MITE
Invent Solutions

MANGALORE INSTITUTE OF TECHNOLOGY & ENGINEERING

(A Unit of Rajalaxmi Education Trust®, Mangalore)
Autonomous Institute affiliated to VTU, Belagavi, Approved by AICTE, New Delhi
Accredited by NAAC with A+ Grade & ISO 9001:2015 Certified Institution

Model Question Paper

Third Semester MCA Degree Examination

Cloud Computing

Time: 3 Hours **Max. Marks: 100**

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M: Marks, L: RBT (Revised Bloom's Taxonomy) level, C: Course outcomes.

		Module -1	M	L	C
Q1	a.	A large e-commerce retailer experiences 10x traffic spike during festivals while maintaining 2x normal load during off-seasons. Apply the concept of elasticity in cloud computing to design a resource scaling strategy that minimizes costs during off-peak periods and ensures service availability during peak demand. Analyze the benefits of cloud elasticity over traditional capacity planning.	10	L2	CO1
	b.	An online SaaS platform charges customers based on API calls, storage, and concurrent users. Apply usage-based pricing models to calculate monthly costs for three different customer tiers and analyze how transparent billing impacts customer decision-making and cost management.	10	L2	CO1
		OR			
Q2	a.	Compare SaaS, PaaS, and IaaS service models by analyzing their management responsibilities, deployment flexibility, and cost implications. Apply this analysis to recommend the most suitable model for (i) a startup developing a mobile app, (ii) an enterprise running legacy databases, and (iii) a small business needing email and collaboration tools.	10	L2	CO1
	b.	A multinational company operates in regions with varying data residency regulations. Apply your understanding of public, private, and hybrid cloud models to design a deployment strategy that balances regulatory compliance, cost, and performance. Analyze trade-offs for each deployment choice.	10	L2	CO1
		Module- 2			
Q3	a.	A startup company is developing a lightweight web application and wants to deploy it quickly across multiple environments with minimal resource overhead while running multiple isolated instances on the same operating system kernel. In this context, identify the most suitable virtualization technology, justify why it is appropriate in terms of performance and resource utilization, and explain how this technology is supported by either Google Cloud or Microsoft Azure with a relevant service example.	10	L3	CO2
	b.	An e-commerce company frequently updates its application and requires independent execution of application components along with rapid scaling during peak seasonal demand. Apply your understanding of containers and application-based virtualization to identify the appropriate virtualization approach, explain how it supports faster deployment and scalability, and illustrate your answer using a container service offered by Google Cloud or Microsoft Azure.	10	L3	CO2
		OR			

Q4	a.	A financial organization stores sensitive customer data on the cloud and uses virtual machines with strict access control to ensure security and isolation. Apply suitable cloud infrastructure mechanisms by identifying the roles of the virtual server, hypervisor, and logical network perimeter, and explain how these mechanisms work together to secure cloud resources with reference to services provided by Google Cloud or Microsoft Azure.	10	L3	CO2
	b.	A video streaming service aims to deliver uninterrupted service even during system failures while also monitoring resource usage to control operational costs. Using appropriate cloud infrastructure mechanisms, explain how resource replication, cloud storage devices, and cloud usage monitoring are applied to achieve high availability and cost optimization, with suitable examples from Google Cloud or Microsoft Azure.	10	L3	CO2
Module – 3					
Q5	a.	A software company is migrating its monolithic application to a microservices architecture to improve scalability and fault isolation. The development team wants each microservice to run consistently across development, testing, and production environments while minimizing dependency conflicts. As a cloud engineer, apply your knowledge of Docker and containerization to explain how containers support microservices deployment, and describe the benefits of using containers in a cloud environment.	10	L3	CO3
	b.	An online food delivery platform experiences fluctuating user traffic and requires automatic scaling, service discovery, and load balancing for its containerized microservices. The platform also needs high availability during peak hours. Apply your understanding of Kubernetes to explain how it manages container orchestration in this scenario and how Kubernetes features help ensure scalability, reliability, and efficient resource utilization in the cloud.	10	L3	CO3
OR					
Q6	a.	A development team wants to automate application deployment so that every code change is automatically tested, built, and deployed to the cloud with minimal manual intervention. Using a DevOps approach, apply the concept of CI/CD pipelines to explain how continuous integration and continuous deployment improve deployment speed and reliability, and describe how CI/CD pipelines are implemented in cloud environments.	10	L3	CO3
	b.	A cloud-based enterprise wants to provision and manage its entire infrastructure—such as virtual machines, networks, and storage—using version-controlled configuration files while ensuring automated testing and deployment. Apply the concept of Infrastructure as Code (IaC) integrated with CI/CD pipelines to explain how cloud infrastructure can be deployed and managed efficiently, and discuss the advantages of this approach in terms of consistency, scalability, and error reduction.	10	L3	CO3
Module – 4					
Q7	a.	A healthcare organization stores sensitive patient records in a cloud storage service and must protect the data from unauthorized access, data breaches, and accidental data loss. Applying data security principles, explain the key aspects of data security involved in this scenario and describe suitable data security mitigation techniques that can be implemented to ensure confidentiality, integrity, and availability of patient data in the cloud.	10	L3	CO4

	b.	A cloud service provider manages large volumes of customer data belonging to multiple organizations across different industries. To build customer trust, the provider must ensure strong protection of provider-managed data while maintaining tenant isolation. Apply your understanding of provider data security to explain how the cloud provider can secure stored and processed data and prevent data leakage between tenants.	10	L3	CO4
OR					
Q8	a.	An enterprise using cloud services is required to comply with internal security policies and external regulatory standards during periodic audits. Applying the concepts of internal policy compliance and audit mechanisms, explain how the organization can ensure continuous compliance in a cloud environment and how governance, risk, and compliance (GRC) practices help in identifying and managing security risks.	10	L3	CO4
	b.	A multinational company plans to migrate its critical business applications to the cloud and wants to define clear security controls to meet regulatory and business requirements. Applying illustrative control objectives for cloud computing, explain how access control, data protection, monitoring, and incident response objectives can be implemented to ensure secure and compliant cloud operations.	10	L3	CO4
Module – 5					
Q9	a.	A smart city project deploys thousands of IoT sensors to monitor traffic congestion and air quality in real time. To reduce latency and avoid sending all raw data to the central cloud, the system processes time-critical data closer to the data source. Apply the edge computing architecture to explain how data is processed in this scenario and justify why edge computing is more suitable than centralized cloud processing.	10	L3	CO5
	b.	An industrial manufacturing plant uses IoT devices to monitor machine health and predict failures. The plant requires intermediate data processing, aggregation, and coordination between edge devices and the cloud. Apply the fog computing architecture to explain how fog nodes operate between IoT devices and the cloud and describe how this architecture improves reliability, scalability, and response time.	10	L3	CO5
OR					
Q10	a.	A healthcare monitoring system uses wearable IoT devices to continuously track patient vital signs and generate alerts during emergencies. Apply suitable edge and fog computing use cases to explain how these technologies support real-time data processing, reduce network bandwidth usage, and improve system responsiveness in IoT-based healthcare applications.	10	L3	CO5
	b.	An e-commerce company uses cloud services to support its online platform and wants to control operational expenses while maintaining performance during peak traffic. Applying business cost metrics and cloud usage cost metrics, explain how factors such as pay-as-you-go pricing, resource utilization, data transfer costs, and cost management considerations can be used to optimize cloud spending.	10	L3	CO5

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