

UNIT-1 – AWS FUNDAMENTALS

4 MARKS QUESTIONS (4 Questions)

Q1. What is Cloud Computing? Name its three service models.

Answer:

Cloud computing is the on-demand delivery of IT resources like servers, storage, and databases over the internet. Instead of owning hardware, users rent services from cloud providers.

The three main service models are:

1. **IaaS (Infrastructure as a Service)**
 2. **PaaS (Platform as a Service)**
 3. **SaaS (Software as a Service)**
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Q2. What is AWS? Mention any two benefits.

Answer:

Amazon Web Services (AWS) is a leading cloud computing platform that provides 200+ services like compute, storage, networking, AI, and databases.

Benefits:

1. **Pay-as-you-go pricing**
 2. **High scalability and global availability**
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Q3. Define Elasticity and Scalability in AWS.

Answer:

- **Scalability:** Ability to increase or decrease resources (CPU, RAM, instances) based on workload.
 - **Elasticity:** Automatic scaling of resources based on incoming traffic. Handled by Auto Scaling + Load Balancer.
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Q4. What are Regions and Availability Zones?

Answer:

- **Region:** A geographical area that contains multiple data centers. Example: Mumbai region (ap-south-1).
 - **Availability Zone (AZ):** A single physical data center inside a region. AZs are isolated from failures and connected with low-latency networks.
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5 MARKS QUESTIONS (4 Questions)

Q1. Explain the main characteristics of cloud computing.

Answer:

1. **On-demand self-service:** Resources available without human interaction.
 2. **Broad network access:** Accessible from mobile, laptop, and browsers.
 3. **Resource pooling:** Shared infrastructure for many users.
 4. **Elasticity:** Auto-scaling up/down based on demand.
 5. **Measured service:** Users pay only for what they use.
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Q2. What is the Shared Responsibility Model in AWS?

Answer:

This model defines which responsibilities belong to AWS and which belong to the customer.

- **AWS Manages:**
 - Hardware, network, virtualization
 - Physical security of data centers
 - Storage, compute, and database infrastructure
- **Customer Manages:**
 - Data stored in the cloud
 - Access control & IAM
 - OS configuration
 - Application security

This model ensures secure and reliable cloud usage.

Q3. Explain IaaS, PaaS, and SaaS with examples.

Answer:

- **IaaS:** Provides basic infrastructure—servers, storage, networking.
Example: AWS EC2, S3, EBS.
 - **PaaS:** Provides platform with tools to develop apps.
Example: AWS Elastic Beanstalk, Google App Engine.
 - **SaaS:** Ready-to-use software accessed through browser.
Example: Gmail, Google Docs, Salesforce.
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Q4. What is Virtualization? How is it used in cloud computing?

Answer:

Virtualization allows one physical machine to run multiple virtual machines.

In cloud computing:

- Hypervisors create VMs
 - Helps utilize hardware fully
 - Enables EC2 instances
It reduces cost, increases scalability, and improves flexibility.
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✓ 6 MARKS QUESTIONS (4 Questions — Half-Page Answers)

Q1. Explain the types of cloud deployment models: Public, Private, Hybrid, and Multi-Cloud.

Answer:

Cloud deployment models describe how cloud resources are accessed.

1. Public Cloud

Owned and operated by cloud providers like AWS, Azure, GCP.

Users share hardware but data remains isolated.

Example: AWS EC2 instances.

2. Private Cloud

Used by one organization only.

Hosted internally or by a third-party.

Secure and customizable.

Example: VMware-based private cloud.

3. Hybrid Cloud

Combination of public and private cloud.

Sensitive data → Private cloud

Applications & scaling → Public cloud

Example: Hospital storing patient data privately but using AWS for hosting apps.

4. Multi-Cloud

Using multiple cloud providers together.

Example: AWS + Azure + GCP

Improves reliability and avoids vendor lock-in.

Q2. Explain AWS Global Infrastructure with diagram description.

Answer:

AWS Global Infrastructure includes:

1. **Regions** – Geographical locations
2. **Availability Zones (AZs)** – Isolated data centers
3. **Edge Locations** – Content delivery endpoints for CloudFront
4. **Local Zones** – Close to large cities for low-latency services

Flow Explanation:

User request → nearest **edge location** → AWS **region** → hosted service (EC2/RDS).

This infrastructure ensures:

- Low latency
 - High redundancy
 - Fault tolerance
 - Global reach
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Q3. Explain the benefits of AWS with real-world examples.

Answer:

1. **Cost-effective:** Pay only for usage.
Example: Startups avoid buying servers.
2. **Elasticity:** Auto scaling for applications.
Example: E-commerce websites get high traffic during sale days.
3. **High Availability:** Multi-AZ replication.
4. **Security:** Data encryption, IAM, VPC isolation.
5. **Global Deployment:** Host apps in multiple countries.
6. **Managed Services:** RDS, Lambda reduce developer workload.

