to function smoothly. **Demonstrate** the operating system of your work environment. [Marks-5] **CLO-2** *Level-3*

PID	Arrival Time	Burst Time	Priority
P1	0	4	5
P2	1	5	2
P3	2	2	1
P4	3	1	5
P5	4	6	4
P6	6	3	3

b) **Apply** the Round Robin CPU Scheduling algorithm (**quantum=2**) considering the scenario and calculate the average waiting time and turnaround time. [Marks-5]

c) **Apply** the preemptive version of the scheduling algorithm based on priority for the above scenario to find out the average waiting time and turnaround time. (High Priority = 1) [Marks-5]