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Even Semester Exam for Even Semester Examination-2023

Paper Name: Fundamental Concepts of Operating Systems

Paper Code: BCA 203

Time: 2.5 Hours

Maximum Marks: 60

Note: Mobile Phones or programmable calculators or any equipment with memory are not allowed inside the examination hall.

Follow proper numbering for answering the questions.

Section- A
(Attempt all questions | 20 x 1 = 20)

Q. No.	Questions	Marks	CLO	BL
1.	Operating System works as an interface between the user and the hardware. (T/F)	1	CLO1	L1
2.	"SSTF" is one of the process scheduling algorithms. (T/F)	1	CLO1	L1
3.	A scheduling is preemptive if the resources assigned to a process cannot be taken away before the execution is over. (T/F)	1	CLO1	L1
4.	A process goes from running to ready state when it has to wait for I/O. (T/F)	1	CLO1	L1
5.	Two processes can enter their critical section without disturbing data consistency. (T/F)	1	CLO3	L2
6.	MRU Page replacement algorithm requires the knowledge of future. (T/F)	1	CLO3	L1
7.	Deadlock represents a condition in which a set of blocked processes, each holding a resource, are waiting to acquire a resource held by another process. (T/F)	1	CLO1	L1
8.	Mutual exclusion is not a necessary condition for a deadlock. (T/F)	1	CLO1	L2
9.	Banker's algorithm is a deadlock avoidance algorithm. (T/F)	1	CLO3	L1
10.	A single processor system cannot support multitasking. (T/F)	1	CLO3	L1
11.	A fixed time is allotted to each process, called quantum, for execution in Round Robin Scheduling. (T/F)	1	CLO3	L1
12.	Turn-Around Time is the time that a process takes before it starts its execution. (T/F)	1	CLO3	L1
13.	Memory management refers to management of Secondary Memory. (T/F)	1	CLO3	L1
14.	LRU stands for Latest Recently Used. (T/F)	1	CLO3	L2
15.	Paging allows non-contiguous memory allocation. (T/F)	1	CLO3	L1
16.	When we want to load the page on the memory, and the page is already available on memory, then it is called page fault. (T/F)	1	CLO2	L1
17.	Virtual memory is a technique that allows the execution of processes that are not completely in memory. (T/F)	1	CLO3	L2
18.	A thread is a lightweight process. (T/F)	1	CLO2	L2
19.	Paging exhibits external fragmentation. (T/F)	1	CLO1	L4
20.	Program counter indicates the address of the current instruction being executed. (T/F)	1	CLO1	L5

Section- B
(Attempt any four questions | 4 x 5 = 20)

	Questions	Marks	CLO	BL
1.	What is a layered Operating System? Explain with the help of a suitable diagram.	5	CLO1	L2
2.	What is a Process Control Block? What are the key pieces of information that it contains?	5	CLO2	L2
3.	Discuss the Critical Section Problem and write a correct and complete solution for the same.	5	CLO2	L3
4.	Explain the working of TLB in paging.	5	CLO3	L3
5.	Define files. Write about some common file attributes.	5	CLO5	L2
6.	If it takes 20 ns to search the TLB and 100 ns to access the memory, find the effective access time for a hit ratio of 98%.	5	CLO4	L4

Section- C
(Attempt any two questions | 2 x 10 = 20)

Q. No.	Questions	Marks	CLO	BL																																																																						
1.	Consider the processes P₀, P₁, P₂, P₃, and P₄ as given in the following table: <table><tr><td>Processes</td><td>P₀</td><td>P₁</td><td>P₂</td><td>P₃</td><td>P₄</td></tr><tr><td>Burst Time</td><td>20</td><td>4</td><td>7</td><td>3</td><td>5</td></tr><tr><td>Priority</td><td>2</td><td>1</td><td>4</td><td>6</td><td>3</td></tr></table> Given that the Arrival Time for all the processes is 0, draw the Gantt chart and calculate the AWT and ART for: a) FCFS scheduling b) Priority scheduling	Processes	P ₀	P ₁	P ₂	P ₃	P ₄	Burst Time	20	4	7	3	5	Priority	2	1	4	6	3	10	CLO1	L3																																																				
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2.	What is Banker's algorithm? Find need matrix and check weather system is in safe state or not? Find the safe sequence if it exists. <table><tr><td></td><td colspan="3">ALLOCATION</td><td colspan="3">MAX</td><td colspan="3">AVAILABLE</td></tr><tr><td>Process</td><td>A</td><td>B</td><td>C</td><td>A</td><td>B</td><td>C</td><td>A</td><td>B</td><td>C</td></tr><tr><td>P₀</td><td>0</td><td>1</td><td>0</td><td>7</td><td>5</td><td>3</td><td>3</td><td>3</td><td>2</td></tr><tr><td>P₁</td><td>2</td><td>0</td><td>0</td><td>3</td><td>2</td><td>2</td><td></td><td></td><td></td></tr><tr><td>P₂</td><td>3</td><td>0</td><td>2</td><td>9</td><td>0</td><td>2</td><td></td><td></td><td></td></tr><tr><td>P₃</td><td>2</td><td>1</td><td>1</td><td>2</td><td>2</td><td>2</td><td></td><td></td><td></td></tr><tr><td>P₄</td><td>0</td><td>2</td><td>2</td><td>4</td><td>3</td><td>3</td><td></td><td></td><td></td></tr></table>		ALLOCATION			MAX			AVAILABLE			Process	A	B	C	A	B	C	A	B	C	P ₀	0	1	0	7	5	3	3	3	2	P ₁	2	0	0	3	2	2				P ₂	3	0	2	9	0	2				P ₃	2	1	1	2	2	2				P ₄	0	2	2	4	3	3				10	CLO3	L4
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3.	Consider the following reference string: 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1 For a system with 3 frames, compute the number of page faults if the following page replacement algorithms are used: a) LRU b) Optimal	10	CLO4	L5																																																																						
4.	Consider the following request queue: 98, 183, 37, 122, 14, 124, 65, 67 Given that there are 200 blocks and the head starts at 53, find the total head movement for the following algorithms: a) FCFS b) SSTF	10	CLO5	L4																																																																						

BL – Bloom's Taxonomy Levels

(1-Remembering, 2-Understanding, 3-Applying, 4-Analyzing, 5-Evaluating, 6-Creating)