SPRING MID SEMESTER EXAMINATION-2023

School of Computer Engineering
Kalinga Institute of Industrial Technology, Deemed to be University
Database Management System
[CS-2004]

Time: 1 1/2 Hours **Full Mark: 20**

Answer any four Questions including Q.No.1 which is Compulsory.
The figures in the margin indicate full marks. Candidates are required to give theiranswers in their own words as far as practicable and all parts of a question should beanswered at one place only.

1. Answer all the questions. [1 x 5]

   a) Discuss the importance of data model in database design.

   b) Mention the SQL command for adding a check constraint (salary greater than 10000) to an existing Emp table.

   c) Differentiate between CHAR and VARCHAR datatypes.

   d) Given the basic ER and relational models, which of the following is INCORRECT?
   i. An attribute of an entity can have more than one value.
   ii. An attribute of an entity can be composite.
   iii. In a row of a relational table, an attribute can have more than one value.
   iv. In a row of a relational table, an attribute can have exactly one value or a NULL value.

   e) In a shop, an employee may manage many customers. However, a customer can be managed by only one employee. Further, every customer must be assigned to an employee however the same is not mandatory for every employee.
   Which one of the following correctly represents the cardinality and participation for the relationship between employee and customer?
   i. 1:1, total, partial ii. 1:1, partial, partial
   iii. 1:M, partial, total iv. 1:M, total, partial

2.

   a. Consider te following schema:
   Supplier (<u>sid</u>, sname, address)
   Parts (<u>pid</u>, pname, color)
   Catalog (<u>sid, pid</u>, cost)
   Solve the following queries by using *relational algebra as well as SQL* expressions. [4 Marks]

      i. Find the names of suppliers who supply some red part.

      ii. Find the pids of parts supplied by at least two different suppliers.

   b. What are the differences between equi join and natural join operation? Explain with the help of an example. [1 Mark]

3.

   a. Explain different level of abstraction and level of data independence with respect to Library database system. [3 Marks]

   b. Discuss the purpose and components of storage manager and query processor. [2 Marks]

4.

a. Consider a database that consists of the following relations

Supplier (sno, sname)
Parts (pno, pname)
Project (jno, jname)
Suuply (sno, pno, jno)
Solve the following queries by using *relational calculus* expressions. [3 Marks]

i. Retrieve the part numbers that are supplied to exactly two projects.

ii. Retrieve the part numbers that are supplied by every supplier.

iii. Retireve the project names that are supplied by supplier 'S12' only

b. What is a foreign key constraint? Why are such constraints important? What is referential integrity? [2 Marks]

5.

a. Consider a Conference database in which researchers submit their research papers for consideration. Reviews by reviewers are recorded for use in the paper selection process. The database system caters primarily to reviewers who record answers to evaluation questions for each paper they review and make recommendations regarding whether to accept or reject the paper. The data requirements are summarized as follows:

- Authors of papers are uniquely identified by email id, First and last names are also recorded.
- Each paper is assigned a unique identifier by the system and is described by a title, abstract and the name of the electronic file containing the paper.
- A paper may have multiple authors, but one of the authors is designated as the contact author.
- Reviewers of papers are uniquely identified by email address. Each reviewer's first name, last name, phone number , affiliation and topics of interest are also recorded.
- Each paper is assigned between two and four reviewers. A reviewer rates each paper assigned to him or her on a scale of 1 to 10 in four categories: technical merit, readability, originality, and relevance to the conference. Finally, each reviewer provides an overall recommendation regarding each paper.
- Each review contains two types of written comments: one to be seen by the review committee only and the other as feedback to the author(s).

Design an entity-relationship diagram for the conference database. Make necessary assumption. [3 Marks]

b. Convert the above ER diagram into relational schemas and specify primary and foreign keys. [2 Marks]

*** Best of Luck ***