[5640]- 5003

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

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 an aggregate?

b) List some of the popular key-value databases.

c) Can relationship between any two nodes be bidirectional in a graph database. (State true / false - comment)

d) What is polyglot programming?

e) State the significance of event logs in an event sourcing system.

f) Define an Integration Database.

Q2) Attempt all

[12]

a) i) Explain the common characteristics of NoSQL databases. **[5]**

ii) What is super column family? **[2]**

b) An aggregate ignorant data model is best suited when there is no primary structure for manipulating your data comment. **[5]**

P.T.O.

Q3) Attempt all **[12]**

    a)   i)   Model the following purchase information as an aggregate model based on the given workload.

                Wrokload is as follows : [most frequent queries] **[5]**

                1)   List out customer with higher order value.

                2)   List out the fast moving products from the inventory.

            Note :   Entities in the purchase systems are customer, order, Inventory product / ordered product justify your answer.

           ii)   What is change log? **[2]**

    b)   Write a note on quorums. **[5]**

Q4) Attempt all **[12]**

    a)   i)   What is Inpedance mismatch? Explain with example. **[5]**

           ii)   List the enterprise concerns with polyglot persistence. **[2]**

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

        Mr. Joshi purchased a Dell laptop online from Amazon's shopping site, cost of laptop is 50,000/- This laptop was also recommended as a best by Mr. kadam on 5th October 2019. Amazon also sells other branded laptops with different processors specification. Intel dual core, Intel quad core. This above Dell laptop has contains Intel dual core processar. With a waranty of 2 years. Mr. Patil rated a Sony laptop as four star with processar Intel quad core with a waranty of 3 years.

        i)   Identify different labels, Nodes, relationship and respective properties.

        ii)   Draw a Graph model using the same.

Q5) Attempt all **[12]**

    a)   i)   Explain different advantages of the system. **[5]**

           ii)   A cluster is resilent to machine failure and hence provide high reliability. (State True / False - Comment) **[2]**

    b)   A map - reduce computation can be used to simulate the concept of materialized view in NoSQL databases comment. **[5]**

Q6) Attempt all **[12]**

   a)   i)   Single server configuration is best suited wher data is modeled as a graph model or when data is modeled as aggregates. **[5]**

        ii) Define what do you mean by Implicit schema for a NoSQL database. **[2]**

   b)   Explain how NoSQL databases improve data access performance. **[5]**

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

   a)   One of the technique to obtain high performance in NoSQL databases is by relaxing on durability comment. **[6]**

   b)   Write a note on scaling in MongoDB. Explain with diagram. **[6]**

   c)   Consider an organization's employee collection spread over 3 nodes in a cluster, where each document contains employee information like emp-no, emp-name, dept, salary. **[6]**

       Draw a Map-Reduce pattern for the following queries :

       i)   Find average salary of employees from "finance" department.

       ii) Give total count of employees in an organization.