

CLOUD COMPUTING
(CSEN 5243)

Time Allotted : 3 hrs

Full Marks : 70

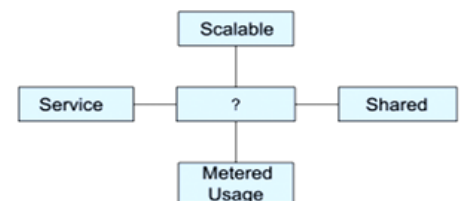
Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group - A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**
- (i) A service that concentrates on hardware follows the _____ as a Service model.
(a) IaaS (b) CaaS (c) PaaS (d) all of the mentioned
- (ii) Which of the following software can be used to implement load balancing?
(a) Apache mod_balancer (b) Apache mod_proxy_balancer
(c) F6's BigIP (d) All of the mentioned.
- (iii) Azure Storage plays the same role in Azure that _____ plays in Amazon Web Services.
(a) RDS (b) EC2
(c) S3 (d) MapReduce
- (iv) Multiple reader and writer is supported by
(a) GFS (b) HDFS
(c) MapReduce (d) Both (a) and (b).
- (v) Which of the following lets a Web service advertise itself in terms of a collection of endpoints?
(a) SOA (b) WSDL
(c) SOAP (d) RDF.
- (vi) Which of the following should be replaced with the question mark in the following figure?
(a) Abstraction (b) Virtualization
(c) Mobility pattern (d) All of the mentioned.
- (vii) Which deployment model of cloud computing should be used by a business group, consisting of multiple companies, for its authorized users?
(a) Community Cloud (b) Hybrid Cloud
(c) Public Cloud (d) Private Cloud.



- (viii) Who should have the primary responsibility of managing the database for a SaaS-based cloud computing environment like Salesforce.com?
(a) Service Provider (b) Service Subscriber
(c) Both of them (d) Neither of them.
- (ix) Cloud computing architecture is a combination of?
(a) Service-oriented architecture and grid computing
(b) Utility computing and event-driven architecture
(c) Service-oriented architecture and event-driven architecture
(d) Virtualization and event-driven architecture.
- (x) X86 is a
(a) System Abstraction (b) Machine Abstraction
(c) Library Level Abstraction (d) OS level Abstraction.

Group- B

2. (a) With respect to the NIST Reference Model of Cloud Computing, explain the following with suitable schematic and examples:
(i) Service Models (ii) Deployment Models. [(CO2)(Analyze/IOCQ)]
(b) Discuss two major disadvantages of cloud computing with suitable examples. [(CO2)(Discuss/LOCQ)]
(c) What are the main characteristics of an IaaS solution? Give one scenario example where IaaS is not suitable. [(CO3)(Analyze/IOCQ)]
(3 + 3) + 2 + (2 + 2) = 12
3. (a) What is virtualization in the context of cloud computing? Depict, using a classification chart, the taxonomy of various virtualization techniques. [(CO2)(Remember/LOCQ)]
(b) Distinguish with example where (i) Type-I (or Native) Hypervisor, and (ii) Type-II (or Hosted) Hypervisor are suitable. [(CO3)(Analyze/IOCQ)]
(c) Is there any connection between Cluster and Cloud? These are same? If No, what are the differences? [(CO4)(Analyze/IOCQ)]
(1 + 4) + (2 + 2) + (1 + 2) = 12

Group - C

4. (a) What is 'multi-tenancy' in the context of SaaS? Explain in brief. [(CO3)(Analyze/IOCQ)]
(b) Mention three characteristics of a typical SaaS solution that you think are significant; explain with suitable example(s) and/or appropriate schematic diagram(s) that you feel will help establish your understanding. [(CO3)(Analyze/IOCQ)]
(c) "Cloud computing can replace expensive personal computer hardware and/or costly software licenses" — explain with suitable example(s). [(CO3)(Analyze/IOCQ)]
2 + 6 + 4 = 12

5. (a) What is Infrastructure-as-a-Service (IaaS) and what are the main characteristics of an IaaS solution? [(CO6)(Develop/HOCQ)]
(b) Explain some typical situations where: (i) IaaS makes sense, and (ii) where IaaS may not be suitable. [(CO6)(Develop/HOCQ)]
(c) What advantages does Platform-as-a-Service (PaaS) provide? Explain in brief with one example. [(CO6)(Develop/HOCQ)]
Use suitable example(s) and/or appropriate schematic diagram(s) that you feel will help establish your understanding.

4 + 4 + 4 = 12

Group - D

6. (a) What are the goals of GFS. Explain Garbage Collection in GFS. [(CO2)(Remember/LOCQ)]
(b) How GFS avoids “single point of failure”? [(CO4)(Examine/LOCQ)]
(c) Linda is a good Photographer. She captures shots and often tries to give special effects on pictures using her own set up with an AWS account. She plans to distribute her collection of beautiful images to the world. What are the QoSs she may worry about and why? [(CO6)(Propose/HOCQ)]

(2 + 4) + 2 + 4 = 12

7. (a) What are the mechanisms for protecting data in cloud? How tenancy is affecting the data security? How Optimization phase is Cloud Lifecycle is related to Tenancy? [(CO5)(Analyze/IOCQ)]
(b) Critically Comment: Infrastructure Security management of Hybrid model and Public model imposes responsibilities on Customer only. [(CO3)(Criticize/IOCQ)]
(c) What is CHAP and OpenID? [(CO3)(Remember/LOCQ)]

(2 + 1 + 2) + 3 + (2 + 2) = 12

Group - E

8. (a) What is Amazon’s AWS? Explain in brief. [(CO5)(Apply/HOCQ)]
(b) Describe, in brief, the following two broad categories of services that AWS provides through its range of API’s; use suitable example(s) and/or schematic diagram(s) that you feel will establish your understanding: [(CO5)(Apply/HOCQ)]
(i) Data as a Service (e.g., ECS, Historical Pricing)
(ii) Infrastructure as a Service (e.g., SQS, S3, EC2).

2 + (4 + 6) = 12

9. (a) Consider the following Scenario:
An Educational and Research organization is interested to install cloud. The stakeholders are Professors, Research Fellows and Students. Professors share study materials and take online exams. Research fellows execute complex algorithms. Students discuss doubts in forums and submit assignments online.

Answer the following Questions:

I. Which deployment model is suitable? Why?

II. What are the different aspect you have judged to arrive at this decision.

[(CO4,C06)(Choose/HOCQ)]

(b) What is Elastic IP? Why it is useful?

[(CO2)(Understand/LOCQ)]

(c) ABC corp has their DB application using MySQL. They are planning to port it to cloud.

What kind of DB services they should choose and why?

Additionally they want to monitor the DB usage by them. For monitoring which service is suitable and why?

[(CO5,C06)(Conclude/HOCQ)]

(3 + 3) + (1 + 1) + (2 + 2) = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	21.88	38.54	39.58

Course Outcome (CO):

After the completion of the course students will be able to

1. Identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud.
2. Describe the core issues of cloud computing such as security, privacy, and interoperability to choose the appropriate technologies, algorithms, and approaches for the identified problems.
3. Analyze various cloud computing solutions.
4. Evaluate cloud Storage systems and Cloud security, the risks involved, its impact.
5. Apply knowledge for solving real life cloud computing problem scenario and illustrate solutions.
6. Develop appropriate cloud computing solutions and recommendations according to the applications used.

*LOCQ: Lower Order Cognitive Question; IOCQ: Intermediate Order Cognitive Question; HOCQ: Higher Order Cognitive Question