Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1 With a neat diagram, explain cloud computing and its historical development. (10 Marks) List the characteristics and benefits of cloud computing. (10 Marks)

Explain in brief the services provided by the following cloud service provider:

Amazon web service

Microsoft azure

Google AppEngine.

(10 Marks)

Write a note on challenges in cloud computing.

(10 Marks)

Module-2 Define virtualization and explain hardware level virtualization with its advantages.

(10 Marks)

Discuss the taxonomy of virtualization techniques at different levels.

(10 Marks)

(10 Marks) What are the characteristics of virtualized environment? a.

Explain with a neat diagram Type-I and Type-II hypervisor. b.

(10 Marks)

Module-3

Explain the different types of cloud. 5 a.

(10 Marks)

What is laas? Explain its reference implementation with a neat diagram.

(10 Marks)

Explain the economics of the cloud,

(10 Marks)

What does the acronym SaaS mean? How does it relate to cloud computing?

(10 Marks)

Analyze the various cloud security risks that organization face when utilizing cloud

(10 Marks)

computing services. Explain the security risks posed by a management OS. (10 Marks)

Discuss the traditional concept of trust and trust necessary for online activities.

Explain in detail virtual machine security.

(10 Marks) (10 Marks)

(10 Marks)

Describe Amazon EC2 and its basic features.

b. Analyze how cloud computing technology can be applied to support remote ECG monitoring.

What is a bucket? What type of storage does it provide?

(10 Marks)

10 Examine the core components of AppEngine. (10 Marks)

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main tone

Important Note: 1 On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages 2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be

On compressing of identification, appeal to evaluator and for equations written eg. 42+8 = 50, will be treated as malpractice.

7

$Cloud\ Computing-21CS72$

Dec 2024/Jan 2025

Q. No.	Solutions	Marks Allocated
1a.	Historical development of cloud computing. Distributed system (2M) Mainframe (2M) Cluster Computing (2M) Grid Computing (2M) Diagram (2M)	10M
1b.	Characteristics of Cloud computing 1. On Demand Self Service. 2. Broad Network Access 3. Resource Pooling 4. Rapid Elasticity 5. Measured Servers 6. Reliability 7. Scalability 8. Sustainability	5M
	Benefits of Cloud Computing 1. Cost Saving 2. Scalability 3. Accessibility 4. Automatic Updates 5. Disaster Recovery	5M
2a	OR (i) Amazon web services - Compute on demand service namely EC2 & S3(Simple Storage Service) (2M) - Supports Iaas & Saas (1M)	3M
	(ii) Microsoft Azure 3 types of Role 1. Worker Role 2. Web Role 3. Virtual Machine ROC Supports Iaas, Paas, Saas.	4M
	 (iii) Google AppEngine Fully managed Paas Supports multiprogramming language Easy development and deployment 	3M
2b	Challenges in cloud computing 1. Security & privacy	10M

	2. Downtime & Avaliability	
	· · · · · · · · · · · · · · · · · · ·	
	3. Compliance & Legal issues4. Vendor lock	
	5. Cost Management 6. Data Control	
	7. Latency & Performance	
	(Any 5 points from above – Each carries 2M)	2) (
3a	Virtualization	2M
	It is a technology that allows multilink virtual environments to run on a single	
	physical hardware system.	
	Hardware level Virtualization	
	1. Virtualization Extensive	8M
		OIVI
	2. Hypernsive Supply3. Enhanced Isolation	
	4. Reduced overhead	
21.	(Each carries 2 Marks)	2)./
3b	Taxonomy of virtualization Techniques	2M
	1. Process level techniques	
	2. System level techiniques	
	i. Hardware virtualization	8M
	ii. Operating system virtualization	Olvi
	iii. Application virtualization	
	iv. Network virtualization	
	v. Storage virtualization	
	OR	
4a	Characteristics of virtualized environment	10M
	1. Isolation	
	2. Hardware Independence	
	3. Resource pooling	
	4. Scalability	
	5. Efficient Resource utilization	
	6. Live migration	
	7. Security	
	(Any five points – Each carries 2 Marks)	
4b	Type I and Type II Hypervisor	4M
	Type I – Runs directly on the top of the hardware.	1
	Type II- Requires support of an operating system to provide virtualization.	
	Type it resquires support of an operating system to provide virtualization.	
	Type I Characteristics	
	1. Performance	3M
	2. Security	
	3. Example	
	Type II Characteristics	
	1. Ease of use	3M
<u> </u>	1. 2007 01 000	1 21.1

