✅ Q1 (a) Explain Cloud Computing with their needs (5 Marks)

Definition

Cloud Computing is a model that provides **on-demand access** to shared computing resources such as servers, storage, networks, and applications over the Internet.

Needs of Cloud Computing

1. **Scalability** – Resources can be increased or decreased as per demand.
2. **Cost Reduction** – No need to buy costly hardware or software.
3. **Accessibility** – Services can be accessed anytime, anywhere.
4. **Data Backup & Recovery** – Automatic backup and disaster recovery.
5. **Maintenance Free** – Managed by cloud service providers.

Conclusion

Cloud computing is required to provide **flexible, cost-effective, and scalable computing services**.

✅ Q1 (b) Distinguish between Parallel and Distributed Computing (5 Marks)

Basis	Parallel Computing	Distributed Computing
Definition	Multiple processors execute tasks simultaneously	Multiple computers connected via network
Location	Same system	Different locations
Communication	Shared memory	Message passing
Fault Tolerance	Low	High
Example	Multi-core CPU	Cloud systems

✅ Q1 (c) Explain

(i) Distributed Computing (5 Marks)

Definition

Distributed computing is a system where **multiple computers work together** to solve a problem.

Features

- Resource sharing
- Scalability
- Fault tolerance

Example

Google Search Engine, Cloud systems.

(ii) Grid Computing (5 Marks)

Definition

Grid computing connects **heterogeneous computers** to work on a common task.

Features

- Uses idle resources
- High performance
- Large-scale problems

Example

Weather forecasting, scientific simulations.

✅ **Q2 (a) Identify Cloud Architecture with diagram & explanation (5 Marks)**

Cloud Architecture Components

1. **Front End** – User interface (browser, apps)
2. **Back End** – Servers, storage, databases
3. **Cloud Service Model** – IaaS, PaaS, SaaS
4. **Management Layer** – Monitoring, billing
5. **Security Layer** – Authentication, encryption

Text Diagram

User → Internet → Front End

↓

Cloud Services

↓

Servers & Storage

✅ Q2 (b) Explain Cloud Service Models (5 Marks)

1. IaaS

- Provides virtual machines, storage
- Example: AWS EC2

2. PaaS

- Provides platform to develop applications
- Example: Google App Engine

3. SaaS

- Provides ready-to-use applications
- Example: Gmail, Dropbox

✅ Q2 (c) Explain Virtualization with types & need (5 Marks)

Definition

Virtualization allows **multiple virtual machines** to run on a single physical system.

Types

1. **Full Virtualization**
2. **Para-Virtualization**
3. **Hardware Virtualization**

Need

- Resource utilization
- Cost reduction
- Isolation

✅ Q3 (a) Sketch & explain Cloud Architecture (5 Marks)

(Same answer as Q2(a), rephrase allowed in exams)

✅ Q3 (b) Phases of Cloud Migration (5 Marks)

1. **Assessment** – Identify applications
2. **Planning** – Choose cloud model
3. **Migration** – Move data & apps
4. **Testing** – Verify performance
5. **Optimization** – Improve efficiency

✅ Q4 (a) Summarize Amazon Web Services (5 Marks)

AWS Overview

AWS is a **cloud platform by Amazon** offering computing, storage, and networking services.

Key Services

- EC2 – Virtual servers
- S3 – Storage
- RDS – Databases
- Lambda – Serverless computing

Advantages

- Scalability
- Pay-as-you-go

✅ Q4 (b) Explain PaaS with Pros & Cons (5 Marks)

PaaS Definition

Platform as a Service provides **development environment** over cloud.

Pros

- Faster development
- No infrastructure management

Cons

- Vendor lock-in
- Limited control

✅ Q5 (a) Types of Cloud Security Attacks with examples (5 Marks)

1. **Data Breach** – Unauthorized data access
2. **Account Hijacking** – Stolen credentials
3. **DDoS Attack** – Service disruption
4. **Malware Injection** – Malicious code
5. **Insider Attack** – Internal threats

✅ Q5 (b) Define Cloud Computing with principles (5 Marks)

Definition

Cloud computing delivers computing resources over the Internet on demand.

Principles

1. On-demand self-service
2. Broad network access
3. Resource pooling
4. Rapid elasticity
5. Measured service