Question Bank

Unit 2: Cloud Enabling Technologies

1. Identify the key components of a data center and describe how they support cloud computing services.

2. Examine the fundamental considerations for designing an energy-efficient data center and explain their impact on sustainability.

3. Define virtualization and illustrate its significance in cloud computing with real-world applications.

4. Analyze the advantages and challenges of server virtualization in terms of performance, cost, and scalability.

5. Compare and contrast hardware-level and software-level virtualization, highlighting their use cases and limitations.

6. Explain the concept of network virtualization and evaluate its role in optimizing modern data centers.

7. Illustrate the essential components of a virtualization architecture and justify their importance in cloud environments.

8. Describe the role of a hypervisor in virtualization and differentiate between Type 1 and Type 2 hypervisors with examples.

9. Suggest best practices for managing a virtualized environment and justify their effectiveness in maintaining performance and security.

10. Discuss the key challenges in managing a virtualized data center and propose solutions to mitigate them.

11. Distinguish between hosted and bare-metal hypervisors and assess their suitability for different deployment scenarios.

12. Evaluate the critical factors to consider when choosing a hypervisor for a specific cloud computing environment.

13. Illustrate how CPU virtualization operates and analyze its benefits in cloud infrastructures.

14. Examine various memory virtualization techniques and explain how they enhance resource allocation in virtualized systems.

15. Scenario: A cloud service provider experiences significant performance bottlenecks due to inefficient I/O device virtualization, leading to increased latency and degraded system responsiveness. Task: Investigate the root causes of these I/O virtualization complexities and propose innovative solutions to optimize performance and resource allocation.

16. Scenario: A technology startup wants to improve computing efficiency by deploying virtual clusters for its cloud-based AI training workloads. Task: Define virtual clusters and demonstrate how their implementation can enhance computational efficiency, scalability, and fault tolerance for the startup's cloud environment.

17. Scenario: A company managing a large-scale virtualized data center is struggling with resource allocation inefficiencies, leading to underutilization of computing resources. Task: Outline effective strategies for resource management that can maximize performance and assess how these strategies impact system scalability and cost-effectiveness.

18. Scenario: A multinational organization is transitioning to a fully automated data center using virtualization but faces challenges in optimizing workflows and reducing manual intervention. Task: Explain how virtualization facilitates automation in data centers and analyze its influence on operational efficiency, including downtime reduction and workload balancing.

19. Scenario: A cloud provider is considering implementing orchestration tools to streamline the management of its expanding virtualized environment but is unsure of the benefits. Task: Explore the role of orchestration tools in automating virtual machine deployments, monitoring, and scaling, and justify their necessity in ensuring efficient cloud operations.

20. Scenario: A company implementing data center automation through virtualization has encountered both efficiency improvements and unexpected operational challenges. Task: Critique the advantages and drawbacks of virtualization-driven automation in data centers and propose enhancements to optimize cost savings, system reliability, and scalability.