**KIST COLLEGE OF MANAGEMENT**

**(Affiliated to Tribhuvan University)**

**Full Marks: 60**

**Pass Marks: 36**

**Time: 3 hrs.**

**Kamalpokhari, Kathmandu**

**March, 2024**

**Pre - Board Examination**

**BIM / Fourth Semester / IT 220: Database Management System**

*Candidates are required to answer the question in their own words as far as practicable.*

**Group – A**

**Brief Answer Questions: [10 x 1 = 10]**

1. What is a Database?
2. Who is a Database Administrator (DBA)?
3. Define Entity Types in the context of the Entity-Relationship Model.
4. What is Relational Algebra?
5. Explain the purpose of Data Definition Language (DDL) in SQL.
6. What does the SELECT clause do in SQL?
7. Define Database Normalization.
8. What is the purpose of a View in a database?
9. Explain the concept of Data Warehousing.
10. What is the significance of Concurrency Control in databases?

**Group – B**

**Short Answer Questions (Attempt Any Five Questions): [5 x 3 = 15]**

1. Define Database Management System (DBMS) and list three advantages of using databases.
2. What are Entity Types, Entity Sets, Attributes, and Keys in the Entity-Relational Model? Discuss the concept of Specialization and Generalization in data modeling.
3. What are the Unary and Binary Relational Operations in Relational Algebra?
4. Define First, Second, and Third Normal Forms in the context of Database Normalization.
5. Describe the purpose of Data Definition Language (DDL) and Data Manipulation Language (DML) in SQL.
6. Explain the concept of Serializable Schedule and Two-Phase Locking in Transaction Processing.

**Group – C**

**Long Answer Questions (Attempt Any Three Questions): [3 x 5 = 15]**

1. You are tasked with designing a database for an online bookstore. The online bookstore sells books of various genres and authors. Customers can browse the catalog, search for books, add them to their shopping cart, and proceed to checkout. Design suitable ER diagram and create their relationship and add relevant attributes by yourself.
2. Compare and contrast the concurrency control techniques of Two-Phase Locking and Timestamp Ordering.
3. Describe the concepts of Parallel and Distributed Databases, highlighting their advantages and challenges.
4. Discuss the role of Big Data and NoSQL databases in modern data management systems.

**Group – D**

**Comprehensive Answer Questions: [2 x 10 = 20]**

1. Databases rely heavily on data integrity to ensure accurate and consistent information. Discuss the concept of Functional Dependencies in the context of relational database design. Explain how Normalization forms, specifically First, Second, and Third Normal Forms (1NF, 2NF, and 3NF), help eliminate data redundancy and anomalies (insertion, deletion, update) while maintaining data integrity. Provide an example scenario demonstrating the benefits of normalization in a relational database.
2. SQL is a powerful language for interacting with relational databases. Explain the core functionalities of Data Manipulation Language (DML) statements in SQL. Focus on the SELECT statement, including clauses like FROM, WHERE, ORDER BY, and JOIN operations. Illustrate how these functionalities can be used to retrieve and manipulate data from a relational database. Construct a sample query scenario involving multiple tables and JOIN operations to retrieve specific data based on certain criteria.

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