

SRM VALLIAMMAI ENGINEERING COLLEGE
(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF INFORMATION TECHNOLOGY

QUESTION BANK



M.Tech DATA SCIENCE

III SEMESTER

CP3262 – CLOUD COMPUTING TECHNOLOGIES

Regulation – 2023

Academic Year 2026 – 2027(ODD Semester)

Prepared by

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DEPARTMENT OF INFORMATION TECHNOLOGY

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SUBJECT : CP3262 – CLOUD COMPUTING TECHNOLOGIES

SEM / YEAR: III Semester/ II Year

	UNIT I VIRTUALIZATION AND VIRTUALIZATION INFRASTRUCTURE			
	Basics of Virtual Machines - Process Virtual Machines – System Virtual Machines –Emulation – Interpretation – Binary Translation - Taxonomy of Virtual Machines. Virtualization –Management Virtualization — Hardware Maximization – Architectures – Virtualization Management – Storage Virtualization – Network Virtualization Implementation levels of virtualization – virtualization Structure – virtualization of CPU, Memory and I/O devices – virtual clusters and Resource Management, Virtualization for data centre automation.			
	PART – A			
Q. No.	Questions	BT Level	Competence	
1	What is a virtual machine?	BTL1	Remembering	
2	Define process virtual machine.	BTL1	Remembering	
3	State system virtual machine.	BTL1	Remembering	
4	Recall what is emulation in virtualization?	BTL1	Remembering	
5	Outline what is interpretation?	BTL1	Remembering	
6	Point out what is binary translation?	BTL1	Remembering	
7	What is virtualization?	BTL1	Remembering	
8	Define management virtualization.	BTL1	Remembering	
9	Recall about hardware maximization in virtualization.	BTL1	Remembering	
10	State storage virtualization.	BTL1	Remembering	
11	Outline what is network virtualization?	BTL1	Remembering	
12	What are virtual clusters?	BTL1	Remembering	
13	Differentiate process and system virtual machines.	BTL2	Understanding	
14	Infer the role of emulation in virtualization.	BTL2	Understanding	
15	How is binary translation used in CPU virtualization?	BTL2	Understanding	
16	How does virtualization help in hardware utilization?	BTL2	Understanding	
17	What is the purpose of virtualization management?	BTL2	Understanding	
18	How does storage virtualization work?	BTL2	Understanding	
19	Explain the concept of network virtualization with an example.	BTL2	Understanding	
20	Differentiate between interpretation and binary translation.	BTL2	Understanding	
21	How does virtualization structure impact system performance?	BTL2	Understanding	
22	What is virtualization of I/O devices?	BTL2	Understanding	
23	Interpret resource management in virtual clusters.	BTL2	Understanding	
24	How does virtualization support data center automation?	BTL2	Understanding	
	PART – B			
Q. No.	Questions	Marks	BT Level	Competence
1	Apply the concept of process and system virtual machines to deploy a development and production environment on a single physical server.	16	BTL3	Applying
2	Demonstrate how emulation and binary translation enable running legacy OSes on modern hardware.	16	BTL3	Applying
3	Apply hardware maximization techniques in a data center using virtualization.	16	BTL3	Applying

4	Show how virtualization of CPU, memory, and I/O devices supports performance isolation in a cloud environment.	16	BTL3	Applying
5	Apply storage and network virtualization to create a multi-tenant cloud environment.	16	BTL3	Applying
6	Demonstrate how to form a virtual cluster for high-availability web services.	16	BTL3	Applying
7	Apply virtualization structure and management to automate VM provisioning using tools like OpenStack.	16	BTL3	Applying
8	Demonstrate how virtualization supports data center automation for a dynamic web application.	16	BTL3	Applying
9	Explain in detail virtual clusters and Resource Management.	16	BTL4	Analyzing
10	Analyze the benefits and drawbacks of using process VMs vs. system VMs in software development.	16	BTL4	Analyzing
11	Examine how emulation, interpretation, and binary translation differ in performance and compatibility.	16	BTL4	Analyzing
12	Compare hardware maximization via virtualization against traditional server provisioning.	16	BTL4	Analyzing
13	Analyze how virtualization of I/O subsystems can improve performance but introduces complexity.	16	BTL4	Analyzing
14	Examine the implications of storage virtualization on data protection and recovery.	16	BTL4	Analyzing
15	Analyze the architecture and performance impact of virtual clusters.	16	BTL4	Analyzing
16	Evaluate virtualization management platforms (like OpenStack vs. VMware) in terms of scalability and automation.	16	BTL4	Analyzing
17	Analyze how virtualization enables data center automation and what challenges it introduces.	16	BTL4	Analyzing

