Hall Ticket No | | | | | | | | | | | Question Paper Code: BCS005

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech II Semester End Examinations (Regular) - July, 2017

Regulation: IARE–R16

ADVANCED DATABASE MANAGEMENT SYSTEM

(Computer Science and Engineering)

Time: 3 Hours **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) Discuss the importance of a database system instead of simply storing data in operating system files? When would it make sense not to use a database system? **[7M]**

   (b) Consider the following information about a university database: **[7M]**

   - Professors have an SSN, a name, an age, a rank, and a research specialty.
   - Projects have a project number, a sponsor name (e.g, NSF), a starting date, an ending date, and a budget.
   - Graduate students have an SSN, a name, an age, and a degree program (e.g., M.S. or Ph.D.).
   - Each project is managed by one professor (known as the project's principal inves- tigator).
   - Each project is worked on by one or more professors (known as the project's co-investigators).
   - Professors can manage and/or work on multiple projects.
   - Each project is worked on by one or more graduate students (known as the project's research assistants).
   - When graduate students work on a project, a professor must supervise their work on the project. Graduate students can work on multiple projects, in which case they will have a (potentially different) supervisor for each one.
   - Departments have a department number, a department name, and a main office.
   - Departments have a professor (known as the chairman) who runs the department.
   - Professors work in one or more departments, and for each department that they work in, a time percentage is associated with their job.
   - Graduate students have one major department in which they are working on their degree.
   - Each graduate student has another, more senior graduate student (known as a student advisor) who advises him or her on what courses to take.

   Design and draw an ER diagram that captures the information about the university. Use only the basic ER model here; that is, entities, relationships, and attributes. Be sure to indicate any key and participation constraints

2. (a) Discuss the following terms: relation schema, relational database schema, domain, attribute, attribute domain, relation instance, relation cardinality, and relation degree. **[7M]**

(b) Consider the employee database given below, where the primary keys are underlined. **[7M]**

employee (*employee name*, *street*, *city*)
works (*employee name*, company name, salary) company (*company name*, city)
manages (*employee name*, manager name)
Give an expression in SQL for each of the following queries:

i. Find the names of all employees who work for First Bank Corporation.
ii. Find all employees in the database who live in the same cities as the com- panies for which they work.
iii. Find all employees in the database who live in the same cities and on the same streets as do their managers.
iv. Find all employees who earn more than the average salary of all employees of their company.

UNIT – II

3. (a) Briefly describe different kinds of inter operation parallelism can be exploited within a query. **[7M]**
   (b) Discuss the implementation challenges of ORDBMS. **[7M]**
4. (a) Explain various operations can be implemented in parallel in a shared-nothing architecture. **[7M]**
   (b) Discuss the similarities and differences between OODBMS and ORDBMS. **[7M]**

UNIT – III

5. (a) Enumerate the concept of horizontal fragmentation in DDBMS and list the advantages of horizontal fragmentation. **[7M]**
   (b) Explain different components in reference architecture for distributed databases with the help of diagram. **[7M]**
6. (a) List and briefly discuss different levels of transparency supported in distributed database management systems. **[7M]**
   (b) What are the objectives of data distribution design in DDBMS. **[7M]**

UNIT – IV

7. (a) Briefly discuss different modeling constraints considered during Fragment allocation problem. **[7M]**
   (b) Explain different categories of equivalence transformations for relational algebra based on the type of operators involved. **[7M]**
8. (a) Briefly discuss different dimension for the analyzing the framework of distributed systems. **[7M]**
   (b) Discuss about a reasonable unit of distribution in fragmentation. Discuss the Relation or fragment of relation? **[7M]**

UNIT – V

9. (a) Discuss the difference between semijoin and bloom join operation in distributed databases. **[7M]**
   (b) Illustrate the inverted index data structure to enable fast retrial of all documents that contain query string. **[7M]**
10. (a) Write a brief note on cost-based query optimisation in distributed databases. **[7M]**
    (b) Illustrate the graph based data model for representing semistructured XML data. **[7M]**

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