AWS helps companies save money, scale easily, and improve performance.

Q4. Explain in detail the difference between traditional IT infrastructure and cloud infrastructure.

Answer:

Traditional IT	Cloud IT
Need to purchase hardware	Rent resources
High upfront cost	Pay-as-you-go
Manual scaling	Automatic scaling
On-premises servers	Stored in AWS data centers
Maintenance required	AWS manages hardware

Detailed explanation:

Traditional IT requires buying servers, storage, networking devices, cooling, and hiring staff for maintenance. Scaling needs buying new hardware.

Cloud infrastructure provides virtual machines and storage over the internet. Scaling is automatic. Upfront investment is zero. AWS handles server maintenance, power, cooling, etc.

This makes cloud computing cheaper, faster, and more flexible than on-premises systems.

UNIT-2 : AWS NETWORKING (VPC, Subnets, Route Tables, Security Groups, Route 53, CloudFront)

✓ 4 MARKS QUESTIONS (4 Questions)

Q1. What is a Virtual Private Cloud (VPC)?

Answer:

A VPC is a **logically isolated virtual network** inside AWS.

It allows you to create your own private network with custom IP ranges, subnets, route tables, and security groups.

You can control networking, security, traffic flow, and resource placement inside a VPC.

Q2. What is a Subnet in AWS? Explain types of subnets.

Answer:

A subnet is a **small section of a VPC**, created using a CIDR block.

Types:

1. **Public Subnet:** Has route to Internet Gateway.
 2. **Private Subnet:** No direct internet access.
 3. **Isolated Subnet:** No outbound connectivity.
 4. **VPN-only Subnet:** Connected via VPN, not internet.
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Q3. What is an Internet Gateway and why is it used?

Answer:

An Internet Gateway (IGW) allows resources in a **public subnet** (like EC2) to connect to the **internet**.

It enables two-way communication: outbound and inbound traffic.

Without IGW, EC2 instances cannot have public access.

Q4. Define a Security Group.

Answer:

A Security Group is a **virtual firewall** for EC2 instances.

It controls inbound and outbound traffic using rules.

Security Groups are **stateful**, meaning if inbound traffic is allowed, the response is automatically allowed.

5 MARKS QUESTIONS (4 Questions)

Q1. Explain the key components of a VPC.

Answer:

1. **CIDR Block:** Defines IP range (Example: 10.0.0.0/16).
 2. **Subnets:** Divide VPC into logical sections.
 3. **Route Tables:** Controls routing of traffic.
 4. **Internet Gateway / NAT Gateway:** Provides internet access.
 5. **Security Groups & NACLs:** Security layers.
 6. **VPC Peering / VPN:** Connects VPCs or on-premises networks.
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Q2. Explain Route Tables in VPC.

Answer:

A route table contains **rules (routes)** that determine traffic flow.

Elements:

- **Destination:** IP range
- **Target:** IGW, NAT, VPC Peering, Local

Every subnet must be associated with one route table.

Public subnets have a route to IGW; private subnets do not.

Q3. What is Route 53? Mention its functions.

Answer:

Amazon Route 53 is AWS's **DNS (Domain Name System)** service.

Functions:

1. Domain registration
2. DNS resolution

3. Routing traffic to resources
 4. Health checks & fault tolerance
 5. Load balancing using DNS
- It maps domain names to IP addresses.
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Q4. What is CloudFront? Explain its working.

Answer:

CloudFront is a **Content Delivery Network (CDN)** that delivers content (images, videos, websites) from the nearest **edge location**.

Working:

1. User requests content
 2. DNS redirects to nearest edge location
 3. CloudFront checks cached data
 4. If not present → fetch from origin server (S3/EC2)
 5. Cache content for future use
- This reduces latency and speeds up delivery.
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✓ 6 MARKS QUESTIONS (4 Questions — Half-Page Answers)

Q1. Explain AWS VPC in detail with benefits and working.

Answer:

A **Virtual Private Cloud (VPC)** is a private isolated network inside AWS. It allows full control over IP ranges, subnets, gateways, and routing.

Working:

1. Choose CIDR block (e.g., 10.0.0.0/16).
2. Create subnets (public/private).
3. Attach Internet Gateway for public access.
4. Create route tables to define traffic flow.
5. Launch EC2 instances inside subnets.

6. Secure using Security Groups & NACLs.

Benefits:

- Enhanced security
- Customizable network
- Scalable
- Connects to on-premises via VPN
- Supports high availability with multiple AZs

VPC behaves like your own data center inside AWS.

Q2. Explain Public, Private, and Isolated Subnets with examples and use cases.

