Cloud Computing & Devops Assignment

1. Describe at least three key benefits of using cloud computing for businesses. Explain how cloud computing can improve scalability, cost efficiency, and disaster recovery compared to traditional on-premises solutions.

Ans:

Businesses benefit from the scalability that cloud computing provides by being able to change resources in response to demand and avoid over-provisioning. Pay-as-you-go approaches, which eliminate up-front infrastructure expenditures, improve cost efficiency. Geographically dispersed data centres that provide redundancy and quick recovery increase disaster recovery. Cloud computing is more flexible, economical, and robust than on-premises solutions since they don't rely on local backups and have set resources, greater upfront costs, and other limitations.

2. Explain the differences between Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS). Provide real-life examples for each service model and discuss how they cater to different user needs.

Ans:

Servers and storage are available as virtualized computing resources through infrastructure as a service (IaaS), such as Amazon Web Services. Platform as a Service (PaaS), such as Google App Engine, offers a platform and tools for creating, deploying, and managing applications. Ready-to-use software programmes are distributed through the internet as part of a software as a service (SaaS) model, such as Microsoft 365. Businesses that want total control should choose IaaS, developers should use PaaS for quicker app deployment, and customers should utilise SaaS if they want easy access to software.

3. Compare and contrast the three main cloud deployment models: Public
Cloud, Private Cloud, and Hybrid Cloud. Give examples of scenarios where each deployment model would be most suitable and explain the advantages of each.

Ans:

Public cloud provides shared resources that are available online (like AWS and Azure), which is ideal for businesses wanting affordable scalability. Private cloud refers to resources that are devoted to a single organisation (like VMware or OpenStack), making it perfect for sectors like finance that have stringent security needs. In order to meet the needs of enterprises that need flexibility and data management while

minimising costs and maximising performance, hybrid clouds combine both (for instance, employing the public cloud for routine tasks and the private cloud for sensitive data).

4. Explain the purpose of IAM in AWS.

Ans:

User identities and rights to access resources are managed by IAM (Identity and Access Management) in AWS. By enabling managers to manage who has access to different AWS services and operations, it promotes security. IAM makes the least privilege principle possible, lowering the dangers of unauthorised access and assisting in upholding data integrity and confidentiality within the AWS environment.

5. Describe the concept of an EC2 instance.

Ans:

A virtual server in Amazon Web Services (AWS) called an EC2 (Elastic Compute Cloud) instance provides scalable computing power. It offers flexibility, control, and scalability in managing computing resources by enabling users to deploy and run applications on a variety of operating systems. A variety of workloads can be accommodated by tailoring EC2 instances based on the CPU, memory, storage, and networking needs.

6. Define a load balancer in AWS.

Ans:

To provide high availability and increased performance in AWS, a load balancer equally distributes incoming network traffic across several instances or resources. Through the avoidance of component overload, it improves applications' failure tolerance. Elastic Load Balancing, one of AWS's load balancers, scales automatically in response to demand, maximising resource usage and delivering a seamless user experience.

7. Discuss the purpose of an Auto Scaling Group in AWS.

Ans:

In AWS, an Auto Scaling Group dynamically modifies the number of instances in response to variations in application demand. It supports maintaining application availability, controlling traffic peaks, and maximising resource use. Auto Scaling Groups maintain constant application performance while reducing operational overhead and expenses by dynamically raising or lowering instances based on established parameters.

8. Describe what Amazon S3 is and its primary use cases.

Ans:

Scalable and secure object storage is provided via Amazon S3, an AWS service. It offers a mechanism to store and retrieve enormous volumes of data with great durability and availability, including photographs, videos, and backups. Data backup and archive, delivering static website content, and functioning as a content repository for apps are some of the main use cases. These functions make it simple to store, retrieve, and distribute digital assets.

9. Define Amazon RDS and its role in AWS.

Ans:

A managed database service offered by AWS is called Amazon RDS (Relational Database Service). With support for several database engines including MySQL, PostgreSQL, and SQL Server, it makes database setup, maintenance, and scalability simple. Users may concentrate on application development rather than database maintenance with RDS handling mundane activities like backups, patch management, and automated failover while assuring dependable and scalable database operations.

10. What Are the Core Principles of DevOps?

Ans:

In order to provide software quickly, reliably, and with continuous improvement, DevOps principles emphasise collaboration between development and IT operations teams. A few key ideas include infrastructure as code, continuous integration and delivery, monitoring and feedback loops, automation for repetitive operations, and cultural reforms that encourage open communication, teamwork, and shared accountability across the software development lifecycle.

11. Explain the Continuous Integration and Continuous Delivery (CI/CD) Pipeline.

Ans:

The construction, testing, and deployment of applications are all automated via the CI/CD pipeline, a software development technique. Continuous Integration (CI) entails regularly merging code updates into a common repository while automatically executing tests to find problems as they arise. By automating the release process and guaranteeing that code changes are constantly pushed to production, continuous delivery (CD) expands continuous integration (CI) and fosters efficiency, dependability, and quick delivery of software updates.

12. What Are Configuration Management and Infrastructure as Code (IaC)?

Ans:

The process of automating and monitoring changes to software and hardware settings in order to preserve consistency and control complexity is known as configuration management. Infrastructure provisioning and management are handled as code under the Infrastructure as Code (IaC) DevOps methodology, allowing for automation, version control, and repeatability. IaC solutions like Terraform and Ansible enable automated creation, modification, and management of infrastructure resources, improving efficiency and lowering human mistakes.

13. Discuss Containerization and Orchestration.

Ans:

An programme and its dependencies are packaged together using the containerization technique to provide consistent deployment across diverse environments. A well-known containerization platform is Docker. Kubernetes is an example of an orchestration system that controls the deployment, scaling, and administration of containerized applications. It automates processes like scaling, self-healing, and load balancing, making it easier to handle intricate container-based applications at scale.