Cloud Computing

☑ Unit I: Fundamentals of Cloud Computing

Q1: What is Cloud Computing?

A: Cloud computing is the delivery of computing services like servers, storage, databases, networking, software, and more over the Internet, known as "the cloud".

Q2: What are the main goals and benefits of cloud computing?

A: The main goals are scalability, cost-efficiency, and flexibility. Benefits include on-demand access, reduced infrastructure cost, and faster deployment.

Q3: What are the different cloud deployment models?

A: There are four models: Public cloud, Private cloud, Hybrid cloud, and Community cloud.

Q4: Can you explain the cloud delivery models?

A: Yes. There are mainly three:

- IaaS (Infrastructure as a Service)
- PaaS (Platform as a Service)
- SaaS (Software as a Service)

Q5: What is a federated cloud or intercloud?

A: It's a combination of cloud services from different providers, working together to offer more scalability or flexibility.

✓ Unit II: Cloud-Enabling Technology and Virtualization

Q6: What technologies enable cloud computing?

A: Technologies include broadband networks, data centers, web technologies, virtualization, multitenancy, and service-oriented architectures.

Q7: What is virtualization?

A: Virtualization allows multiple virtual machines to run on a single physical machine by abstracting hardware resources.

Q8: Name different types of hypervisors.

A: Type 1 (bare-metal) and Type 2 (hosted) hypervisors. Examples are VMware ESXi and Oracle VirtualBox.

Q9: What are the levels of virtualization?

A: CPU, memory, I/O device, and storage virtualization.

Q10: How is virtualization useful in data centers?

A: It improves resource utilization, simplifies management, and enables automation.

✓ Unit III: Standards and Platforms

Q11: Mention some cloud computing standards.

A: Open Cloud Consortium, Open Virtualization Format, XML, JSON, RSS, Atom, and security standards.

Q12: What services does Amazon Web Services (AWS) offer?

A: Compute (EC2), storage (S3), communication (SNS), and many additional services like Lambda, RDS.

Q13: Explain Google App Engine briefly.

A: It's a PaaS offering by Google for building scalable web applications. It manages the application lifecycle and provides built-in services.

O14: What is Microsoft Azure?

A: It's a cloud platform by Microsoft offering services like SQL Azure for databases and virtual machines through the Windows Azure platform.

Unit IV: Data Storage and Security

Q15: What are GFS and HDFS?

A: GFS (Google File System) and HDFS (Hadoop Distributed File System) are distributed file systems designed for big data storage.

Q16: What is BigTable and HBase?

A: BigTable is Google's distributed database. HBase is the open-source version used with Hadoop.

Q17: What is cloud storage and its advantage?

A: Cloud storage allows saving data on remote servers. It's scalable, accessible, and cost-effective.

Q18: How is cloud computing secure?

A: It offers general security features like encryption, access control, and monitoring. Business continuity and disaster recovery are also part of cloud security.

✓ Unit V: Ubiquitous Clouds & IoT

Q19: What is ubiquitous computing in the context of cloud?

A: It means computing is available everywhere, enabled by cloud services running on various devices seamlessly.

Q20: How does cloud support IoT?

A: Cloud provides storage, processing, and real-time analytics for data collected by IoT devices like sensors, RFID, GPS.

Q21: Can you give examples of IoT applications?

A: Smart buildings, power grids, retail management, and cyber-physical systems.

☑ Unit VI: Future of Cloud Computing

Q22: How will cloud impact operating systems?

A: Future OS will be more cloud-integrated, supporting distributed apps and real-time data access.

Q23: What is Docker and why is it important?

A: Docker is a containerization tool that simplifies deployment and management of applications, making them portable and efficient.

Q24: What is Jungle Computing?

A: It's the use of heterogeneous, dynamic, and large-scale computing environments like cloud, grid, and clusters together.

Q25: What is Energy-Aware Cloud Computing?

A: It refers to optimizing cloud operations to reduce energy consumption and improve sustainability.

Absolutely Chetan! Here's a deeper **set of viva-style questions**—some conceptual, some technical, and some scenario-based—**unit-wise** to help you ace even tricky questions.

☑ Unit I: Fundamentals of Cloud Computing

Q1: What are the characteristics of cloud computing?

→ On-demand self-service, broad network access, resource pooling, rapid elasticity, and measured service.

Q2: Compare traditional computing vs cloud computing.

→ Cloud offers scalability, flexibility, and lower upfront costs, while traditional computing is fixed, infrastructure-heavy, and capital-intensive.