Answer:

1. Public Subnet

- Has route → Internet Gateway
 - Used for: Web servers, Bastion hosts
- Example:** EC2 hosting a website.

2. Private Subnet

- No direct internet
 - Outbound through NAT Gateway
 - Used for: Databases, backend services
- Example:** MySQL database server.

3. Isolated Subnet

- No internet or NAT
 - Only internal VPC communication
- Example:** Highly confidential applications, logs.

Use Case Summary:

Frontend → Public

Backend → Private

Secure workloads → Isolated

This structure ensures high security and controlled traffic.

Q3. Explain AWS Security Groups in detail with features and rules.

Answer:

Security Groups are **stateful firewalls** for EC2 instances.

Features:

- Controls inbound & outbound traffic
- Works at instance level
- Stateful: return traffic automatically allowed
- Default SG denies all inbound, allows all outbound
- Can attach multiple SGs to EC2

Rules:

- **Inbound rules:** Allow traffic into instance
- **Outbound rules:** Allow outgoing traffic
- Rules can be based on:
 - IP ranges
 - Ports
 - Protocols
 - Other security groups

Example:

Allow SSH → Port 22

Allow HTTP → Port 80

Allow MySQL from private subnet → Port 3306

Security Groups ensure safe access and minimize attack risks.

Q4. Describe CloudFront architecture and explain how caching works.

Answer:

CloudFront is AWS's CDN service that uses globally distributed **edge locations** to deliver content faster.

Architecture Steps:

1. **User request:** User tries to access image/video/website.
2. **DNS resolution:** Request routed to nearest edge location.
3. **Check cache:**
 - o If cached → delivered instantly
 - o If not → request forwarded to origin (S3/EC2)
4. **Fetch & Cache:** CloudFront stores a copy in the edge location.
5. **Deliver content:** Returned to the user with low latency.
6. **Future requests:** Served directly from cache.

Benefits:

- Faster content delivery
- Lower load on origin server
- Better performance for global users
- Reduces bandwidth cost

CloudFront ensures global, low-latency content delivery.

UNIT-3 : AWS COMPUTE SERVICES (EC2, ELB, Auto Scaling, Lambda, Beanstalk)

✓ 4 MARKS QUESTIONS (4 Questions)

Q1. What is Amazon EC2?

Answer:

Amazon EC2 (Elastic Compute Cloud) is a cloud service that provides **virtual machines (instances)** to run applications.

You can choose OS, RAM, CPU, storage, and pay only for usage. It is elastic because you can increase or decrease instance capacity anytime.

Q2. What is Auto Scaling in AWS?

Answer:

Auto Scaling automatically increases or decreases EC2 instances based on demand.

If traffic increases → more instances launched

If traffic decreases → instances terminated

This ensures high availability and cost efficiency.

Q3. Define Serverless Computing.

Answer:

Serverless computing allows users to run code without managing servers.

AWS handles provisioning, scaling, maintenance.

You upload the function, and it runs only when triggered.

Example: AWS Lambda.

Q4. What is Elastic Load Balancing (ELB)?

Answer:

ELB distributes incoming traffic across multiple EC2 instances.

It prevents overload, improves fault tolerance, and ensures smooth performance.

If one instance fails, ELB automatically routes traffic to healthy instances.

✓ 5 MARKS QUESTIONS (4 Questions)

Q1. Explain the benefits of EC2.

Answer:

1. **Scalability:** Increase CPU/RAM anytime.
 2. **Pay-as-you-go:** Only pay for running instances.
 3. **Flexible configuration:** Choose OS, instance type, storage.
 4. **High availability:** Multi-AZ deployment.
 5. **Security:** VPC, IAM, Security Groups protect instances.
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Q2. What is IaaS? Give advantages and examples.

Answer:

IaaS (Infrastructure as a Service) provides virtualized computing resources over the cloud.

Advantages:

- Cost-effective (no hardware purchase)
- Scalable
- Highly available
- Flexible configuration

Examples:

- AWS EC2
 - Google Compute Engine
 - Azure Virtual Machines
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Q3. Explain how Elastic Load Balancing works.

Answer:

ELB distributes traffic evenly among EC2 instances.

Steps:

1. User request reaches ELB.
2. ELB checks which instance is healthy.
3. Traffic sent only to healthy instances.

4. If traffic increases → Auto Scaling launches new instances.
 5. ELB continues distributing load automatically.
This avoids failures and improves availability.
-

Q4. What is AWS Lambda? Mention its use cases.

Answer:

AWS Lambda is a serverless compute service that runs code in response to events.

Use cases:

- Image resizing
 - Sending emails on user signup
 - Processing S3 uploads
 - Chatbots
 - Scheduled background tasks
- Lambda charges only for the time code executes.
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✓ 6 MARKS QUESTIONS (4 Questions — Half-page Answers)

Q1. Explain in detail the working, features, and use cases of Amazon EC2.

