

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Summer Examination – 2023

Course: B. Tech. Branch: Computer Engineering

Semester: IV

Subject Code & Name: BTCOC402 Operating System

Max Marks: 60

Date: 15.07.2023

Duration: 3 Hr.

Instructions to the Students:

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in () in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

	(Level)	Marks
Q. 1 Solve Any Two of the following.		12
A) Describe memory layout of multiprogramming operating system. State its advantages.	Understand	6
B) Discuss design goals, policies and implementation of a typical operating system.	Understand	6
C) Explain Virtual Machine (VM) based structure of operating system.	Remember	6

Q.2 Solve Any Two of the following.		12	4
A) Describe the contents of Process Control Block (PCB).	Remember	6	✓
B) Explain the role of long term, short term and middle term scheduler in process scheduling.	Analyze	6	
C) Consider the following set of processes to be executing on uniprocessor system.	Apply	6	

Processes	AT	BT
A	0	3
B	2	6
C	4	4
D	7	2

Draw the Gantt Chart and calculate average turnaround time and average waiting time for

- i) SJF Non-preemptive
- ii) SJF Preemptive

Q. 3 Solve Any One of the following.		12	4
A) Explain the use of Resource Allocation Graph (RAG) in deadlock detection.	Analyze	6	
B) Write a pseudocode of Swap instruction used for process synchronization.	Understand	6	
C) Examine banker's algorithm for following snapshot of the system, there are 3 processes, P1, P2 and P3. And 3 resource types, R1, R2 and R3.	Apply	6	

There are 12 instances of resource type R1, 11 instances of resource type R2 and 20 instances of resource type R3.

At time T₀, the situation is as follows-

Processes	Allocated Resources			Maximum resources		
	R1	R2	R3	R1	R2	R3
P1	2	2	3	3	6	8
P2	2	0	3	4	3	3
P3	1	2	4	3	4	4

State-

- Contents of matrix Need.
- Is the system in a safe state at T₀?

Q.4 Solve Any Two of the following.

12

- A)** Consider the page reference string-
4, 7, 6, 1, 7, 6, 1, 2, 7, 2.

Apply

6

If there is there is three-page frames, calculate page faults for following algorithms-

- FIFO page replacement
- LRU page replacement
- Optimal page replacement

- B)** Explain paging mechanism with neat diagram. State the importance of offset in it.

Understand

6

- C)** Discuss the need of page replacement. Differentiate between local and global page replacement.

Analyze

6

Q.5 Solve Any One of the following.

12

- A)** Explain the concept of file. State various file operations.

Remember

6

- B)** Discuss linked and index disk space allocation methods with neat sketch.

Understand

6

- C)** Write a note on free space management.

Understand

6

*** End ***

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