

## **14 MARKS**

1. A SaaS company specializing in AI-powered video analytics needs a cost-efficient virtualization architecture to handle high-volume video processing while ensuring scalability and performance. Design an optimized solution that balances compute, storage, and networking costs, considering factors like GPU acceleration, cloud vs. on-premises deployment, and resource allocation strategies. What technologies and approaches would you recommend?
2. A financial institution is migrating its critical applications to a virtualized environment. Design a secure virtualization architecture that ensures strong data isolation, fault tolerance, and minimal downtime, considering the risks of cyber threats, hardware failures, and high availability requirements. What technologies and best practices would you implement to achieve this?
3. A media production company uses an Aneka-based video rendering cloud to process high-resolution videos. However, due to fluctuating workloads, their system experiences resource underutilization during low demand and performance bottlenecks during peak demand. Design an optimized resource allocation model that dynamically adjusts computing resources to ensure cost efficiency, scalability, and consistent performance. What strategies and technologies would you implement to achieve this?
4. A global enterprise needs to deploy its applications using Aneka across multiple cloud platforms to ensure high availability, compliance with regional data sovereignty laws, and minimal latency for users across different continents. Design a multi-cloud deployment strategy that leverages Aneka's infrastructure organization, logical organization, and cloud deployment modes (Private, Public, Hybrid). How would you optimize workload distribution, fault tolerance, and data replication while maintaining cost efficiency?
5. A fintech company wants to develop a SaaS application powered by Aneka that utilizes AI and cloud computing for financial risk analysis. The application must process large datasets, perform real-time risk assessments, and provide predictive analytics while ensuring scalability, security, and cost efficiency. How would you implement this solution using Aneka's cloud infrastructure, programming models, and services? What strategies would you use for efficient workload distribution and AI model deployment?

6. A research company relies on Aneka for cloud-based simulations, but it is experiencing performance bottlenecks due to inefficient resource allocation and workload distribution. As simulation complexity increases, some resources remain underutilized, while others face overload and delays. How would you optimize resource allocation and workload distribution within Aneka to enhance performance, scalability, and cost efficiency? What techniques and configurations would you implement to balance workloads effectively?
7. Compare the advantages and disadvantages of Microsoft Hyper-V and VMware in terms of security, cost, and manageability. Apply this analysis to help the financial institution determine whether Hyper-V is the best choice for its data centers, providing a well-supported recommendation.
8. A multinational company plans to implement cloud computing but is debating between private, public, and hybrid cloud solutions with virtualization. Apply and Assess the trade-offs between these cloud models and recommend the most suitable approach for a company that requires high security and scalability.
9. A startup wants to create a cloud-based AI application using Aneka SDK but needs guidance on resource allocation and execution management. Design a cloud computing solution using the Aneka SDK, ensuring efficient workload distribution and cost optimization.
10. Your company wants to build a multi-cloud strategy that integrates Aneka with AWS, Google App Engine, and Azure for disaster recovery and redundancy. Develop a strategy to deploy Aneka applications across multiple cloud platforms, ensuring high availability and fault tolerance.
11. A research institution wants to implement data virtualization for real-time data analytics from multiple sources (IoT, databases, cloud storage). Design a data virtualization framework that ensures minimal latency and high data availability. What technologies and architectures would you use? And justify your solution.
12. A company is debating whether to adopt a private, public, or hybrid Aneka cloud for its large-scale data processing needs. Analyze their impact on security, scalability, and cost, identifying key trade-offs. Based on this evaluation, determine the most suitable deployment option for the company's specific requirements.