1. What is AWS?

- **Amazon Web Services** is a leading **cloud platform** offering over 200 services.
- Global availability through **regions** and **availability zones**.
- Operates on a **pay-as-you-use** pricing model.

2. AWS History

- Launched in **2006** with **S3** and **EC2**.
- By 2010: added SimpleDB, EBS, RDS, DynamoDB, CloudFront, CloudWatch, and more.
- Encouraged adoption via developer competitions.
- Continues to expand with new services across dev, ops, and analytics.

3. AWS Cloud Models

- **IaaS** (Infrastructure as a Service): Basic infrastructure services (e.g., EC2).
- **PaaS** (Platform as a Service): Prebuilt environments for app deployment (e.g., AWS Elastic Beanstalk).
- **SaaS** (Software as a Service): Full applications managed by AWS or vendors (e.g., Gmail, Dropbox).

4. Shared Responsibility Model

AWS Responsibilities (Security of the Cloud):

- Physical infrastructure and data center security
- Network and hypervisor maintenance
- Patching and updating managed services

Client Responsibilities (Security in the Cloud):

- Data encryption, classification, and handling
- IAM roles, policies, access control (Principle of Least Privilege)
- OS, app, and VPC security
- Compliance and governance

5. AWS Global Infrastructure

- **Regions**: Geographic areas (e.g., `us-east-1`)
- **Availability Zones**: Isolated data centers within regions
- **Edge Locations**: Used for caching and CDN (e.g., CloudFront)

6. Compute Services

- **VM-based**: EC2, EC2 Spot
- **Container-based**: ECS, ECR, EKS, AWS Fargate
- **Serverless**: AWS Lambda

7. Storage Services

- **Amazon S3**: Object storage in buckets (scalable, various storage classes)
- **Amazon EFS**: Elastic File System, simple & serverless
- **Amazon EBS**: Block storage for EC2
- **Amazon File Cache**: Fast data caching
- **AWS Backup**: Policy-driven, automated data protection

8. Database Services

- **Relational**: Amazon RDS, Amazon Aurora
- **Key-Value**: Amazon DynamoDB
- **In-Memory**: Amazon MemoryDB, ElastiCache
- **Document**: Amazon DocumentDB (MongoDB-compatible)
- **Graph**: Amazon Neptune

9. Analytics Services

- **Amazon Athena**: Query data directly in S3
- **Amazon EMR**: Elastic MapReduce, access to Spark, Hive, etc.
- **AWS Glue**: Data prep and integration
- **Amazon Redshift**: Scalable data warehouse
- **Amazon Kinesis**: Real-time data streams
- **Amazon QuickSight**: BI/analytics visualization tool

10. Machine Learning / AI Services

- **Amazon SageMaker**: Fully managed ML platform (train, build, deploy)
- **Pre-trained AI Services**:
    - **Amazon Comprehend**: NLP
    - **Amazon Rekognition**: Image/video analysis
    - **Amazon Textract**: Text extraction
    - **Amazon Translate**: Language translation

11. Key AWS Services for Data Analytics / Engineering

- EC2, Lambda
- Amazon S3
- Amazon RDS, DynamoDB
- AWS Glue
- Amazon Athena
- Amazon EMR
- Amazon Redshift

12. AWS Free Tier (12-Month Access)

- **Amazon EC2**: 750 hours/month (limited instance types)
- **Amazon S3**: 5GB, 20K GETs, 2K PUTs
- **Amazon RDS**: 750 hours/month
- Many other services included

Free tier details: https://aws.amazon.com/free