PES University, Bengaluru

(Established under Karnataka Act 16 of 2013)

END SEMESTER ASSESSMENT (ESA) - JULY - 2023

UE19CS352 - Cloud Computing

Total Marks : 100.0

1.a. Classify the following into into IaaS, PaaS and SaaS models with proper justification

1. AWS EC2
2. Google App Engine
3. Office 360
4. AWS RDS
5. Shopify (eCommerce software that can be used to build ECommerce Stores)
6. AWS S3

(6.0 Marks)

1.b. What is elasticity? How is it different from scalability? Give an example each to clearly distinguish these concepts (4.0 Marks)

1.c. What are the differences between monolithic and microservices applications? What are the challenges associated with migrating monolithic operations?

(6.0 Marks)

1.d.
What is serverless computing? Give one example of a serverless computing service. What are the benefits associated with serverless computing
(4.0 Marks)

2.a. 1. What are controller-manager, kubelets and pods in Kubernetes? Explain with a diagram where each of them execute – on master or worker? (8.0 Marks)

2.b. How paravirtualization and full virtualization techniques are used to virtualize x86? (5.0 Marks)

2.c. What is VM Migration? What are the different types of VM Migration? State the difference between these types of VM Migration. Explain pre-copy and post-copy techniques of migration. (7.0 Marks)

3.a. What is replication in distributed systems, why is it needed? What are different types of replication techniques based on number of leaders? Explain each of them. (10.0 Marks)

3.b. What is meant by the rebalancing of partitions? What are the aspects that need to be taken e while rebalancing is in the process? Explain the following types of rebalancing techniques.

1. Fixed Number of Partitions
2. Dynamic Partitioning
3. Partitioning proportional to the nodes

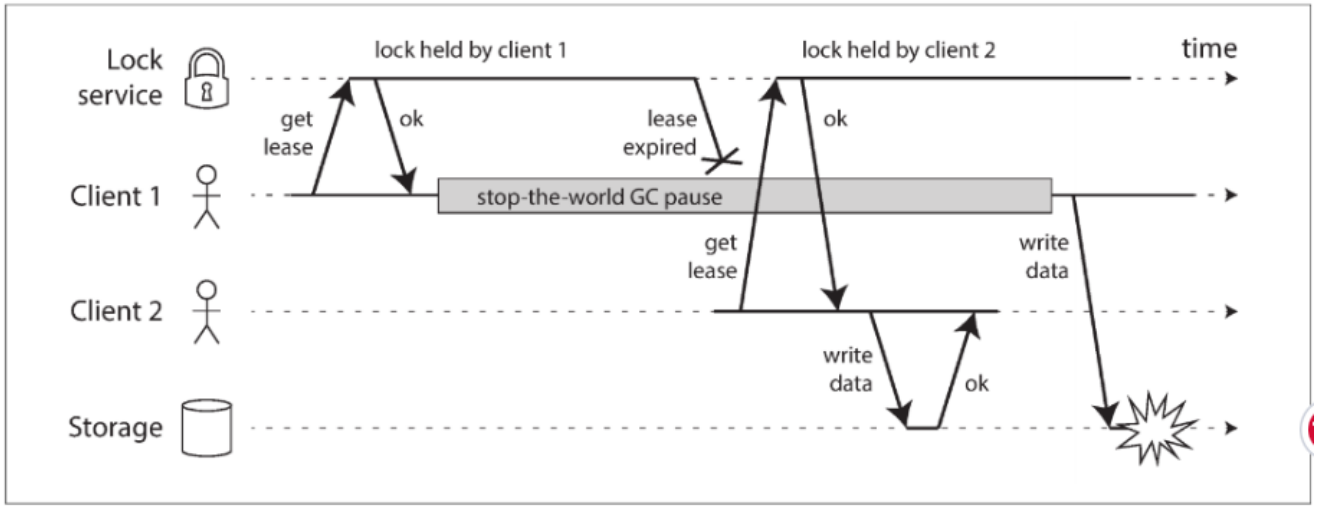
(10.0 Marks)

4.a. What is a “fault-tolerant” system? Name at least two types of failures.
If a service was unavailable for 30 minutes in 75 hours due to 9 failures, compute the MTBF and MTTR of that service. (5.0 Marks)

4.b. What is a leader election? Explain the modified ring election algorithm. Answer the following questions assuming that the initiator is non-faulty.
How many messages are required?
What is the turnaround time?
What is the Complexity of the algorithm? (8.0 Marks)

4.c.

1. The following diagram shows an implementation of distributed lock. What went wrong and why? Explain with a neat diagram, what can be done to avoid such errors.



(7.0 Marks)

5.a. What is multi-tenancy? Mention its benefits in Cloud Computing.
You are asked to design a multitenant database for two Ecommerce stores. HighValueStore and FreshtoMarket to store information about customers. HighValueStorewants to store CustId, Customer names, and email ids while FreshtoMarket wants to store CustId, Customer names, and Area_Name Design a multitenant database using the preallocated column method for the same.
(6.0 Marks)

5.b. What is Cloud Bursting? What are the factors to consider when choosing cloud bursting, Explain how Cloud Bursting can be Beneficial to Cloud Users? (5.0 Marks)

5.c. Write a short note on, support with sketches wherever necessary

1. Dual scheme strategy of failure detection (3 marks)
2. DOS, DDOS and EDODS (6 marks)

(9.0 Marks)