# Islamic University of Technology

Organisation of Islamic Cooperation (OIC)

## Department of Computer Science and Engineering (CSE)

**MID SEMESTER EXAMINATION** **WINTER SEMESTER, 2019-2020**

**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 3(three) questions. **Answer all questions.** Figures in the right margin indicate marks.

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1. (a) In a larger system multiple user may interact and update data simultaneously. In a traditional file processing system this causes data inconsistency. Support this fact using a suitable example. [10]

   (b) Briefly explain "Select" and "Project" operation in relational algebra. Can it be combined? Does the order of the operation impact on the result? Justify your opinion. [10]

   (c) Consider the following table: [5]

Table 1: Data for Question No. 1.(c)

| ID | Address | CGPA |
|---|---|---|
| 1 | a | 3.1 |
| 3 | b | 3.7 |
| 4 | a | 3.4 |
| 12 | f | 3.8 |

Now deduce its super keys, candidate keys and primary key for the given records. Present argument for selecting the primary key.

2. (a) The concept of foreign key comes from the fact that a bad design introduces both redundancy and data inconsistency. Strengthen this statement using suitable example. [10]

   (b) Classify the constraints on generalization or specialization based on: i) The attribute of the higher-level entity determines the lower-level entity membership and ii) The number of branching in its lower-level entity. [10]

   (c) Is it possible to add a "where" clause in an SQL statement involving aggregate functions? Justify your opinion with example. [5]

3. (a) Consider the following scenario:

   Patients come to a hospital for treatment. The hospital has several floors, on each floor there are a number of rooms. Each room has a unique room number. Doctors of different specializations (such as Surgery, ENT, Medicine) work here. Patients first completes his/her basic information such as name, age, address, contact no. Then he is assigned with a doctor based on the type of sickness. Doctors consultation is recorded in a chronological fashion (i.e. by date). A patient can be attached to a number of doctors. For instance, he may need both medicine and surgery (perhaps at two different times).

   Your tasks are as follows:

   i. Draw the ERD for the above system description. [5]

   ii. Write the DDLs to implement the ERD. [5]

   (b) Read the following system description carefully and answer the given questions:

   Government wants to implement its Citizen Information Bank (CIB). Each citizen must have some basic information such as ID, name, date of birth and address. Additionally, many citizens should have profession information. Each profession is predefined and has a number

of additional information such as name of profession, minimum educational qualification and approximate salary. Citizens may have blood group information which must be from the selected list such as A+,A-, B+, B-, AB+, AB-, O+ and O-. Address is organized in two layers such as Divisions and Districts. One division have a number of districts.

Your tasks are as follows:

i. Draw the ERD for the given description. [5]

ii. Write the DDLs equivalent to the ERD. [5]

iii. Write standard SQL statements for the followings: [5]

I) List total number of citizen in each blood group.

II) List each profession code/ID, profession name, its approximate salary along with total number of people in that profession.

III) List top 3 professions code/ID and name. (A profession is the top most profession if it has the maximum number of people involved)