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G.R. No.	
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PAPER CODE	U223-215 (ESE)
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**May 2023 (ENDSEM) EXAM**  
**S.Y. B.TECH. (AI and DS) (AY 2022-23 SEMESTER - II)**  
**COURSE NAME: OPERATING SYSTEM**  
**COURSE CODE: ADUA22205**  
**(PATTERN 2020)**

Time: [1Hr]

[Max. Marks: 30]

**(\*) Instructions to candidates:**

- 1) Use of scientific calculator is allowed
- 2) Use suitable data where ever required
- 3) All questions are compulsory

Question No.	Question Description	Max. Marks	CO mapped	BT Level
Q.1	a) Apply synchronization mechanisms like locks or semaphores to a multi-threaded program to avoid race conditions in shared data.	[4]	[CO3]	[ Level 3 Applying ]
	b) Define semaphores. Compare and contrast the use of binary semaphores versus counting semaphores for synchronization in multi-threaded programs.	[6]	[CO3]	[ Level 4 Analyzing ]
	OR			
	c) Evaluate the effectiveness of different solutions to the Dining Philosophers problem, including using semaphores, locks, and other synchronization mechanisms.	[6]	[CO3]	[ Level 4 Analyzing ]
Q.2	a) Discuss communication protocol followed by Operating System communicate with canonical device also provide pseudo code for the same.	[4]	[CO4]	[ Level 2 Understanding ]

	b) Compare the features and advantages of hard disk drives and flash-based SSDs in terms of storage capacity, access time, and durability.	[6]	[CO4]	[ Level 4 Analyzing ]
	<b>OR</b>			
	c) Explain the policy of a fast file system for placement of directories and files. Provide suitable diagram.	[6]	[CO4]	[Level 2 Understanding ]
<b>Q.3</b>	a) Apply the concept of checksums to detect and correct data corruption in a computer system, and implement this technique in a practical scenario.	[4]	[CO5]	[ Level 3 Applying ]
	b) Compare and contrast the network file systems NFS and AFS, including their features, advantages, and disadvantages.	[6]	[CO5]	[ Level 4 Analyzing ]
	<b>OR</b>			
	c) Examine the various modes of disk failure and identify strategies for detecting and handling errors to maintain data integrity and protection.	[6]	[CO5]	[ Level 4 Analyzing ]