AWS Test

# Basic-Level AWS Interview Questions:

Q1. What is AWS?

Amazon Web Services is a cloud platform that provides services like computing, storage, networking, and databases over the internet.

Q2. What are the main services provided by AWS?

* EC2 (virtual servers)
* S3 (storage)
* RDS (databases)
* Lambda (serverless compute)
* VPC (networking)
* CloudWatch (monitoring).

Q3. What is EC2?

EC2 is a virtual machine in the cloud where you can run applications just like on a physical server.

Q4. What is S3 and what are its storage classes?

S3 is object storage in AWS. Storage classes include Standard, Infrequent Access, Glacier, Reduced Redundancy.

Q5. What is the difference between an EC2 instance and a Lambda function?

* EC2: You manage the server.
* Lambda: No server to manage, it runs code only when triggered, serverless.

Q6. What is IAM and why is it used?

IAM stands for Identity and Access Management, it is used to control who can access AWS resources and what actions they can perform.

Q7. How does AWS VPC work?

Virtual Private Cloud lets you create your own isolated network inside AWS, where you can launch resources like EC2 with custom IP ranges and security.

Q8. What is the difference between public and private subnets in a VPC?

* Public subnet: Accessible from the internet.
* Private subnet: No direct internet access.

Q9. What is an Elastic Load Balancer (ELB)?

ELB distributes incoming traffic across multiple servers to ensure no single server is overloaded.

Q10. What is Auto Scaling in AWS?

Auto Scaling automatically adjusts the number of EC2 instances based on traffic or usage, helping with performance and cost savings.

# Intermediate-Level AWS Questions

Q1. What are the different types of EC2 instance types?

There are four types of EC2 instance:

* General Purpose (like T2, T3): Balanced performance for most applications.
* GPU Instances (like P3, G4): Great for machine learning, AI, or rendering graphics.
* Compute Optimized (like C5): Ideal for CPU heavy tasks like batch processing or gaming.
* Memory Optimized (like R5): Designed for applications that need a lot of RAM, like databases.

Q2. What is the difference between EBS and S3?

* EBS (Elastic Block Store) is like a virtual hard disk that you attach to EC2 instances. It’s used for storing files, operating systems, or databases that need to be accessed like a local drive.
* S3 (Simple Storage Service) is object storage for the internet. You can upload and retrieve any kind of file (images, videos, backups) from anywhere.  
  In short, EBS is block storage for virtual machines; S3 is object storage for any file type.

Q3. How does Route 53 work in AWS?

Route 53 is a DNS service. It helps convert domain names into IP addresses so browsers can find your website. It also allows traffic routing based on latency, geographic location, or weighted distribution. It is used to make websites highly available and fast by directing users to the nearest healthy endpoint.

Q4. Explain the concept of security groups and NACLs.

* Security Groups act like firewalls for EC2 instances. They control who can connect to or from an instance. They are stateful, meaning if traffic is allowed in, the response is automatically allowed out.
* NACLs (Network Access Control Lists) work at the subnet level, not instance level. They are stateless, so you must set rules for both incoming and outgoing traffic. NACLs are useful when you need to allow or deny specific traffic types at a broader level.

Q5. What is CloudWatch and how does it differ from CloudTrail?

CloudWatch is used to monitor AWS resources and applications. It collects metrics like CPU usage, memory, and logs. You can create alarms to get notified if something goes wrong.

CloudTrail records all API activity and user actions in your AWS account. It's mainly used for security auditing and compliance. So, CloudWatch helps you monitor performance, while CloudTrail helps you track who did what and when.

Q6. What is the difference between AWS RDS and DynamoDB?

* RDS (Relational Database Service) is used for traditional databases like MySQL, PostgreSQL, and SQL Server. It is good for applications that need complex queries and relationships between data.
* DynamoDB is a NoSQL database that is super fast and scalable. It’s ideal for applications that require quick read/write operations and don’t need complex joins.

In short, use RDS for structured, relational data, and DynamoDB for flexible, high-speed NoSQL storage.

Q7. Explain AWS Lambda's cold start issue.

A cold start happens when AWS runs your Lambda function after it has been idle for a while. It takes time to set up the environment (load code, dependencies), which delays the response. This usually takes a few hundred milliseconds.

A warm start happens when the function is invoked again soon after the last time — the environment is already running, so it's much faster. Cold starts are a performance issue mainly for time-sensitive applications.

Q8. What are AWS Availability Zones and Regions?

A Region is a large geographic area that contains multiple Availability Zones (AZs).

Each AZ is an isolated data center with independent power, networking, and cooling.  
Using multiple AZs helps improve fault tolerance, if one AZ fails, the others can keep your application running. Regions help serve users closer to their location for better performance.

Q9. How do you secure data in transit and at rest in AWS?

* Data in transit is secured using protocols like SSL/TLS, this ensures encryption when data is being sent or received (e.g., via HTTPS).
* Data at rest (stored data) is secured using encryption provided by AWS services like S3, EBS, or RDS. AWS uses KMS (Key Management Service) to manage encryption keys securely. By using both types of encryption, AWS ensures data is protected during transfer and when stored.

Q10. Explain the Shared Responsibility Model of AWS.

The Shared Responsibility Model explains who is responsible for what in terms of security:

* AWS is responsible for the security of the cloud that includes hardware, software, networking, and physical infrastructure.
* You (the customer) are responsible for the security in the cloud managing access, encrypting data, and setting firewall rules. This shared model ensures both AWS and users work together to secure the environment.

# Advanced-Level AWS Questions

Q1. How would you design a fault-tolerant architecture on AWS?

To design a fault tolerant system on AWS, the goal is to make sure your application stays available and reliable even if some components fail. Here’s how:

* Use multiple Availability Zones (AZs): Deploy your application across at least two AZs so if one goes down, the other can handle the traffic. For example, deploy EC2 instances in two or more AZs with a Load Balancer in front.
* Use Auto Scaling: Set up Auto Scaling groups to automatically increase or decrease the number of EC2 instances based on traffic. This ensures high availability and cost efficiency.
* Elastic Load Balancer (ELB): Place an ELB in front of your EC2 instances to distribute traffic evenly. If one instance fails, traffic is automatically redirected to healthy instances.
* Use RDS Multi-AZ: For databases, use Amazon RDS with Multi-AZ deployment. It automatically switches to a standby database in another AZ if the primary fails.
* Use S3 and CloudFront for static content: Amazon S3 stores your static files (images, CSS, etc.) and CloudFront (CDN) distributes them globally with low latency.
* Backup and Disaster Recovery: Set up regular snapshots for EBS volumes, backups for RDS, and store them in different regions if needed.
* Monitor Everything: Use CloudWatch to monitor resources. Set alarms and use SNS (Simple Notification Service) to alert you of any failures.

By designing with redundancy, automatic failover, and monitoring, your AWS architecture becomes fault-tolerant and highly available.