Answer:

Amazon EC2 is AWS's primary compute service that provides virtual machines in the cloud.

Working:

1. User selects AMI (OS image).
2. Choose instance type (t2.micro, m5.large, etc.).
3. Configure storage (EBS).
4. Launch instance inside a VPC subnet.
5. Attach security group to control traffic.
6. Connect using SSH (Linux) or RDP (Windows).

Features:

- Elastic resizing
- Multiple OS support
- Secure via IAM + SG
- Integrates with Auto Scaling and ELB
- Pay-as-you-go pricing

Use Cases:

- Web hosting
- App hosting
- Virtual labs
- Game servers
- Backup & recovery

EC2 is the backbone of AWS compute services.

Q2. Explain Auto Scaling and Elastic Load Balancing together with an example.

Answer:

Auto Scaling and ELB work together to ensure high availability.

Auto Scaling:

- Automatically adds instances when demand increases.
- Removes instances when demand decreases.

Elastic Load Balancer:

- Distributes traffic across instances.
- Health checks ensure traffic goes to healthy instances.

Example:

During a festival sale, an e-commerce website gets heavy traffic:

- Auto Scaling launches more EC2 instances.
- ELB distributes traffic equally.
- If traffic drops late at night, Auto Scaling removes extra instances.

This combination gives scalability, fault tolerance, and cost savings.

Q3. Explain Serverless Architecture with AWS Lambda and its advantages.

Answer:

Serverless architecture means application code runs without provisioning or managing servers.

AWS Lambda Workflow:

1. User uploads function code.
2. Configure trigger (S3, DynamoDB, API Gateway).
3. Lambda executes code only when event occurs.
4. AWS handles scaling, patching, maintenance.

Advantages:

- No server management
- Auto-scaling
- Pay only for execution time
- Very fast development
- Can run thousands of parallel executions

Example Use Case:

When an image is uploaded to S3 → Lambda automatically resizes and stores it.

Serverless reduces cost and operational complexity.

Q4. Explain AWS Elastic Beanstalk with features and deployment steps.

Answer:

Elastic Beanstalk is a PaaS service used to deploy and manage applications without handling the underlying servers.

Features:

- Supports Java, Python, .NET, PHP, Node.js
- Automatically manages EC2, ELB, Auto Scaling
- Easy monitoring
- Version control and rollback

- Fully managed environment

Deployment Steps:

1. Develop application code.
2. Upload to Elastic Beanstalk.
3. Beanstalk automatically creates:
 - EC2 instances
 - Load balancer
 - Auto Scaling Group
 - Security Groups
4. Application becomes available through a URL.
5. Monitor using Beanstalk dashboard.

Elastic Beanstalk makes deployment fast, simple, and scalable.

UNIT-4 : AWS STORAGE SERVICES (S3, EBS, EFS, Storage Types)

4 MARKS QUESTIONS (4 Questions)

Q1. What is Cloud Storage?

Answer:

Cloud storage is a service that stores data on the internet instead of a local hard drive. It works like a **digital locker**, where files are stored securely and can be accessed from anywhere.

Cloud storage provides scalability, durability, and remote access.

Q2. What is Amazon S3?

Answer:

Amazon S3 (Simple Storage Service) is an **object storage** service used to store any amount of data.

Features:

- 11 nines durability (99.99999999%)
 - Unlimited storage
 - Accessible worldwide
 - Used for images, videos, backups, static websites
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Q3. What is EBS in AWS?

Answer:

EBS (Elastic Block Store) is **block storage** for EC2 instances.

It acts like a virtual hard drive where the OS and applications of an EC2 instance are stored.

Features: persistent storage, snapshots, high performance.

Q4. What is Amazon EFS?

Answer:

EFS (Elastic File System) is a **shared file storage** system for EC2 instances.

Multiple EC2 instances can access EFS at the same time.
It automatically scales as files are added or removed.

5 MARKS QUESTIONS (4 Questions)

Q1. Explain Object Storage, Block Storage, and File Storage.

Answer:

1. Object Storage:

- Stores data as objects with metadata
- Flat structure, no folder hierarchy
- Used for images, videos, backups
- Example: Amazon S3

2. Block Storage:

- Stores data in fixed-size blocks
- Works like a hard disk
- Used for OS, databases
- Example: EBS

3. File Storage:

- Data stored in files arranged in folders
 - Supports hierarchical structure
 - Example: EFS, Google Drive
-

Q2. What are S3 Storage Classes? Explain any three.

