Daffodil International University

Faculty of Science & Information Technology

Department of Computer Science & Engineering

Final Examination, Summer 2025

Course Code: CSE 323, Course Title: Operating Systems

Level: 3 Term: 3 Batch: 62

Time: 02:00 Hrs **Marks: 40**

Answer ALL Questions [Optional]

[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)*** You are designing a ticket booking system where multiple agents can book tickets from the same pool concurrently. Design the system using semaphores to ensure that no overbooking occurs. **[5]** **CO2**

2. ***a)*** Given the resources a cloud computing platform: A = 3, B = 14, C = 12, D = 12 and the allocations are, **[5]** **CO3**

Process	Allocation	Max
	A B C D	A B C D
P0	0 0 1 2	0 0 1 2
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

Apply an appropriate algorithm to check if the system is in safe state or not. If yes then identify the safe sequence.

3. ***a)*** A system uses fixed partitioning to allocate memory to jobs. The memory blocks and job sizes are listed below. Apply Best-Fit method to determine the memory allocation. **[6]** **CO3**

Job	Size (kB)	Turnaround Time (ms)
Job 1	90	4
Job 2	20	2
Job 3	50	3
Job 4	15	1
Job 5	75	3
Job 6	25	2
Job 7	60	3

Memory Block	Size (kB)
Block 1	40
Block 2	100
Block 3	60
Block 4	120

4.	***a)***	A program references the following pages with 3 available frames: 7, 2, 3, 1, 2, 7, 2, 4, 3, 1, 2, 1. Apply the optimal page replacement algorithm and calculate the hit and miss ratio.	**[5]**	
	b)	Apply FIFO and LRU algorithms to the given pages and compare the number of page faults with the optimal one.	**[5]**	
	c)	A system has TLB access time = 30ns, memory access time = 100ns, and TLB hit ratio = 80%. Calculate the Effective Access Time (EAT). If the page is not found in the TLB, what happens next in the address translation process.	**[2]** **[2]**	
5.	***a)***	Disk queue with requests for I/O to blocks on 20, 135, 35, 70, 100, 10, 85, 140, 5, 160, 55, 180, 75, 30, 120 tracks, where each movement takes 0.25 ms. The available tracks are 200 and the initial head position is at 50. Compute total head movement and R/W time using C-LOOK (Increasing order).	**[5]**	**CO3**
	b)	SSTF or C-LOOK, which scheduling algorithm is better in minimizing the R/W time for this scenario? Justify your answer.	**[5]**	