R18

Code No: 155AB

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year I Semester Examinations, January - 2025

ADVANCED OPERATING SYSTEMS

(Common to CSE, IT)

Time: 3 Hours **Max. Marks: 75**

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a)	Define the term "termination detection" in distributed systems.	[2]
b)	What are the inherent limitations of a distributed system?	[3]
c)	What is the purpose of the token in token-based algorithms?	[2]
d)	What is the main concept of Maekawa's algorithm?	[3]
e)	Define the term "wait-for graph" in deadlock detection.	[2]
f)	What is the difference between prevention and detection of deadlocks?	[3]
g)	Define the purpose of distributed file systems.	[2]
h)	Write a short note on load balancing in distributed file systems.	[3]
i)	Define the term "distributed scheduling".	[2]
j)	What are the typical design issues in DSM systems?	[3]

PART – B

(50 Marks)

2.a) Differentiate between client-server and peer-to-peer architectures.
b) Summarize the issues in distributed operating systems. [5+5]

OR

3.a) Explain the concept of vector clocks and how they differ from Lamport's logical clocks.
b) Demonstrate how timestamps help in causal ordering of messages. [5+5]

4. Describe Lamport's algorithm for mutual exclusion in detail, including how it handles clock synchronization. [10]

OR

5. Analyze the Suzuki-Kasami's broadcast algorithm and explain how it minimizes message overhead while ensuring mutual exclusion. [10]

6.a) Describe the four necessary conditions for a deadlock to occur, with examples.
b) Examine the role of control organizations in distributed deadlock detection and resolution. [5+5]

OR

7.a) Illustrate the challenges involved in detecting and resolving deadlocks in distributed systems.

b) Differentiate between hierarchical and distributed deadlock detection algorithms. [5+5]

8.a) Explain the basic architectures of multiprocessor systems.

b) Analyze the challenges in designing multiprocessor operating systems. [6+4]

OR

9. Explain the following:
a) Inter-process communication
b) Distributed file systems architecture. [5+5]

10. Discuss the components of a load distributing algorithm with suitable examples. [10]

OR

11.a) Discuss the architecture and motivation for distributed shared memory systems.

b) Analyze the requirements for effective load distributing in distributed systems. [6+4]

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