

KATHMANDU UNIVERSITY
End Semester Examination
February, 2025

Marks Scored:

Level : B.E./B.Sc.
Year : IV

Course : COMP 478
Semester : I

Exam Roll No. : Time: 30 mins.

F. M. : 10

Registration No.:

Date 04 FEB 2025

SECTION "A"

[20Q. × 0.5 = 10 marks]

Choose the most appropriate answer and **encircle**.

- Which cloud service model provides virtual machines, storage, and networking as a service?
a. SaaS b. PaaS c. IaaS d. DaaS
- Which of the following protocols is commonly used for web services communication?
a. FTP b. SOAP c. SMTP d. POP3
- Which of the following is a key difference between Grid Computing and Cloud Computing?
a. Grid computing provides centralized resources, while cloud computing follows a distributed approach.
b. Cloud computing offers on-demand scalability, while grid computing focuses on resource sharing across multiple organizations.
c. Grid computing is more cost-effective than cloud computing for all use cases.
d. Cloud computing requires dedicated hardware, while grid computing runs only on virtualized environments.
- Which of the following is a potential drawback of cloud computing for businesses?
a. Increased control over data and infrastructure
b. Higher capital expenditure compared to traditional IT infrastructure
c. Reduced need for internet connectivity
d. Vendor lock-in and limited migration flexibility
- Which of the following cloud computing characteristics is most beneficial for big data processing?
a. Limited storage capacity b. On-demand scalability
c. High latency in data processing d. Fixed infrastructure costs
- Which IoT protocol is designed for low-power devices and operates on top of UDP (User Datagram Protocol)?
a. HTTP b. MQTT c. SNMP d. CoAP

7. Which cloud feature allows resources to be dynamically adjusted based on demand?
 - a. Elasticity
 - b. Scalability
 - c. On-demand self-service
 - d. Virtualization
8. Which cloud service model provides the software and applications over the internet, eliminating the need for users to manage infrastructure or platforms?
 - a. SaaS
 - b. PaaS
 - c. IaaS
 - d. DaaS
9. Which of the following is a characteristic of the IaaS (Infrastructure as a Service) model?
 - a. Users access software applications via the cloud.
 - b. Users are provided with a platform to develop applications.
 - c. Users rent virtualized computing resources such as servers and storage.
 - d. Users don't have to worry about hardware or software updates.
10. Which of the following best describes a method to enhance data security in cloud computing?
 - a. Storing data in plain text for easy access
 - b. Using multi-factor authentication (MFA) for user access
 - c. Sharing encryption keys publicly
 - d. Disabling audit logs for privacy
11. Which of the following refers to data remanence?
 - a. Inadvertent disclosure of data
 - b. Data storage of audit and compliance purpose
 - c. Computational accuracy
 - d. Data confidentiality
12. Trust issues in the cloud can be minimized by ____.
 - a. Contract, policy and regulation
 - b. VPC
 - c. Application level monitoring
 - d. IDM
13. Which of the following is a key advantage of using microservices architecture in cloud computing?
 - a. Single monolithic application deployment
 - b. Easier scalability and independent service deployment
 - c. Centralized database management
 - d. Reduced cloud infrastructure costs
14. Which of the following principles is most closely associated with cloud-native architecture?
 - a. Using static, on-premise infrastructure
 - b. Building applications that are tightly coupled to the underlying hardware
 - c. Emphasizing flexibility and scaling using loosely coupled, distributed services
 - d. Relying on a single service for all functionalities

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15. What is a potential drawback of multi-tenancy in cloud computing?
 - a. Decreased resource utilization
 - b. Difficulty in scaling applications for individual tenants
 - c. Increased risk of performance degradation due to resource sharing
 - d. High cost of dedicated resources for each tenant
16. What is the primary function of a hypervisor in cloud virtualization?
 - a. Managing user access to cloud applications
 - b. Allocating storage for virtual machines
 - c. Ensuring data security between virtual machines
 - d. Creating and managing virtual machines by abstracting physical hardware
17. Which of the following best describes the "uniform interface" constraint in RESTful APIs?
 - a. It requires the use of a specific programming language for implementation
 - b. It ensures all resources have the same URL structure
 - c. It mandates using a specific database type
 - d. It defines a consistent way for clients and servers to communicate
18. Which of the following is an example of a Type 1 hypervisor?
 - a. VMware Workstation
 - b. Oracle VirtualBox
 - c. Microsoft Hyper-V
 - d. VirtualBox Extension Pack
19. Exponential distributed lifetime refers to _____.
 - a. Age of module does not affect probability of failure
 - b. probability of failure is exponential to the age of module
 - c. The condition applicable for Bath-tub curve
 - d. Module lifetime is exponential
20. Which of the following best describes the difference between MTTR (Mean Time To Repair) and MTBF (Mean Time Between Failures) in cloud availability?
 - a. MTTR measures the time to repair after a failure, while MTBF measures the average operational time between failures.
 - b. MTTR measures uptime, while MTBF measures downtime.
 - c. MTTR measures the time before a failure, while MTBF measures the time to fix it.
 - d. MTTR and MTBF are both used to calculate cloud storage costs.

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SECTION "B"

[6Q. × 4 = 24 marks]

Attempt *ANY SIX* questions.

1. Discuss in brief about two vital features of cloud computing which complement the state of the art cloud computing.
2. Provide a brief overview of IoT communication protocols and their types. Additionally, differentiate between two major communication protocols used in IoT. [2+2]
3. Discuss in brief about Taxonomy of fear in terms of security concerns in the cloud.
4. Explain the key differences between REST architecture and the SOAP protocol.
5. Discuss in brief about different deployment models of cloud. Write in brief about where those models are appropriate.
6. Briefly explain the security concerns associated with different cloud service models and why IaaS is considered more secure compared to other service models. [2+2]
7. Provide a brief overview of virtualization and the different types of hypervisors used in cloud computing. [2+2]

SECTION "C"

[2Q. × 8 = 16 marks]

Attempt *ANY TWO* questions.

8.
 - a. Write about the IAM and availability concerns in Zero Trust Architecture. [4]
 - b. Describe the ways that mitigate the security concerns that arise due to lack of control in cloud. [4]
9.
 - a. Explain in brief about reliability and availability of a system with perspective of MTTF, MTBF and MTTR. [4]
 - b. Briefly explain the key principles of cloud-native architecture and how they contribute to building scalable, resilient applications in the cloud. [4]
10. Discuss in brief about major overlapping of distributed systems and the rise of microservice architecture with major technologies used in it. [4+4]

