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Question Paper Code: 1047241

B.E. / B.Tech. DEGREE EXAMINATIONS, NOV/ DEC 2024
Seventh Semester
Computer Science and Engineering
U20CS701 – INFORMATION STORAGE MANAGEMENT
(Regulation 2020)

Time: Three Hours Maximum: 100 Marks

Answer ALL questions

PART – A (10 x 2 = 20 Marks)

1. List the activities involved in managing a data center.

2. Mention the component that constitutes the disk service time; also highlight the component that contributes the largest percentage of the disk service time in random I/O operation.

3. How does SCSI differ from other disk drive interfaces?

4. Analyze the key benefits of Network Attached Storage (NAS) compared to DAS or SAN?

5. Identify the role of Fixed Content in the context of archives?

6. Mention the challenges of storage virtualization.

7. State the importance of Information Availability in BC.

8. Differentiate Backup and Restore operations.

9. Define the terms "Source" and "Target" in Local Replication.

10. Mention two key considerations for Network Infrastructure in Remote Replication.

PART – B (5 x 16 = 80 Marks)

11. (a) A company is planning to upgrade its storage systems in order to handle their growing data needs and to reduce the operational costs and delays in accessing critical information. Evaluate the evolution of storage technology and architecture in addressing modern data storage needs. How can an effective Data Center Infrastructure help resolve the company's issues with information storage and management? (16)

(OR)

(b) (i) Discuss the impact of random and sequential IO in different RAID configurations. (8)

(ii) Explain the process of data recovery in case of a device failure in RAID 5. (8)

12. (a) (i) Compare and contrast Direct-Attached Storage (DAS) and Network Attached Storage (NAS). Discuss their benefits, limitations, and typical use cases in enterprise environments. (8)

(ii) Explain the evolution of SCSI from traditional SCSI to Parallel SCSI, and its impact on storage performance. Also, discuss the SCSI Command Model. (8)

(OR)

(b) Consider a scenario where a financial institution is migrating to a hybrid cloud setup and needs to implement a Network Attached Storage (NAS) solution to support file sharing between cloud and on-premise infrastructure. Discuss the key benefits of NAS in a hybrid cloud environment and the components that are essential for effective NAS deployment. Also, explore the role of NAS file I/O operations and file-sharing protocols in ensuring seamless data accessibility. (16)

13. (a) Is it possible to deploy iSCSI and FCIP together in the same distributed network for an IP SAN? If so, how would you design such a hybrid solution, and what considerations need to be taken into account to ensure interoperability, performance, and management efficiency? (16)

(OR)

(b) Explain the evolution of storage technologies from traditional SAN and NAS to Content-Addressed Storage (CAS) and virtualized storage environments. Analyze how each advancement has addressed specific business needs and technical challenges in data management, retrieval, and long-term archiving. (16)

14. (a) A company having a business continuity plan in place, the recovery took longer than expected, causing significant revenue loss when it is experiencing a data center outage. Analyze the shortcomings of the company's Business Continuity (BC) plan. Discuss the key components of a well-structured BC Planning Lifecycle that could have minimized the downtime and improved recovery efforts. (16)

(OR)

(b) Discuss the backup technologies and topologies suitable for NAS environments, and explain how they address the unique requirements of networked storage systems. (16)

15. (a) A healthcare provider is upgrading its Electronic Health Records (EHR) system and needs to implement a robust replication strategy to ensure data availability and compliance with regulations. Compare and contrast the uses of local replicas versus remote replication for this scenario. Discuss the modes of remote replication that could be employed, the technologies involved, and how you would address potential network infrastructure challenges. (16)

(OR)

(b) Analyze the various modes of remote replication and associated technologies. Discuss how different network infrastructures influence the choice and implementation of remote replication strategies. (16)

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