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Supplementary/Improvement Examination (for Even Semester Examination-2024)
Paper Name: Fundamental Concepts of Operating Systems Paper Code: BCA 203/BSC 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 applications. (T/F)	1	CLO1	L1
2.	In Peer-to-Peer Computing environment, there is no fixed hierarchy among the nodes.	1	CLO1	L1
3.	A Real Time Operating System has well defined and fixed time constraints. (T/F)	1	CLO1	L1
4.	Seek time is the time for the disk arm to move the heads to the cylinder containing the desired sector. (T/F)	1	CLO1	L1
5.	Two processes can enter their critical section without disturbing data consistency. (T/F)	1	CLO3	L2
6.	Belady's anomaly is exhibited in Optimal page-replacement algorithm. (T/F)	1	CLO3	L1
7.	Dynamic loading of program refers to the strategy in which a routine is loaded much before it is called. (T/F)	1	CLO1	L1
8.	Hold and Wait a necessary condition for a deadlock. (T/F)	1	CLO1	L2
9.	Multilevel Feedback Queue Scheduling is a Process Scheduling algorithm. (T/F)	1	CLO3	L1
10.	Multitasking is a logical extension of time sharing. (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.	Waiting 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.	RAG stands for Resource Application Graph. (T/F)	1	CLO3	L2
15.	Paging allows contiguous memory allocation. (T/F)	1	CLO3	L1
16.	Internal Fragmentation is least in best fit allocation in fixed size partitioning. (T/F)	1	CLO2	L1
17.	Belady's anomaly is exhibited in FIFO page-replacement algorithm. (T/F)	1	CLO3	L2
18.	LRU stands for Latest Recently Used. (T/F)	1	CLO2	L2
19.	Program counter indicates the address of the current instruction being executed. (T/F)	1	CLO1	L2
20.	A thread is a lightweight process. (T/F)	1	CLO1	L1

Section- B

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

	Questions	Marks	CLO	BL
1.	What is a layered Operating System? Explain the advantages and disadvantages of MS-DOS layered structure.	5	CLO1	L2
2.	Discuss the dual mode of operation of an operating system.	5	CLO2	L2
3.	Discuss the Critical Section Problem. What are the criteria for correctness of a solution to the Critical Section Problem?	5	CLO2	L3
4.	What are the necessary conditions that should hold simultaneously for deadlock to occur?	5	CLO3	L3
5.	Give an account of some popular computing environments.	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)

<table>
<tr><th>Q. No.</th><th>Questions</th><th>Marks</th><th>CLO</th><th>BL</th></tr>
<tr><td>1.</td><td>What is Process Scheduling? Explain. Consider the following table:
<table>
<tr><td>Process</td><td>P1</td><td>P2</td><td>P3</td></tr>
<tr><td>Burst time (ms)</td><td>24</td><td>11</td><td>13</td></tr>
</table>
Draw a Gantt chart and calculate the Average Waiting Time and the Average Turn-around Time for each of the following:
a) FCFS scheduling
b) SJF scheduling
c) Round Robin Scheduling (Time Quantum = 4 ms)</td><td>10</td><td>CLO1</td><td>L3</td></tr>
<tr><td>2.</td><td>Discuss, with suitable examples, the various Page replacement algorithms.</td><td>10</td><td>CLO3</td><td>L4</td></tr>
<tr><td>3.</td><td>What is Banker's algorithm? Given that the resource type A has 10 instances, B has 5 instances, and C has 7 instances. 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">AVAILABE</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>P_0</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>P_1</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>P_2</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>P_3</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>P_4</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></td><td>10</td><td>CLO4</td><td>L5</td></tr>
<tr><td>4.</td><td>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</td><td>10</td><td>CLO5</td><td>L4</td></tr>
</table>

BL – Bloom's Taxonomy Levels

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