Q3: What is multi-tenancy in cloud computing?

→ It's an architecture where a single instance of software serves multiple customers (tenants), isolating data but sharing resources.

Q4: Give real-world examples of IaaS, PaaS, and SaaS.

→ IaaS: AWS EC2, PaaS: Google App Engine, SaaS: Gmail, Office 365.

Q5: What challenges does cloud computing face today?

→ Security, compliance, vendor lock-in, performance issues, and managing hybrid environments.

✓ Unit II: Cloud-Enabling Technology and Virtualization

O6: What is a virtual machine?

→ A software emulation of a physical computer that runs an OS and applications as if it were a real machine.

Q7: What is paravirtualization?

→ A virtualization technique where the guest OS is aware it's being virtualized, leading to better performance.

Q8: Difference between containerization and virtualization?

→ Containers (e.g., Docker) share the OS kernel, making them lighter and faster than VMs which emulate hardware entirely.

Q9: What is storage virtualization?

→ Abstracting multiple physical storage devices into a single logical storage unit.

Q10: What role does virtualization play in cloud elasticity?

→ Virtualization allows dynamic provisioning and de-provisioning of resources based on load.

Unit III: Standards and Platforms

Q11: Why are standards important in cloud computing?

→ They ensure interoperability, portability, and security among cloud providers and services.

Q12: What is Open Virtualization Format (OVF)?

→ A standard for packaging and distributing virtual appliances or VMs.

Q13: What is EC2 in AWS?

→ Elastic Compute Cloud – a scalable compute service to run applications in the cloud.

O14: What is Azure Blob Storage?

→ A Microsoft Azure service for storing unstructured data like images, videos, and documents.

Q15: Explain the difference between Amazon S3 and EBS.

→ S3 is object storage for static content; EBS is block storage used with EC2 for persistent disk volumes.

✓ Unit IV: Cloud Storage & Security

Q16: What is the CAP theorem in cloud databases?

→ It states that a distributed system can only achieve two of the three: Consistency, Availability, and Partition Tolerance.

Q17: How does cloud computing handle backup and recovery?

→ Through automated snapshots, geo-replication, and distributed storage.

Q18: What is data at rest vs data in transit?

→ Data at rest is stored data (e.g., on disk), data in transit is moving over a network. Both need encryption.

Q19: What is Identity and Access Management (IAM)?

→ A security framework for managing user identities and access rights in cloud environments.

Q20: How does cloud computing support business continuity?

→ With redundant resources, backups, automated failover, and disaster recovery mechanisms.

✓ Unit V: Ubiquitous Clouds & IoT

Q21: What is the role of cloud in smart cities?

 \rightarrow Cloud supports data processing, real-time analytics, and decision-making for traffic, utilities, safety, etc.

Q22: Name common protocols used in IoT.

→ MQTT, CoAP, HTTP, and Zigbee.

Q23: How does cloud support scalability in IoT?

→ It handles increased data flow from IoT devices by allocating more resources as needed.

Q24: What are cyber-physical systems?

→ Systems that integrate physical processes with computational models, like self-driving cars or industrial control systems.

Q25: Explain fog computing vs cloud computing.

→ Fog brings processing closer to edge devices, reducing latency, while cloud centralizes it.

✓ Unit VI: Future Trends and Emerging Tech

Q26: What are microservices, and how are they used in cloud apps?

→ Microservices are small, independently deployable services that together form a larger application, often containerized.

Q27: What is Serverless Computing?

→ A model where developers write functions, and cloud providers manage all infrastructure, scaling, and execution (e.g., AWS Lambda).

Q28: What are the benefits of Docker in cloud?

→ Lightweight, fast startup, consistent environments, and easy deployment across platforms.

Q29: What is edge computing?

→ Processing data at the edge of the network, near the source, to reduce latency and bandwidth usage.

Q30: How does AI integrate with cloud computing?

→ AI uses cloud for training models, data storage, and deploying AI-based services like image recognition or natural language processing.

Web Application development

✓ Unit I: Introduction to Web Technologies

1. What is HTML and why is it used?

HTML (HyperText Markup Language) is the standard language for creating webpages. It structures content using elements like headings, paragraphs, links, images, and forms.

2. What is the difference between HTML tags and elements?

Tags are code snippets like or . Elements consist of a start tag, content, and an end tag (e.g., Hello is a paragraph element).

3. What are semantic HTML5 elements?

improving readability and SEO.