Answer:

1. S3 Standard:

- For frequently accessed data
- Fastest performance

- Used for website images, videos

2. S3 Intelligent-Tiering:

- Automatically shifts data between frequent and infrequent access
- Saves cost
- Useful for unpredictable access patterns

3. S3 Glacier:

- For archival data
 - Very low-cost storage
 - Slow retrieval (minutes to hours)
 - Used for old records, logs
-

Q3. Explain the use cases of EFS.

Answer:

- Shared file storage for multiple EC2 instances
 - Web hosting where multiple servers need same files
 - Big data analytics
 - Media processing
 - Containerized applications (EKS/ECS)
EFS automatically increases or decreases capacity.
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Q4. What are the steps to host a static website on S3?

Answer:

1. Create an S3 bucket
2. Enable “Static Website Hosting”
3. Upload HTML/CSS/JS files
4. Make objects public
5. Access website via S3 endpoint URL

This allows website hosting without servers.

6 MARKS QUESTIONS (4 Questions — Half-Page Answers)

Q1. Explain Amazon S3 in detail with features, benefits, and use cases.

Answer:

Amazon S3 is AWS's most popular storage service that stores data as **objects** inside **buckets**.

Features:

- 11 nines durability
- Unlimited scalability
- Versioning
- Lifecycle rules
- Access control with IAM, Bucket Policies
- Cross-Region Replication
- Multiple storage classes

Benefits:

- Highly durable and secure
- Accessible globally
- Cost-effective
- Easy integration with CloudFront, Lambda, EC2

Use Cases:

- Backup & restore
- Hosting static websites
- Data lakes
- Media storage
- Software downloads

S3 is the backbone of cloud storage in AWS.

Q2. Explain Object Storage, Block Storage, and File Storage with examples, diagrams (text), and differences.

Answer:

1. Object Storage (S3)

- Data stored as objects (file + metadata + ID)
- Flat storage, no folders
- Used for videos, images, backups

Diagram (text):

Object

```
|--- Data  
|--- Metadata  
└--- Unique ID
```

2. Block Storage (EBS)

- Data split into blocks like pages of a notebook
- Low-latency and fast
- Best for OS, databases

3. File Storage (EFS)

- Data stored as files & folders
- Supports multiple EC2 instances

Differences:

Type	Structure	Use Case	Example
Object	Flat	Media, backups	S3
Block	Blocks	OS, DB	EBS
File	Directory	Shared files	EFS

Q3. Explain Amazon EBS in detail with features and uses.

Answer:

Amazon EBS is **persistent block storage** used with EC2 instances.

Features:

- Persistent storage even after EC2 stops
- Snapshots for backup
- High IOPS performance
- Encrypted volumes
- Attach/detach from instances
- Choice of SSD or HDD volumes

Uses:

- Storing operating systems
- Databases (MySQL, Oracle)
- Application data
- Boot volumes
- Big data workloads

EBS acts like a high-performance virtual hard disk.

Q4. Explain Amazon EFS in detail with architecture, advantages, and real-time examples.

Answer:

Amazon EFS is a **fully managed, elastic, shared file storage** service.

Architecture:

- Files stored in a NFS-based system
- Scales storage automatically
- Multiple EC2 instances can mount the same file system
- Works across multiple Availability Zones

Advantages:

- Scalable
- No capacity planning needed

- Shared access
- Highly available
- Secure (encryption + VPC)

Real-life Examples:

- Multiple web servers sharing images
- Shared log files for analytics
- Video rendering farms
- Kubernetes persistent storage

EFS is ideal where multiple servers need the same data.

UNIT-5 : AWS DATABASE SERVICES & WELL-ARCHITECTED FRAMEWORK

4 MARKS QUESTIONS (4 Questions)

Q1. What is Amazon RDS?

Answer:

Amazon RDS (Relational Database Service) is a fully managed cloud service for running relational databases like MySQL, PostgreSQL, SQL Server, and Amazon Aurora. AWS handles backups, patching, scaling, and high availability so users only focus on queries and data.

Q2. What is DynamoDB?

Answer:

AWS DynamoDB is a **fully managed NoSQL database** that stores data in key-value or document format. It is serverless, highly scalable, and provides millisecond response time. Ideal for real-time applications.

Q3. What is Amazon Redshift used for?

Answer:

Amazon Redshift is a **data warehouse** designed for big data analytics. It analyzes large datasets (TB to PB) using fast SQL queries. Used for business analytics, dashboards, and reporting.

Q4. What are the six pillars of AWS Well-Architected Framework?

Answer:

1. Operational Excellence
2. Security
3. Reliability
4. Performance Efficiency
5. Cost Optimization

6. Sustainability

5 MARKS QUESTIONS (4 Questions)

Q1. Explain the main features of Amazon RDS.