UNIT II - CLOUD PLATFORM ARCHITECTURE

Cloud Computing: Definition, Characteristics - Cloud deployment models: public, private, hybrid, community – Categories of cloud computing: Everything as a service: Infrastructure, platform, software – Layered cloud Architectural Development - Architectural Design Challenges

PART – A

Q. No.	Questions	BT Level	Competence
1	What is cloud computing?	BTL1	Remembering
2	Define public cloud.	BTL1	Remembering
3	List the characteristics of cloud computing.	BTL1	Remembering
4	What is meant by private cloud?	BTL1	Remembering
5	Define IaaS with an example.	BTL1	Remembering
6	What is the role of virtualization in cloud computing?	BTL1	Remembering
7	Mention any two cloud deployment models.	BTL1	Remembering
8	Define SaaS.	BTL1	Remembering
9	What is hybrid cloud?	BTL1	Remembering
10	What is community cloud?	BTL1	Remembering
11	What is meant by PaaS?	BTL1	Remembering
12	Define layered cloud architecture.	BTL1	Remembering
13	Differentiate public and private clouds.	BTL2	Understanding
14	Outline the term “Everything as a Service”.	BTL2	Understanding
15	Compare IaaS and SaaS with examples.	BTL2	Understanding
16	Infer the key features of PaaS.	BTL2	Understanding
17	How does hybrid cloud provides flexibility to organizations?	BTL2	Understanding
18	List any two architectural design challenges in cloud computing.	BTL2	Understanding
19	What are the benefits of using layered architecture in cloud systems?	BTL2	Understanding
20	Differentiate community cloud and hybrid cloud.	BTL2	Understanding
21	How does cloud computing help in cost reduction?	BTL2	Understanding

22	State the term “cloud service model”.	BTL2	Understanding
23	How does cloud architecture handle scalability?	BTL2	Understanding
24	Differentiate between public and private clouds.	BTL2	Understanding
PART – B			
1	Apply the layered cloud architecture model to design a cloud-based e-learning system.	16	BTL3 Applying
2	Demonstrate the application of hybrid cloud in a healthcare organization.	16	BTL3 Applying
3	Apply SaaS and PaaS models in developing a modern online business solution.	16	BTL3 Applying
4	Implement a public cloud solution for a startup using IaaS and justify your choice.	16	BTL3 Applying
5	Design a deployment scenario using community cloud for educational institutions.	16	BTL3 Applying
6	Apply cloud service models to a university system managing infrastructure, development, and ERP.	16	BTL3 Applying
7	Implement a fault-tolerant cloud architecture for a retail application.	16	BTL3 Applying
8	Demonstrate how scalability is addressed through autoscaling in public cloud platforms.	16	BTL3 Applying
9	Analyze the differences between public, private, and hybrid cloud models in terms of cost, control, and scalability.	16	BTL3 Applying
10	Compare IaaS, PaaS, and SaaS with examples and use cases.	16	BTL4 Analyzing
11	Examine the pros and cons of hybrid cloud architecture for data-sensitive industries.	16	BTL4 Analyzing
12	Analyze how cloud computing transforms traditional IT infrastructure.	16	BTL4 Analyzing
13	Compare architectural design challenges of cloud systems with traditional systems.	16	BTL4 Analyzing
14	Evaluate layered cloud architecture in terms of efficiency, security, and modularity.	16	BTL4 Analyzing
15	Analyze the impact of security design flaws in multi-tenant cloud environments.	16	BTL4 Analyzing
16	Discuss the architectural design issues encountered in implementing SaaS platforms.	16	BTL4 Analyzing
17	Analyze the implications of Everything as a Service (XaaS) in enterprise IT planning.	16	BTL4 Analyzing

