B.Sc. Engg. CSE/SWE 3rd Semester   28 September 2022 (Afternoon)

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

MID-SEMESTER EXAMINATION   WINTER SEMESTER, 2021-2022
DURATION: 1 HOUR 30 MINUTES   FULL MARKS: 75

CSE 4307: Database Management Systems

Answer all **3 (three)** questions. Marks of each question and corresponding CO and PO are written in the right margin with brackets.

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1. a) *"In a traditional file processing system it is hard to provide user access to some, but not all, data."* Explain using suitable example.   **10** (CO1) (PO1)

   b) Is there any difference between schema and instance in relational database area? Explain. Consider the following records: **4 + 6** (CO1) (PO1)

   Table 1: Employees data for Question No. 1.(b)

Name	Address	DOB
m	a	1-1-87
n	b	2-4-82
q	a	1-12-80
r	f	3-4-79

   Now, deduce its super keys, candidate keys, and primary key for the given records. Present suitable arguments for finalizing the primary key.

   c) What is domain of attribute? How can you ensure it in implementation phase?· Explain with example.   **5** (CO1) (PO1)

2. a) Consider the following SQL statement to list all employees name, address and their total salary where total salary is calculated as the sum of his/her basic and bonus amount (if any):   **5** (CO1) (PO1)

   ```
   select Name, address, (salary+bonus) Total
   from emp;
   ```

   It was observed that the values for total salary for a number of employees were displayed as 0 but each of employees monthly salary has been found correct.

   Your task is to identify and explain the most probable cause of the above result. At the same time, provide a suitable solution to get rid of such error.

   b) Consider the following entities (note: here pk means primary key, fk[x] means foreign key referencing entity x):   **2 × 5** (CO1) (PO1)

   - Depts(Name(pk),Location,Budget)
   - Students(SID(pk),Name,CGPA,Dept(fk[Depts]))
   - Teachers(TID(pk),Name,Designation, Dept(fk[Depts]))
   - Supervisors(TID(fk[Teachers]),SID(fk[Students]),ProjectName)

   Write SQL statements for the following queries:

   i) List of departments name, location, and total number teachers for each department.
   ii) List of the students with ID, name, their dept name, and dept location only for those departments that are located at "Academic Building 2".

iii) List of teachers with their name, designation, and the total number of students they are supervising.

iv) List of teachers with their name and designation who are supervising at least 5 students.

v) List of top 3 department name, location and the total number of students (ranking is based on total number of students)

c) What is the basic purpose of a materialized view? Consider the following 2 view definitions: **5**
(CO2)
(PO2)

```
create or replace view empV
as select id,name, salary/12 as monthlySalary
from emp;

create or replace view studentV
as select id,name,dob,cgpa
from students;
```

Is it allowed to insert data through these views? Justify your choice. (assume the tables emp and student exist with the mentioned attributes in the view definitions)

3. Read the following user requirement in the context of automation of Bangladesh NID, driving license and treatment history:

National ID (NID) is an integrated collection of citizens' information such as Name, Date of Birth, Occupation, Blood Group. Each citizen has his/her own NID. In order to investigate the population density, the country has been divided into divisions. Each division has its name, size (in square kilometer) and a brief description. Again each division has a number of districts with similar attributes. Citizen information must be connected to its corresponding division and district.

Each citizen may have exactly one driving license where information such as type of license, issue date, and expiration date are maintained. Whenever any accident occurs, it is logged in the central system. The system stores relevant information such as date and time of accident, location of accident, and the number of deaths (if any).

There are a number of hospitals in the country having names and contact information. Each hospital may have more than one contact number. Citizens may avail treatment in any hospitals they prefer. Whenever any patient (i.e. citizen) is admitted, the system keeps the record of his/her date of admission, a brief description, and release date.

a) Draw the Entity Relationship Diagram (ER-D) using conventional method. **10**
(CO3)
(PO3)

b) Write appropriate DDL statements to implement above ER-D. **10**
(CO1)
(PO1)

c) Write standard SQL for the followings: **5 × 2**
(CO1)
(PO1)

   i Find the list of Districts along with its total population.

   ii Find the list of Districts having at least 20000 people living there.

   iii Find the number of accidents occurred (if any) by a citizen whose NID is 210.

   iv Find the list of top 5 hospitals based on the number of patients admitted so far.

   v Find the list of Divisions along with its total number of Districts for each Division.