**[5253] - 543**

# T.E. (Information Technology) (Semester - I)
# Database Management Systems
## (2015 Pattern)

*Time : 2½ Hours]*                                           *[Max. Marks :70*

*Instructions to the candidates:*

1) *Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Figures to the right indicate full marks.*
4) *Use of calculator is allowed.*
5) *Assume Suitable data if necessary.*

**Q1)** a)  Discuss the fundamental operations in relational algebra with example. **[3]**

b)  Explain different types of attributes of an entity with example. **[3]**

c)  Draw and list different components of database system structure. **[4]**

**OR**

**Q2)** a)  List E-R diagram symbols. & draw an E-R diagram for a hospital management system with a set of patients and a set of medical doctors. Associate with each patient a log of the various tests and examination conducted. **[6]**

b)  Consider the following database **[2]**
Student (RollNo, Name, Address)
Subject (Sub_code, Sub_name)
Marks (Roll_no, Sub_code, Marks)
Write following queries in SQL.
1. Find average marks of each student, along with the name of student

c)  Differentiate between horizontal and vertical fragmentation. **[2]**

**Q3)** a)  Explain various types of outer join operations with example. **[5]**

b)  What is lossless decomposition? Suppose that we decompose the schema R=(A,B,C,D,E) into (A,B,C) and (A,D,E), show that this decomposition is a lossless decomposition if the following set F of functional dependencies holds: A→BC CD → E B→D E → A. **[5]**

*P.T.O.*

*Q4)* a) Explain embedded and dynamic SQL. **[5]**

b) Discuss various MYSQL data types **[5]**

*Q5)* a) Explain the CRUD operations in MongoDB with suitable example.**[4]**

b) What is fragment of relation? What are the main types of fragmentation? Why a fragmentation is useful concept in distributed database design? **[6]**

c) List down all the possible crash recovery methods. Explain shadow paging with proper example. **[8]**

OR

*Q6)* a) Explain Architecture of Parallel & Distributed Databases. **[6]**

b) Explain different database architectures. **[6]**

c) What is deadlock? Explain how deadlock detection and prevention is done. **[6]**

*Q7)* a) Explain the following terms in XML with examples : **[6]**
   i) Documents      ii) Elements
   iii) Nested/sub elements      iv) Attributes
   v) Namespace      vi) DTD
   vii) Schema

b) What are the different data types in JSON? Discuss about JSON object and ARRAY in details. **[5]**

c) What is HDFS? Explain HBase data model and HBase region. **[5]**

OR

*Q8)* a) What is XML Schema? Give XML Schema for the following banking system: account (account_number, branch_name, balance) Customer(customer_number, customer_street, customer_city), Depositor(customer_number, account_number) **[6]**

b) What is concurrency control? Explain time stamp based concurrency control. **[6]**

c) Compare with suitable examples : **[4]**
   i) RDBMS and XML
   ii) JSON and XML

*Q9)* a)  What is Data Warehouse? Explain Schemas in Data Warehouse. **[8]**

  b)  What is OLTP & OLAP? Explain different OLAP operations.   **[8]**

<div align="center">OR</div>

*Q10)*a)  Write short note on: (any two) :                      **[8]**
    i)   SQLite database
    ii)  Machine learning for big Data
    iii) Machine learning for BI.

  b)  What is KDD process? Explain KDD process in detail.       **[8]**

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