UNIT – III EDGE AND FOG COMPUTING

Fog Computing, Characteristics, Application Scenarios, Issues and challenges-Fog Computing Architecture: Communication and Network Model, Programming Models, Fog Architecture for smart cities, healthcare and vehicles.Edge Computing Scenario's and Use cases - Edge computing purpose and definition, Edge computing use cases, Edge computing hardware architectures, Edge platforms, Edge vs Fog Computing

PART – A			
Q. No.	Questions	BT Level	Competence
1	What is fog computing?	BTL1	Remembering
2	Mention any two characteristics of fog computing.	BTL1	Remembering
3	What is edge computing?	BTL1	Remembering
4	Name any two application areas of fog computing.	BTL1	Remembering
5	State any two issues in fog computing.	BTL1	Remembering
6	What is the main purpose of edge computing?	BTL1	Remembering
7	Give two examples of edge computing hardware.	BTL1	Remembering
8	What is the difference between fog and edge computing?	BTL1	Remembering
9	Name any two programming models used in fog computing.	BTL1	Remembering
10	List two features of fog computing architecture.	BTL1	Remembering
11	What is the role of communication in fog architecture?	BTL1	Remembering

12	Mention one fog computing use case in healthcare.	BTL1	Remembering
13	List ways in which fog computing reduces latency.	BTL2	Understanding
14	Identify the role of location awareness in fog computing.	BTL2	Understanding
15	Mention how edge computing helps in improving bandwidth efficiency.	BTL2	Understanding
16	Outline the components of fog architecture used in smart cities.	BTL2	Understanding
17	Give reasons why fog computing fits vehicle communication systems.	BTL2	Understanding
18	Distinguish fog and edge computing based on deployment.	BTL2	Understanding
19	Classify the communication models used in fog computing.	BTL2	Understanding
20	State the need for fog computing in IoT systems.	BTL2	Understanding
21	Identify the benefits of fog computing in smart healthcare.	BTL2	Understanding
22	What is the use of edge computing in industrial automation?	BTL2	Understanding
23	Define a fog node with an example.	BTL2	Understanding
24	List ways fog and edge computing support cloud computing	BTL2	Understanding

PART – B

1	Apply fog computing in a smart city traffic control system.	16	BTL3	Applying
2	Design a fog computing-based architecture for real-time healthcare monitoring.	16	BTL3	Applying
3	Apply fog computing in vehicle-to-vehicle communication.	16	BTL3	Applying
4	Implement edge computing in industrial automation systems.	16	BTL3	Applying
5	Develop a fog computing solution for disaster management.	16	BTL3	Applying
6	Design a smart parking system using edge computing.	16	BTL3	Applying
7	Apply fog computing in a public transportation system.	16	BTL3	Applying
8	Create an edge computing solution for smart farming	16	BTL3	Applying
9	Analyze the challenges in fog computing architectures.	16	BTL3	Applying
10	Compare edge and fog computing in terms of performance, scalability, and use cases.	16	BTL4	Analyzing
11	Examine the network and communication models in fog computing.	16	BTL4	Analyzing
12	Analyze fog computing architecture for healthcare systems.	16	BTL4	Analyzing
13	Discuss the issues in programming models for fog and edge computing.	16	BTL4	Analyzing
14	Analyze the role of edge computing in real-time applications.	16	BTL4	Analyzing
15	Evaluate edge hardware platforms and their suitability for AI at the edge.	16	BTL4	Analyzing
16	Analyze the synergy and differences between cloud, fog, and edge computing.	16	BTL4	Analyzing
17	Explain in detail about Fog computing and its role in application with an example.	16	BTL4	Analyzing