Answer:

Features:

1. **Automated Backups:** Daily snapshots + point-in-time recovery.
 2. **Scalability:** Increase memory, CPU, and storage easily.
 3. **Multi-AZ Deployment:** Provides high availability.
 4. **Security:** Encryption, VPC isolation, IAM policies.
 5. **Monitoring:** CloudWatch metrics and performance insights.
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Q2. What is Amazon Aurora? Explain its advantages.

Answer:

Aurora is AWS's cloud-optimized relational database compatible with MySQL and PostgreSQL.

Advantages:

- 5x faster than MySQL
- 3x faster than PostgreSQL
- Highly available
- Auto-scaling storage up to 128 TB
- Fault-tolerant and automatic failover

Aurora is ideal for enterprise-level applications.

Q3. Explain the difference between SQL and NoSQL databases.

Answer:

SQL

Structured data

Uses tables (rows/columns)

Fixed schema

Uses JOINs

NoSQL

Unstructured/semi-structured data

Uses key-value, document, graph

Flexible schema

No joins

Examples: MySQL, PostgreSQL Examples: DynamoDB, MongoDB

SQL is used for structured data and transactions, while NoSQL is used for scalability and flexible data.

Q4. Explain the design principles of AWS Well-Architected Framework (any four).

Answer:

1. **Automate processes (Operational Excellence):** Reduce manual work.
 2. **Implement strong identity (Security):** Use IAM, MFA, encryption.
 3. **Automatically recover from failures (Reliability):** Use Auto Scaling and Multi-AZ.
 4. **Use right resources (Performance Efficiency):** Select proper instance types.
 5. **Reduce unnecessary cost (Cost Optimization):** Shut down idle resources.
 6. **Use environmentally efficient resources (Sustainability):** Use modern, efficient hardware.
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✓ 6 MARKS QUESTIONS (4 Questions — Half-page Answers)

Q1. Explain Amazon RDS in detail with architecture, benefits, and supported databases.

Answer:

Amazon RDS is a managed relational database service that automates database tasks.

Architecture:

- RDS instance runs inside a VPC

- Optional Multi-AZ replication for high availability
- Storage on EBS
- Daily automated backups
- Read Replicas for high performance

Benefits:

- No need to install or maintain DB software
- Automatic patching and backups
- Scalability
- High availability with failover
- Secure with encryption + VPC isolation

Supported Databases:

- MySQL
- PostgreSQL
- SQL Server
- Amazon Aurora

RDS simplifies database management on AWS.

Q2. Explain Amazon DynamoDB in detail with features and real-time use cases.

Answer:

DynamoDB is AWS's fully managed NoSQL database that offers high speed and scalability.

Features:

- Key-value & document store
- Serverless
- Auto scaling
- Highly available (multi-region replication)
- Millisecond latency
- DynamoDB Streams for event processing

Use Cases:

1. Shopping cart sessions
2. Chat applications (WhatsApp-like)
3. Gaming leaderboards
4. IoT device data
5. Real-time analytics

DynamoDB is ideal for applications needing fast, consistent performance.

Q3. Explain Amazon Redshift with architecture, features, and real-world example.

Answer:

Amazon Redshift is a **data warehouse** for analyzing massive datasets.

Architecture:

- Redshift cluster containing nodes
- Leader node manages queries
- Compute nodes execute queries
- Columnar storage reduces I/O
- Massively Parallel Processing (MPP)

Features:

- Fast SQL-based analytics
- Compression to save storage
- BI tools support (Tableau, QuickSight)
- Automated backups
- Scales to petabytes

Real-World Example:

An e-commerce company analyzes:

- Sales trends
- Customer behavior
- Peak shopping hours

Redshift provides fast reporting and insights.

Q4. Explain all six pillars of the AWS Well-Architected Framework with examples.

Answer:

1. Operational Excellence

Focus on monitoring and automation.

Example: Automated backups of RDS.

2. Security

Protect systems and data.

Example: IAM roles, MFA, encryption.

3. Reliability

Ensure systems recover quickly.

Example: Multi-AZ deployment.

4. Performance Efficiency

Use resources efficiently.

Example: Right-sizing EC2 instances.

5. Cost Optimization

Avoid unnecessary expenses.

Example: Stop unused instances.

6. Sustainability

Reduce environmental impact.

Example: Using energy-efficient AWS data centers.

These pillars help build secure, fast, and cost-effective cloud architectures.

MOST IMPORTANT AWS QUESTIONS & ANSWERS (All Units – Combined)

(Each question is NEW and NOT repeated from previous lists)

☒ 4 MARKS QUESTIONS WITH ANSWERS (10 Important Questions)

Q1. What is Pay-as-you-go pricing in AWS?

Answer:

Pay-as-you-go means you only pay for the services you use, for the time you use them. There is no upfront cost or long-term commitment.
Example: If an EC2 instance is running for 3 hours, you pay only for 3 hours, not for the whole day.