	2. Performance	
	3. Security4. Example	
5a	Different types of cloud	10
Ja	1. Public cloud	10
	2. Private cloud	
	3. Hybrid cloud	
5b		
30	Infrastructure as a service(Iaas) Definition (2M)	
	Key feature (2M)	
	Component(2M)	
	Diagram (2M) Description of the diagram (2M)	
	Description of the diagram (2M) OR	
60		1014
6a	Economics of the cloud 1. Cost structure	10M
	2. Financial benefits	
	3. Economic implications4. Hidden cost	
	5. Cost optimization strategies (Fach corries 2 Morks)	
<i>(</i> 1.	(Each carries 2 Marks)	101/4
6b	Software as a service (Saas)	10M
	Definition (2M) Very characteristics (2M)	
	Key characteristics (2M)	
	Relation to cloud (4M) Reporting of Spag in aloud computing (2M)	
7a	Benefits of Saas in cloud computing (2M)	10M
/a	Cloud security risks 1. Insecure API	TOW
	2. Data breaches	
	3. Threats	
	4. Denial of service ((DOS) attacks	
	5. Misconfigured cloud settings	
	(Each carries 2 Marks)	
7b	Security risks posed by management OS	10M
70	1. Unauthorized access	TOIVI
	2. Misconfiguration	
	3. Weak authentication	
	4. Index threats	
	5. Insecure API	
	6. Denial of service (DOS) attacks	
	OR	
8a	Trust –Means assured reliance on the character, ability, strategy or truth of	2M
Ju	someone or something. Trust necessary for online activities in cloud	2171
	computing.	
	1. Data security and privacy	
	2. Service reliability	8M
	2. Strice remonity	0171

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	3. Compliance and legal objectives	
	4. Transparency and accountability	
	5. Vendor lock in concern	
	6. Reputation and reviews	
	7. Authentication and access control	
8b	Virtual machine security	10M
	1. Isolation and segmentation	
	2. Hypervisor security	
	3. Access control and authentication	
	4. Network security	
	5. Data Protection	
	6. VM Hardening	
	7. Monitoring and Logging	
	8. Incident Response and Recovery	
9a	Amazon EC2 and its Features	10M
	Amazon Elastic compute cloud is a web service provided by AWS, that offers	
	web service provided by AWS, that offers scalable computing capacity in the	
	cloud features.	
	1. Scalability	
	2. Flexible pricing methods	
	3. Variety of instance types	
	4. Virtual private cloud	
	5. Elastic load balancing	
	6. Security	
9b	Cloud computing applied to remote ECG monitoring	10M
, ,	1. Data collection	101.1
	2. Data transmission	
	3. Data storage	
	4. Data processing and analysis	
	5. Collaboration and accessibility	
	6. Security and compliance	
	7. Cost efficiency	
	7. Cost efficiency	
10a	Bucket	10M
10a	Bucket is a fundamental container in cloud storage services. Buckets are used	101/1
	to store and organize data objects.	
	to store and organize data objects.	
	Types of storage provided by buokets	
	Types of storage provided by buckets 1. Object storage	
	2. Storage classes	
	3. Backup and archive solutions	
1.01	4. Data sharing and collaboration	107.5
10b	Core components of APPEngine	10M
	1. Services	
	2. Versions	
	3. Instances	

- 4. Scaling
- 5. Datastore
- 6. Cloud Firestore
- 7. Cloud storage8. Task queues
- 9. Mamcache
- 10. Routings cloud balancing
 11. Monitoring and logging
 12. Security features