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DTE 1st Semester 8th March 2019 (Morning)

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
Department of Computer Science and Engineering (CSE)

MID SEMESTER EXAMINATION **WINTER SEMESTER, 2018-2019**

DURATION: 1 Hour 30 Minutes **FULL MARKS: 75**

CSE 4173: Introduction to Database Management System

Programmable calculators are not allowed. Do not write anything on the question paper.

There are **4 (four)** questions. Answer any **3 (three)** of them.

Figures in the right margin indicate marks.

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1. a) Describe the purposes of Database Management System. 10

   b) What are the differences among **Cartesian Product**, **Join** and **Natural Join** operation? Explain with necessary examples. 10

   c) What is the **Atomic** property of an attribute? Explain with necessary examples. 5

2. a) What is **Data Abstraction**? Describe the three levels of **data abstraction** which simplify the users' interactions with the system. 10

   b) Explain the distinctions among **Super Key**, **Candidate Key** and **Primary Key** with suitable examples. 10

   c) What does a **Null** value indicates? Point out some complications in database operation on a **null** value. 5

3. *employee* (employee name, street, city)
   works (employee name, company name, salary)
   company (company name, city)
   manages (employee name, manager name)

   a) Write down the **sql queries** as well as the **relational algebra** for the following queries. 20

      i. Find the **names** and **cities** of residence of all employees who work for "First Bank Corporation".
      ii. Find the **names**, **street addresses**, and **cities** of residence of all employees who work for "First Bank Corporation" and earn more than $10,000.
      iii. Find all employees (**name**) in the database who do not work for "First Bank Corporation".
      iv. Find all employees (**name**) in the database who earn more than each employee of "Small Bank Corporation"
      v. Find the number of employees in each company in the database.

   b) List and explain the common data types available in SQL. 5

4. *department(*dept_name, building, budget*)*
*course (*course_id, title, dept_name, credits)
instructor (ID, name, dept_name, Salary)
section (course_id, sec_id, semester, year, building, room_number)
teaches (ID, course_id, sec_id, semester, year)

a) Write down the necessary DDL to create above tables. Include necessary foreign key constraints where necessary. 10

b) Nowadays, most users of a database system are not present at the site of the database, but connect to it through a network. We can therefore differentiate between client machines, on which remote database users work, and server machines, on which the database system runs. Now, describe the database architecture with diagram. 15