Q2. What is a NAT Gateway?

Answer:

A NAT Gateway allows **private subnet** instances to access the **internet** (for updates, downloads) while keeping them hidden from public access.
It provides outbound internet access but blocks inbound requests.

Q3. What is VPC Peering?

Answer:

VPC Peering connects two VPCs so they can communicate using private IP addresses.
It works across the same or different AWS regions.
Useful for connecting internal applications securely.

Q4. What is an AMI?

Answer:

An Amazon Machine Image (AMI) is a template used to launch EC2 instances.
It contains OS + software + configurations needed to start a server.

Q5. What is CloudWatch?

Answer:

CloudWatch is AWS's monitoring service that tracks metrics like CPU, memory, network

usage, and application logs.

It can trigger alarms and automate scaling actions.

Q6. What is S3 Versioning?

Answer:

Versioning keeps multiple versions of an object in an S3 bucket.

It protects against accidental deletion or overwriting by storing previous copies.

Q7. What are EBS Snapshots?

Answer:

Snapshots are backup copies of EBS volumes stored in S3.

They are incremental, meaning only changed data is saved.

Q8. What is NoSQL?

Answer:

NoSQL databases store data in flexible formats like key-value, documents, or graphs.

They do not use tables or fixed schemas like SQL databases.

Example: DynamoDB.

Q9. What is Multi-AZ deployment in RDS?

Answer:

Multi-AZ creates a standby database in a different Availability Zone.

If the main DB fails, AWS automatically switches to the standby to ensure high availability.

Q10. What are Edge Locations in CloudFront?

Answer:

Edge locations are global servers where CloudFront caches content.

Users receive data from the nearest location, reducing latency.



5 MARKS QUESTIONS WITH ANSWERS (10 Important Questions)

Q1. Explain the difference between Public Subnet and Private Subnet.

Answer:

Public Subnet	Private Subnet
Has route to Internet Gateway	No direct internet
Used for web servers	Used for DB & backend
Has public IP addresses	Only private IPs
Can be accessed from internet	Cannot be accessed from internet
Public = exposed to internet	
Private = internal & secure	

Q2. Explain EC2 Pricing Models.

Answer:

- On-Demand:** Pay per hour/second. Flexible, no commitment.
 - Reserved Instances:** 1–3 year commitment. Up to 75% cheaper.
 - Spot Instances:** Very cheap but can be interrupted anytime.
 - Dedicated Hosts:** Physical servers dedicated to one customer.
 - Savings Plans:** Discount for committing to usage (like CPU time).
-

Q3. Explain Security Groups vs NACLs.

Answer:

Security Group	NACL
Instance-level firewall	Subnet-level firewall
Stateful	Stateless
Allow rules only	Allow/deny rules
Automatically allows return traffic	Must allow both directions

SG = more secure

NACL = for subnet-wide control

Q4. Explain the need for Auto Scaling.

Answer:

Auto Scaling adjusts EC2 instances automatically.

Benefits:

- Handles traffic spikes
- Reduces cost by terminating idle instances
- Provides fault tolerance
- Improves app performance

Used in e-commerce, education portals, exam sites, video streaming apps.

Q5. Explain S3 Lifecycle Management.

Answer:

Lifecycle rules automatically move objects between storage classes.

Example:

- After 30 days → move to Infrequent Access
- After 90 days → move to Glacier
- After 1 year → delete

This reduces storage cost without manual work.

Q6. Explain Amazon Aurora.

Answer:

Aurora is AWS's high-performance relational database compatible with MySQL and PostgreSQL.

Features:

- 5x faster than MySQL
- Auto-scaling up to 128 TB
- Highly fault-tolerant

- Low-latency replicas
 - Fully managed by AWS
-

Q7. Explain IAM Users, Groups, and Roles.

Answer:

- **Users:** Individual identities (developer, admin).
 - **Groups:** Collection of users with same permissions.
 - **Roles:** Temporary permissions for AWS services (EC2, Lambda).
IAM improves security by following least-privilege access.
-

Q8. Explain the difference between S3, EFS, and EBS.

Answer:

S3	EFS	EBS
Object storage	File storage	Block storage
Unlimited	Automatically scalable	Fixed-size volumes
Accessed by internet	Shared by EC2	Attached to one EC2
Static sites	Shared applications	OS & databases

Q9. Explain Amazon Redshift and its usage.

Answer:

Redshift is a data warehouse for analytics.

Uses:

- Big data analysis
 - Business intelligence
 - Reporting
 - Sales data analysis
- Features:
- Columnar storage

- Parallel processing
 - Very fast query performance
-

Q10. Explain Weighted Routing Policy in Route 53.

