1. What is Amazon S3?

Amazon S3 is a fully managed, highly scalable object storage service used to store any amount of data. It offers 11 nines durability and is commonly used for backups, static website hosting, logs, and application data.

2. What is an S3 bucket?

An S3 bucket is a logical container for storing objects in S3. Every object must exist inside a bucket, and bucket names are globally unique.

3. How is data organized inside S3?

S3 uses a flat structure; there are no real folders. "Folders" are only a visual representation created using object key prefixes.

4. What are S3 objects?

Objects are files stored in S3 along with their metadata. Each object has an object key, value (data), metadata, and optionally version ID.

5. What is an Object Key?

The object key is the full path or name of the object inside a bucket. Example: images/logo.png

6. What storage classes does S3 offer?

Major storage classes include:

- S3 Standard
- Standard-IA

- One Zone-IA
- Intelligent-Tiering
- Glacier Instant Retrieval
- Glacier Flexible Retrieval
- Glacier Deep Archive
- Reduced Redundancy (deprecated)

7. What is the maximum S3 object size?

The maximum object size is **5 TB**, but a single upload request supports up to 5 GB. For anything larger, we must use multipart upload.

8. How do you upload large files to S3? (Multipart upload)

We use multipart upload, which splits a large file into smaller parts, uploads them in parallel, and then S3 combines them into a single object. It improves speed and reliability.

9. What is S3 versioning?

Versioning keeps multiple versions of the same object. It helps in preventing accidental deletions or overwrites and supports recovery of older versions.

10. What is the difference between S3 and EBS/EFS?

- **S3** → Object storage, accessed via API, used for images, backups, logs.
- **EBS** → Block storage used with EC2 instances, similar to virtual disks.

- **EFS** → Managed NFS file system, supports multiple EC2 instances concurrently.

11. How do you host a static website on S3?

1. Upload HTML/JS/CSS files.
2. Enable "Static website hosting" in bucket properties.
3. Make objects public or use CloudFront.
4. Set index and error documents.

12. How do you reduce S3 cost?

- Use lifecycle policies to move data to cheaper tiers.
- Use Intelligent-Tiering.
- Delete unused versions and incomplete multipart uploads.
- Compress files before uploading.
- Use S3 Glacier for archives.
- Use CloudFront caching to reduce data transfer cost.

13. How does S3 pricing work?

S3 pricing depends on:

- Storage class used
- Number of requests (PUT/GET)
- Data transfer out of AWS
- Replication costs
- Lifecycle transitions and metadata operations
- Retrieval costs for Glacier tiers

14. Explain S3 Standard vs S3 Standard-IA vs One Zone-IA.

- **S3 Standard** → High durability, high availability, multi-AZ; used for frequent access.
- **Standard-IA (Infrequent Access)** → Cheaper storage, but retrieval fees; used for less frequently accessed data.
- **One Zone-IA** → Single AZ storage, cheaper but no multi-AZ redundancy; used for non-critical, recreatable data.

15. What is S3 Intelligent Tiering and when to use it?

S3 Intelligent-Tiering automatically moves objects between frequent and infrequent access tiers based on usage patterns.
It's ideal when you don't know how frequently data will be accessed.

16. What is Glacier & Glacier Deep Archive?

- **Glacier** → Low-cost archival storage for long-term data that is accessed occasionally. Retrieval takes minutes to hours.
- **Glacier Deep Archive** → Lowest-cost storage for long-term data retention. Retrieval can take 12–48 hours.