[5919]-13

M.Sc. (Computer Science)
CSUT-113 : DATABASE TECHNOLOGIES
(2019 Pattern) (Semester-I)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

    1)   Question 1 is compulsory.

    2)   Solve any five questions from Q.2 to Q.7.

    3)   Questions Q.2 to Q.7 carry equal marks.

Q1) Solve any five of the following: **[10]**

    a)   What is Sharding?

    b)   Impedance mismatch is a disadvantage of NoSQL. databases. (State True/False - comment).

    c)   What is standard column family in column - family stores?

    d)   List some of the popular Graph databases.

    e)   State the significance of eventual consistency in NoSQL databases.

    f)   Define the document database.

Q2) Attempt all: **[12]**

    a)   i)   What is an aggregate? **[2]**

          ii)   Describe aggregate data model with example. **[5]**

    b)   Polyglot persistance refers to the usage of different databases in different circumstances in a single applications:- Comment. **[5]**

Q3) Attempt all: **[12]**

    a)   i)   Event sourcing is an approach to the persistance.(Justify) **[2]**

          ii)   Explain the concept of Brewer's theoram. **[5]**

    b)   Consider an "Employee" database of a company, with three collections (entitier) :- Employee, Address, **[5]**
Designation.

          i)   Employee will have a unique employee ID, first name and last name.

          ii)   Address will contain city, state, and country.

          iii)   Designation specifies the name of post on which employee is recruited.

    Create a document data model for the given use case.

P.T.O.

Q4) Attempt all: **[12]**

    a)   i)   Define replication factor. **[2]**

          ii)   Master slave distribution allous replicating the data across multiple nodes. Comment. **[5]**

    b)   Discuss the concept of incremental Migration. **[5]**

Q5) Attempt all: **[12]**

    a)   i)   The Cassandra cluster scales horizontally.(State True/False) Justify.**[2]**

          ii)   Explain how NoSQL databases are useful to store different formats of data. **[5]**

    b)   Model the following case study as a graph database. **[5]**

        Mr.Goyal purchased a Mobile phone online from Flipkart shopping site at the cost of 10,000/-. This mobile was also recommended by Mr. Kohli on 10 January 2022. Flipkart also sells other branded mobile phones of different companies such as Vivo, Oppo, Redmi.

        The mobile purchased by Mr. Kohli is Vivo V11 with a warranty of 1 year.

        i)   Identify different nodes, lebels, relationships and respective properties.

        ii)   Draw a graph model using the same.

Q6) Attempt all: **[12]**

    a)   i)   NoSQL databases are schemaless :- Comment. **[2]**

          ii)   Describe the properties of NoSQL databases. **[5]**

    b)   How consistency is applied in column - family databases? **[5]**

Q7) Attempt any two: **[12]**

    a)   Write a note on version stamps in NoSQL databases. **[6]**

    b)   Explain replication set of MongoDB with diagram. **[6]**

    c)   Describe the concept of map - reduce structure with a two - stage map-reduce example. **[6]**

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