

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular End Semester Examination – Summer 2022

Course: B. Tech.

Branch : IT

Semester :VI

Subject Code & Name: Operating Systems

Max Marks: 60

Date: 17/08/2022

Duration: 3.45 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/CO)	Marks																		
<b>Q.1 Solve Any Two of the following.</b>																				
A) Define OS. List and explain any four services provided by an operating system.	Remember / CO2	6																		
B) Define process. Explain process control block.	Remember / CO2	6																		
C) Define system call. Enlist and explain types of system calls.	Remember / CO2	6																		
<b>Q.2 Solve Any Two of the following.</b>																				
A) Draw and explain process state diagram.	Understand / CO3	6																		
B) Consider the following set of processes, with the length of the CPU burst given in milliseconds:	Apply / CO3	6																		
<table><thead><tr><th>Process</th><th>Burst Time</th><th>Arrival Time</th></tr></thead><tbody><tr><td>P1</td><td>3</td><td>0</td></tr><tr><td>P2</td><td>1</td><td>1</td></tr><tr><td>P3</td><td>6</td><td>3</td></tr><tr><td>P4</td><td>6</td><td>7</td></tr><tr><td>P5</td><td>5</td><td>8</td></tr></tbody></table>			Process	Burst Time	Arrival Time	P1	3	0	P2	1	1	P3	6	3	P4	6	7	P5	5	8
Process	Burst Time	Arrival Time																		
P1	3	0																		
P2	1	1																		
P3	6	3																		
P4	6	7																		
P5	5	8																		
a. Draw Gantt charts that illustrate the execution of these processes using the following scheduling algorithms: SJF preemptive and SJF non-preemptive.																				
b. What is the average waiting time in each case?																				
C) Describe in brief: i) Context switch ii) Medium term scheduler iii) External fragmentation iv) Thrashing	Understand / CO3	6																		
<b>Q.3 Solve Any One of the following.</b>																				
A) consider a system with five processes P <sub>0</sub> through P <sub>4</sub> and three resource types A, B, and C. Resource type A has ten instances, resource type B has five instances, and resource type C has seven instances.	Apply / CO4	8																		

Suppose that, at time T0, the following snapshot of the system has been taken:

	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P0	0	1	0	7	5	3	3	3	2
P1	2	0	0	3	2	2			
P2	3	0	2	9	0	2			
P3	2	1	1	2	2	2			
P4	0	0	2	4	3	3			

Calculate need matrix using Banker's algorithm. Justify safe sequence if the system is in safe state.

B) Explain paging with suitable diagram.

Understand / 8  
CO5

Q.4 Solve Any Two of the following.

A) Define Semaphore. List and explain the types of Semaphores.

Understand / 6  
CO5

B) List and explain in brief classical problems of process synchronization.

Understand / 6  
CO5

C) List and explain necessary and sufficient conditions of deadlock.

Remember / 6  
CO4

Q.5 Solve Any Two of the following.

A) Explain any two disk scheduling algorithms with suitable example.

Understand / 8  
CO6

B) Consider page reference string given below:

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

Calculate page fault ratio using First-in First-out, Optimal and Least Recently Used page replacement algorithms.

Apply / CO5 8

C) Explain RAID disk organization with suitable diagram.

Understand / 8  
CO6

\*\*\* End \*\*\*