PES University, Bengaluru

(Established under Karnataka Act 16 of 2013)

END SEMESTER ASSESSMENT (ESA) - May 2023

UE20CS351 - Cloud Computing

Total Marks : 100.0

1.a. List and explain the benefits of moving applications to the cloud. (4.0 Marks)

1.b. Explain the following terms with respect to Cloud Computing

1. Elasticity
2. Rapid provisioning
3. Measured Service
4. Resource Pooling

(4.0 Marks)

1.c. Explain different degrees of parallelism with an example each (6.0 Marks)

1.d. Discuss the relative advantages and disadvantages of private and public clouds' (6.0 Marks)

2.a. What is the difference between a hosted hypervisor and a baremetal hypervisor? Give an example each (5.0 Marks)

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

2.c. What is the difference between hot migration and cold migration? Explain pre-copy and post copy techniques of hot migration. (6.0 Marks)

2.d. List and briefly explain any four differences between a VM and a Container (4.0 Marks)

3.a. What does CAP theorem state? Briefly explain how would you choose a database for your application based on CAP theorem (8.0 Marks)

3.b. What is replication in a distributed environment? Explain leaderless replication. (5.0 Marks)

3.c. What is 'rebalancing of partitions'? Why is it necessary to rebalance the partitions? Explain Dynamic partitioning and Partitioning proportionally to the nodes. (7.0 Marks)

4.a. What is the purpose of Leader Election in Distributed computing? Explain the Ring Election algorithm. What are the problems associated with this algorithm? Discuss the algorithm time complexity and worst-case scenario. (10.0 Marks)

4.b. What is a “fault-tolerant” system? Name at least two types of faults. if a service was unavailable for 60 minutes in 75 hours due to 6 failures, compute MTBF and MTTR of that service. (5.0 Marks)

4.c. What is Zookeeper? How does it work? Name at least two contexts where zookeeper services may be used. (5.0 Marks)

5.a. How do you design a multitenant database with name-value pair? Explain neatly with an example showing appropriate table entries. (6.0 Marks)

5.b. What is a DOS attack? Explain with appropriate sketches, how is DoS different from DDoS? Distinguish EDoS from the above. (6.0 Marks)

5.c. What are two types of failure detection techniques? Name different failure detection strategies and describe the dual scheme strategy of failure detection (4.0 Marks)

5.d. Explain the following types of security design pattern

1. Defense in Depth
2. Honeypots
3. Sandboxes
4. Network Patterns

(4.0 Marks)