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

MID SEMESTER EXAMINATION **WINTER SEMESTER, 2012-2013**

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

CSE 4307: Database Management Systems

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) Consider the following relational schema about Parts and Suppliers who supply them: 5x4

Part (p_id , p_name , p_color) // *primary key- p_id*
Supplier (s_id , s_name , s_address) // *primary key-s_id*
Supplies (s_id, p_id, price) // *primary key- s_id, p_id*

Write a single SQL query for each of the following questions.

i. Find the names of the suppliers who supply a 'red' part at a price less than $20.
ii. Find the IDs of the parts that can be supplied both by the suppliers in 'China' and by the suppliers in 'Germany'.
iii. Find the part names those are supplied by more than 10 suppliers.
iv. For each part, find its ID, its average price, and the number of suppliers - who supply it.

b) Discuss the string operation in SQL. 5

2. a) Consider the following SQL query- 5

```
select U.userID, U.Name, UE.gradYear
from Users U, UserEducation UE
where U.sex="Male" and UE.userID=U.userID and UE.university_Name="IUT";
```

Now, translate this query into an equivalent Relational Algebra expression.

b) Consider the following relational database, where the primary keys are underlined. Give an expression in the *relational algebra* to answer each of the queries. 5x4

Passengers (*PId*, PassengerName, Address, Age)
Reservations (*PId*, *FlightNum*, SeatNo, Class, Fair)
Flights (*FlightNum*, DepartCity, DestinationCity, DepartureTime, ArrivalTime, MinutesLate)

i. Find out the names of passengers and their flight number who had a reservation on a flight from Bangladesh to Canada -that departs at 6.00 pm.
ii. Find the IDs of passengers who had a reservation on a flight that was more than 30 minutes late.
iii. Find the name(s) of oldest passenger(s).
iv. Find out the highest fair for Business class paid by any passenger.

3. a) What are the major components of ER diagram? 4
   b) Discuss different types of attributes with appropriate examples. 6
   c) Consider the following set of information: 15
      - Each user has a userID.
      - AnonymousUsers are a type of Users with attribute country.
      - NamedUsers are a type of Users with attributes name and email.
      - Each blog has a blogID, blog title and topic.
      - A NamedUser can have friendship with zero or more other NamedUsers.
      - Each friendship has an associated start date.
      - A NamedUser can own many Blogs, but each blog is owned by exactly one user.
      - A User can post to zero or more Blogs. Each post has a given content. Many users can post to a blog.

      Draw an ER diagram that represents the above information. Your answer should include entity sets, attributes, relationships, ISA relations. Indicate the type of each relationship with appropriate arrows (one-one, one-many, etc.). [Note: Do not forget to underline the keys.]

4. a) Define *Database* and *DBMS*. What are the applications of DBMS? 4
   b) What are the types of entity sets used in ER model? Briefly discuss them with example. 5
   c) Discuss different types of keys that are used in database with appropriate example. 6
   d) Briefly discuss the drawbacks of file-based system. 10