

CLOUD COMPUTING
(CSEN 3235)

Time Allotted : 3 hrs

Full Marks : 70

Figures out of the right margin indicate full marks.

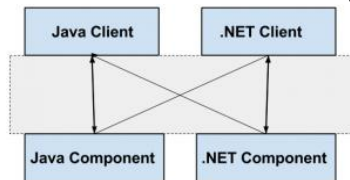
Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.

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) Which of the following is created based on Hadoop upon EC2?
(a) Autoscaling (b) RDS
(c) MapReduce (d) SimpleDB.
 - (ii) Which one of these cloud-based solutions is not considered to be a PaaS offering?
(a) Force.com (b) Amazon EC2
(c) Microsoft Azure Services (d) All of these.
 - (iii) An application that needed _____ storage alone might not benefit from a cloud deployment at all.
(a) onsite (b) time sharing (c) offline (d) virtual
 - (iv) Azure Storage plays the same role in Azure that _____ plays in Amazon Web Services.
(a) RDS (b) EC2 (c) S3 (d) MapReduce
 - (v) Which one of the following is not really an advantage of cloud computing?
(a) Worry-free about running out of storage
(b) Handling diverse network types
(c) Ubiquitous access to computing set-up
(d) Paying only for what you use.
 - (vi) Virtual Machine Ware (VMware) is an example of
(a) infrastructure service (b) platform service
(c) software service (d) none of these.
 - (vii) Which of the following lets a web service advertise itself in terms of a collection of endpoints?
(a) SOAP (b) CHAP (c) SLA (d) WSDL.

(viii) Which of the following is used as middleware layer in the following figure?



- (a) RDF (b) ESB (c) UDDI (d) Registry.

(ix) In computing, a ___ is a term used with respect to user interfaces, to describe ways in which the virtual space of a computer’s desktop environment is expanded beyond the physical limits of the screen’s real estate through the use of the software.

- (a) virtual desktop (b) virtualization
(c) VMM (d) hypervisor

(x) What is not an advantage of auto-scaling?

- (a) Better fault-tolerance (b) Better availability
(c) Better compliance (d) Better cost management.

Group - B

2. (a) What is virtualization? Depict, using a classification chart, the taxonomy of various virtualization techniques. [(CO4)(Remember/HOCQ)]
(b) Compare the two types of virtualizations for execution environments – Processlevel and System-level – with respect to technique and virtualization model. [(CO2)(Understand/LOCQ)]
(c) Explain through suitable schematic diagram(s) the following: (i) Type-I (or Native) Hypervisor, and (ii) Type-II (or Hosted) Hypervisor.

[(CO1)(Analyse/IOCQ)]

4 + 4 + 4 = 12

3. (a) What is a Hybrid Cloud? Critically comment on: Elasticity and Scalability are mutually conflicting properties and cannot be achieved by a single solution. [(CO2)(Remember/LOCQ)]
(b) What are the different deployment models in cloud? Give useful example of each type. [(CO3)(Understand/LOCQ)]
(c) What do you mean by “Rapid Provisioning” and “Pay per Use” in connection with “Cloud Computing” definition? Describe with real world scenario.

[(CO3)(Analyse/IOCQ)]

(1 + 2) + 4 + (1 + 1 + 3) = 12

Group - C

4. (a) Answer the following with proper explanation:
(i) Think about a scenario, when a service provider creates a new service offering, which allows the customers to deploy virtual machines and specify their network configuration. What sort of cloud offering is this?

- (ii) Think about a scenario, when a service provider creates a new service offering, which is basically an email client in the browser. What sort of cloud offering is this? [[CO3](Judge/HOCQ)]
- (b) Critically Comment on:
- (i) SOAP and REST are equally capable. [[CO4](Criticize/HOCQ)]
- (ii) DbaaS is an extension of PaaS. [[CO4](Criticize/HOCQ)]
- (c) Describe the differences of type I and II hypervisors with proper diagram. As per your opinion, which one is more efficient and why? [[CO2](Analyze/IOCQ)]
- (2 + 2) + (2 + 2) + (2 + 2) = 12**
5. (a) A company ABZ decides to provide free access to cloud resources dedicated to higher education. Which one of the three cloud computing delivery models, SaaS, PaaS, or IaaS should it embrace and why? Which deployment model they should use and why? Will this solution have an impact on distance learning? Why? [[CO4](Understand/LOCQ)]
- (b) What do you mean by “Vendor Lock-in”? Which service model is mostly affected by it and why? [[CO2](Understand/LOCQ)]
- (c) What is IaaS? Give example of a real world application of IaaS. [[CO1](Analyze/IOCQ)]
- (1 + 2 + 1 + 1 + 2) + (1 + 1 + 1) + (1 + 1) = 12**