Answer:

Different weights are assigned to multiple servers.

Traffic is distributed based on weight.

Example:

- Server A → weight 70
 - Server B → weight 30
- 70% traffic goes to A, 30% to B.
-
-

✓ 6 MARKS QUESTIONS WITH ANSWERS (10 Important Questions)

(Half-page answers — perfect exam length)

Q1. Explain the complete process of launching a secure web server inside a VPC.

Answer:

1. **Create VPC** → Choose CIDR block.
2. **Create Subnets:**
 - Public subnet for web server
 - Private subnet for database
3. **Attach Internet Gateway** to VPC.
4. **Create Route Tables** → Add route to IGW for public subnet.
5. **Create Security Groups:**
 - Allow HTTP (80), HTTPS (443)
 - Allow SSH from admin IP
6. **Launch EC2 instance** inside public subnet.
7. **Assign Elastic IP** for stable access.

8. Install Apache/Nginx and upload website files.

Browser → IGW → Route Table → EC2 → displays website.

Q2. Explain AWS Lambda architecture in detail.

Answer:

Lambda is serverless and event-driven.

Architecture Flow:

1. Event Trigger (S3 upload, API Gateway, DynamoDB stream).
2. Lambda executes function code.
3. Auto-scales based on number of events.
4. Sends output to another AWS service.

Features:

- No servers required
- Pay per execution
- Automatic scaling
- Supports multiple languages

Use Cases:

- Image resizing
 - Email automation
 - Chatbots
 - Real-time file processing
-

Q3. Explain all S3 storage classes in detail.

Answer:

1. S3 Standard:

- Frequent access
- High speed (websites & apps)

2. S3 Intelligent-Tiering:

- Automatically shifts data
- Lowers cost

3. S3 Standard-IA (Infrequent Access):

- Cheaper
- For monthly accessed files

4. Glacier Instant Retrieval:

- Very low cost
- Retrieval within seconds

5. Glacier Flexible Retrieval:

- Wait minutes-hours
- Archive storage

6. Glacier Deep Archive:

- Lowest cost
 - Access once or twice a year
-

Q4. Describe DynamoDB with table structure, keys, and example.

Answer:

DynamoDB stores data as items in tables.

Structure:

- **Table → Items → Attributes**
- Key-value or document format
- No fixed schema

Keys:

1. **Partition Key:** Determines storage location
2. **Sort Key:** Enables sorting within partition

Example:

Table: Users

- Partition Key: UserID

- Sort Key: Timestamp
Stores chats, profiles, images, settings.
-

Q5. Explain Redshift architecture.

Answer:

Redshift uses a **cluster-based architecture**.

Components:

- **Leader Node:** Manages queries
- **Compute Nodes:** Execute queries in parallel
- **Columnar Storage:** Reduces I/O
- **Massively Parallel Processing:** Faster execution

Data Flow:

User query → Leader node → Compute nodes → Processed → Results returned

Used for big data analytics.

Q6. Explain the Security Pillar of the AWS Well-Architected Framework.

Answer:

Focuses on data protection and identity management.

Principles:

1. **Strong Identity Foundation:** IAM, MFA
2. **Traceability:** Logs & CloudTrail
3. **Least Privilege:** Minimum permissions
4. **Data Protection:** Encryption, KMS
5. **Automated Security:** Automated patching
6. **Infrastructure Protection:** VPC, SG, NACL

Ensures strong and reliable application security.

Q7. Explain the Performance Efficiency Pillar.

Answer:

Ensures optimal use of computing resources.

Principles:

- Use right instance types
- Serverless first approach
- Auto Scaling
- Caching with CloudFront
- Database selection (RDS vs DynamoDB)
- Load balancing

Helps maintain high performance under changing workloads.

Q8. Explain EBS volume types in detail.**Answer:**

1. **gp3 (General Purpose SSD):** Balanced for all workloads
2. **io2 (Provisioned IOPS SSD):** High-performance databases
3. **st1 (Throughput HDD):** Big data, streaming
4. **sc1 (Cold HDD):** Lowest-cost archive storage
5. **Magnetic (legacy)**

Different workloads require different disk types.

Q9. Explain VPC Peering and its use cases.**Answer:**

VPC Peering connects two VPCs privately.

Use Cases:

- Microservices in different VPCs
- Multi-team environments
- Shared services (DB, authentication)
- Cross-region communication

Peering avoids public internet and improves security.

Q10. Explain Public Cloud vs Private Cloud vs Hybrid Cloud.

Answer:

Public Cloud:

- Shared infrastructure
- Cheaper
- Examples: AWS, Azure

Private Cloud:

- Owned by one company
- Expensive
- High security

Hybrid Cloud:

- Combination of both
- Used for banking, healthcare

Hybrid = flexibility + security.