UNIT -IV CLOUD PLATFORMS

Amazon Web Services: AWS Infrastructure- AWS API- AWS Management Console - Setting up AWS Storage - Stretching out with Elastic Compute Cloud - Elastic Container Service for Kubernetes-.Windows Azure: Origin of Windows Azure, Features, The Fabric Controller – First Cloud APP in Windows Azure-Service Model and Managing Services: Definition and Configuration, Service runtime API.

PART – A

Q. No.	Questions	BT Level	Competence
1	What does AWS stand for?	BTL1	Remembering
2	What is the purpose of the AWS Management Console?	BTL1	Remembering
3	Name any two services provided by AWS.	BTL1	Remembering
4	What is EC2 in AWS?	BTL1	Remembering
5	Define AWS API.	BTL1	Remembering
6	What is AWS Storage used for?	BTL1	Remembering
7	What is Kubernetes?	BTL1	Remembering
8	Expand ECS.	BTL1	Remembering
9	What is the origin of Windows Azure?	BTL1	Remembering

10	What is the role of the Fabric Controller in Azure?	BTL1	Remembering
11	Define Windows Azure Service Model.	BTL1	Remembering
12	What is the function of the Service Runtime API in Azure?	BTL1	Remembering
13	State the use of AWS EC2 in cloud application deployment.	BTL2	Understanding
14	Mention the purpose of AWS Storage setup.	BTL2	Understanding
15	List the functions of AWS Management Console.	BTL2	Understanding
16	Identify how Kubernetes is used in AWS ECS.	BTL2	Understanding
17	Define the concept of AWS API.	BTL2	Understanding
18	Mention how AWS supports hybrid cloud storage.	BTL2	Understanding
19	State the role of Fabric Controller in Azure.	BTL2	Understanding
20	List the key features of Windows Azure.	BTL2	Understanding
21	Summarize the steps in deploying the first cloud app in Azure.	BTL2	Understanding
22	Classify the service model of Windows Azure.	BTL2	Understanding
23	Identify the use of Service Definition and Configuration files in Azure.	BTL2	Understanding
24	State how Service Runtime API helps in Azure service management.	BTL2	Understanding

PART – B

1	Apply AWS EC2 for setting up a scalable web application.	16	BTL3	Applying
2	Implement a file storage system using AWS S3 and explain its setup.	16	BTL3	Applying
3	Demonstrate the use of AWS Management Console for launching an EC2 instance.	16	BTL3	Applying
4	Deploy a containerized application on AWS using ECS with Kubernetes.	16	BTL3	Applying
5	Build a simple Windows Azure app and deploy it using Azure Service Model.	16	BTL3	Applying
6	Configure a service in Azure using definition and configuration files.	16	BTL3	Applying
7	Show how AWS API can automate infrastructure provisioning.	16	BTL3	Applying
8	Apply the Azure Fabric Controller to manage a high-availability web service.	16	BTL3	Applying
9	Analyze the architectural differences between AWS EC2 and Azure VMs.	16	BTL3	Applying
10	Compare AWS ECS with Azure Kubernetes Service (AKS) in container orchestration.	16	BTL4	Analyzing
11	Evaluate the effectiveness of AWS Management Console versus CLI/API.	16	BTL4	Analyzing
12	Analyze how AWS handles elasticity and scalability using EC2 and S3.	16	BTL4	Analyzing
13	Compare Azure Service Model with traditional deployment models.	16	BTL4	Analyzing
14	Analyze the role of the Fabric Controller in fault management in Azure.	16	BTL4	Analyzing
15	Discuss the security implications of using AWS APIs in cloud applications.	16	BTL4	Analyzing
16	Evaluate the benefits and limitations of Azure Service Runtime API in enterprise applications	16	BTL4	Analyzing
17	Explain the architecture of AWS EC2 and Azure VMs.	16	BTL4	Analyzing