Group - D

6. (a) Critically Comment:
- (i) Type-I Virtualization is better than Type-II
- (ii) Vendor Lock in frees service offerings. [[CO3](Comment/IOCQ)]
- (b) Why XEN is considered to implement paravirtualization? [[CO2](Remember/LOCQ)]
- (c) Consider the problem scenario:
An online shopping (Garments and Gift items) website has been very popular in India. They are using popular service offerings from Amazon for their hosting. Answer the following:
- (i) What is the most important SLA parameter to consider according to you? Why?
- (ii) What kind of instances should be suitable for this shopping website, particularly for India? Why? [[CO1](Analyze/IOCQ)]
- (2 + 2) + 2 + (1 + 2 + 1 + 2) = 12**
7. (a) State whether the following are TRUE/FALSE with explanation:
- (i) EBS volumes can be attached at any time only to a single instance.
- (ii) EBS volumes can contain any file system.
- (iii) The Google Compute Engine implements the API of Amazon EC2.
- (iv) In S3, the file extension of uploaded files is essential for the way, the storage service treats the file. [[CO4,CO6](Explain/LOCQ)]
- (b) An organization debating whether to install a private cloud or to use a public cloud, e.g., the AWS, for its computational and storage needs, asks your advice.

How will you solve it using each one of the following items and come up with a solution:

- (i) The description of the algorithms and the type of the applications to run
 - (ii) The system software used by these applications
 - (iii) The resources needed by each application
 - (iv) The size of the user population
 - (v) The relative experience of the user population
 - (vi) The costs involved [[CO5,CO6](Solve/IOCQ)]
- (c) A private cloud platform service is to be deployed when the application is already developed with Google App Engine. Assemble and explain which type of platform you will choose and name any platform service inside an infrastructure that can be used as alternative to your mobile personal computer. [[CO6](Assemble/HOCQ)]
- 4 + 4 + (2 + 2) = 12**

Group - E

8. (a) How availability and replication is related in distributed storage systems? [[CO3](Understand/LOCQ)]
- (b) Show the data flow and detailed sequence of WRITE operation in GFS with diagram. [[CO4](Show/IOCQ)]
- (c) What do you mean by 3-2-1 back up? Give one real life example of Unmanaged Cloud Storage. [[CO4](Understand/LOCQ)]
- 3 + 4 + (2 + 3) = 12**
9. (a) Critically comment: Infrastructure security management of Hybrid model and Public model imposes responsibilities on customer only. [[CO1](Remember/LOCQ)]
- (b) Using a schematic architecture diagram explain the core components of Google's GWT. [[CO2](Understand/LOCQ)]
- (c) What are the mechanisms for protecting data in cloud? How is tenancy affecting the data security? [[CO2](Analyse/HOCQ)]
- 3 + 4 + (3 + 2) = 12**
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Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	43.75	36.45	21.87

Course Outcome (CO):

- CSEN3235.1. Appreciate the benefits and limitations of cloud-based computing environments.
- CSEN3235.2. Understand the underlying principles of cloud virtualization, cloud storage, cloud security.

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- CSEN3235.3. Analyze the suitability and/or applicability of various cloud computing models, platforms, services, solution offerings and tools from some industry leaders.
- CSEN3235.4. Gain insight into various distributed computing issues (like performance, scalability, availability, reliability) in light of distributed file systems (such as HDFS, GFS).
- CSEN3235.5. Identify security and privacy issues in cloud computing.
- CSEN3235.6. Apply Knowledge to provide solution for real life problems.

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

