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Daffodil International University
Department of Computing and Information System
Faculty of Science & Information Technology
Final Examination, Fall 2024
Course Code: CIS 232
Course Title: Operating Systems

Time: 02:00 Hours **Marks: 40**

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

1. a) What do you mean by process? Explain the process state diagram? [3]

   b) How does a CPU switch from one process to another, and what steps are involved in making this transition? [3]

   c) What is a Process Control Block (PCB) in the context of operating systems, and what specific information does it typically store for each process? How is the PCB used in process management and scheduling within an operating system? [4] CO2

2. a) Consider the following set of processes with their respective arrival times and burst times (in milliseconds) provided below. [5]

Process	Arrival time	Burst time
P1	0	5
P2	1	3
P3	2	1
P4	3	2
P5	4	3

   If the CPU scheduling policy is Round Robin with time quantum = 2 unit, calculate the average waiting time and average turnaround time. CO3

   b) Which of the following scheduling algorithms could result in starvation? Justify your answer. [3]

   i. First-come, First served
   ii. Shortest Job First
   iii. Round robin
   iv. Priority

   c) Differentiate between preemptive and non-preemptive CPU scheduling. [2]

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3. Consider the following snapshot of a system:

	Allocation	Max	Available
	A B C D	A B C D	A B C D
P0	0 0 1 2	0 0 1 2	1 5 2 0
P1	1 0 0 0	1 7 5 0	
P2	1 3 5 4	2 3 5 6	
P3	0 6 3 2	0 6 5 2	
P4	0 0 1 4	0 6 5 6	

Answer the following questions using the banker's algorithm:

a) What is the content of the matrix Need? [2]

b) Is the system in a safe state? Describe with proper explanation. [4]

c) If a request from process P1 arrives for (0,4,2,0), can the request be granted immediately? [4] CO4

4. a) State the differences between Paging and Segmentation. [3]

b) Explain the concept of contiguous allocation in main memory within the context of operating systems. [2]

c) Consider the following reference string, and also page frame size is three. [5]

7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 1, 2, 0

CO5

i. Find total number of page fault using Optimal Page Replacement Algorithm.

ii. Find total number of page Hits.

iii. Find page fault and page hits ratio.

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