UNIT V PROGRAMMING MODEL

	Introduction to Hadoop Framework – Map Reduce, Input splitting, map and reduce functions, specifying input and output parameters, configuring and running a job –Developing Map Reduce Applications - Design of Hadoop file system –Setting up Hadoop Cluster- Aneka: Cloud Application Platform, Thread Programming, Task Programming and Map-Reduce Programming in Aneka			
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PART – A

Q. No.	Questions	BT Level	Competence
1	What is Hadoop?	BTL1	Remembering
2	Define MapReduce.	BTL1	Remembering
3	What is input splitting in Hadoop?	BTL1	Remembering

4	What does the map function do in MapReduce?	BTL1	Remembering
5	What is the role of the reduce function?	BTL1	Remembering
6	Name two parameters needed to run a MapReduce job.	BTL1	Remembering
7	What is HDFS?	BTL1	Remembering
8	What is Aneka?	BTL1	Remembering
9	What is Thread Programming in Aneka?	BTL1	Remembering
10	What is Task Programming in Aneka?	BTL1	Remembering
11	Define MapReduce programming in Aneka.	BTL1	Remembering
12	What is the purpose of configuring a Hadoop job?	BTL1	Remembering
13	State the function of the Hadoop framework.	BTL2	Understanding
14	Mention how input splitting affects Hadoop performance.	BTL2	Understanding
15	Outline the steps for configuring a MapReduce job.	BTL2	Understanding
16	Identify the inputs and outputs of the map phase.	BTL2	Understanding
17	Summarize the shuffle and sort phase in MapReduce.	BTL2	Understanding
18	State how Hadoop cluster improves job execution speed.	BTL2	Understanding
19	Distinguish between Thread and Task programming in Aneka.	BTL2	Understanding
20	Mention how Task programming works in Aneka with an example.	BTL2	Understanding
21	List the advantages of MapReduce programming in Aneka.	BTL2	Understanding
22	Classify the differences between Hadoop and traditional computing models.	BTL2	Understanding
23	Define the role of the Name Node in HDFS.	BTL2	Understanding
24	Give reasons why fault tolerance is important in Hadoop clusters.	BTL2	Understanding
PART – B			
1	Apply the MapReduce model to process sales data and calculate total revenue per region.	16	BTL3 Applying
2	Develop a MapReduce application to count word frequencies in a large document.	16	BTL3 Applying
3	Demonstrate the setup and configuration of a simple Hadoop cluster.	16	BTL3 Applying
4	Create a sample Aneka Task Programming application for image processing.	16	BTL3 Applying
5	Develop a use case of Thread Programming in Aneka for data analytics.	16	BTL3 Applying
6	Apply Aneka MapReduce model to process temperature sensor data.	16	BTL3 Applying
7	Implement a Hadoop job with input splitting and custom output format.	16	BTL3 Applying
8	Build a distributed log analysis tool using MapReduce.	16	BTL3 Applying
9	Analyze the architecture and design of HDFS and its impact on data reliability.	16	BTL3 Applying
10	Compare the MapReduce models of Hadoop and Aneka.	16	BTL4 Analyzing
11	Analyze the performance of a Hadoop cluster during large-scale data processing.	16	BTL4 Analyzing
12	Discuss the design considerations for developing a Hadoop-based application.	16	BTL4 Analyzing
13	Evaluate the benefits and limitations of Thread Programming in cloud platforms.	16	BTL4 Analyzing
14	Examine how Task Programming in Aneka simplifies parallel execution.	16	BTL4 Analyzing
15	Analyze the importance of shuffling and sort phase in MapReduce jobs.	16	BTL4 Analyzing
16	Compare the execution models of Task and MapReduce in Aneka.	16	BTL4 Analyzing
17	Discuss the fault tolerance and scalability features of the Hadoop framework.	16	BTL4 Analyzing