4. Why is CSS important in web development?

CSS (Cascading Style Sheets) styles HTML elements, controlling layout, colors, fonts, margins, animations, etc.

5. What is the difference between margin and padding in CSS?

Margin is the space **outside** an element, padding is the space **inside** (between content and border).

6. What is Bootstrap and why is it used?

Bootstrap is a front-end framework that provides pre-defined classes for responsive design and UI components like buttons, navbars, and modals.

7. What is the W3C and its role in web development?

W3C (World Wide Web Consortium) defines web standards and protocols to ensure interoperability and long-term growth of the Web.

✓ Unit II: Web Scripting Languages

1. What are JavaScript data types?

Primitive: String, Number, Boolean, Undefined, Null, Symbol.

Non-primitive: Objects, Arrays, Functions.

2. Difference between var, let, and const?

• var: function-scoped

• let: block-scoped

• const: block-scoped and cannot be reassigned

3. What is a callback function in JavaScript?

A callback is a function passed as an argument and executed later, often used for async operations.

4. What are Promises and Async/Await in JS?

Promises handle async tasks using .then()/.catch().

Async/Await simplifies syntax, making code easier to read.

5. What is JSON and how is it used?

JSON (JavaScript Object Notation) is a lightweight data format used to exchange data between client and server.

6. What is AJAX?

AJAX (Asynchronous JavaScript and XML) allows web pages to send/receive data from servers without reloading.

7. How does jQuery simplify DOM manipulation?

jQuery uses simple selectors and methods (\$('#id').text()) to easily change content, handle events, and animate elements.

✓ Unit III: Front-End Technologies

1. What is a web framework?

A web framework provides structure and tools to build dynamic web apps faster using MVC architecture.

2. Explain MVC with an example.

Model = data, View = UI, Controller = logic.

E.g., In a todo app, the Model holds todos, View shows the list, Controller handles input.

3. Why use TypeScript over JavaScript?

TypeScript adds type-checking, making code more robust and reducing bugs in large apps.

4. What is Angular CLI?

A command-line tool to scaffold, develop, test, and build Angular apps.

5. What are Angular services and DI?

Services hold reusable logic (like API calls) and DI (Dependency Injection) provides them to components when needed.

6. What is useState() in React?

A React Hook that lets you add and manage state in functional components.

7. What is Redux?

A predictable state management library for JavaScript apps, often used with React.

✓ Unit IV: Back-End Technologies

1. What is Node.js?

Node.js is a runtime environment that lets you run JavaScript on the server side.

2. What is NPM?

NPM (Node Package Manager) is used to install and manage JavaScript libraries and tools.

3. How to create a server in Node.js?

Using the http module:

```
const http = require('http');
http.createServer((req, res) => { res.end("Hello!"); }).listen(3000);
```

4. What is Express.js?

A Node.js framework that simplifies building web apps with routing, middleware, and templates.

5. How does Express.js handle routing?

By defining routes:

```
app.get('/', (req, res) => { res.send("Home"); });
```

6. What is MongoDB and why use it?

A NoSQL database that stores data in flexible, JSON-like documents—ideal for modern apps.

7. What is Mongoose?

An ODM (Object Data Modeling) library for MongoDB and Node.js, simplifying schema creation and data interaction.

Unit V: Mobile Web Development

1. What is mobile-first design?

A design approach that prioritizes mobile UI and enhances it for larger screens.

2. What is jQuery Mobile?

A UI framework built on jQuery for creating mobile-optimized websites and web apps.

3. What are jQuery Mobile pages and transitions?

Pages are <div> sections with data-role attributes; transitions add visual effects between pages.

4. How to create a mobile form using jQuery Mobile?

Use <form> and input fields styled with data-role attributes for better UX.

✓ Unit VI: Web Application Deployment

1. What is AWS?

Amazon Web Services offers cloud solutions for hosting apps, storage, computing, and more.

2. What is EC2?

Elastic Compute Cloud provides virtual servers to run web apps on-demand.

3. What is Elastic Load Balancer (ELB)?

Distributes incoming traffic across multiple EC2 instances for high availability.

4. What is AWS VPC?

Virtual Private Cloud lets you launch AWS resources in an isolated network.

5. What is Elastic Beanstalk?

A platform-as-a-service that simplifies deploying and managing web applications.

6. How do you deploy a Node.js app on AWS?

Use EC2 or Elastic Beanstalk to upload code, install dependencies, and start the server.