**United College of Engineering and Research, Allahabad**

**Department of Computer Science & Information Technology**

**Ist Sessional Examination (2018-19)**

**B.Tech. (Vth Semester (CS & IT))**

**Database Management System**

**Subject Code: RCS-501**

**Time:** 2.00 hours **Max. Marks:** 30

**Note:** There are three sections in this paper. All sections are compulsory.

**Section-A**

**Note:** All questions are **compulsory**. Each question has equal marks. **10\*1=10**

1. Define the candidate key, primary key, super key.
2. Define participation constraints in E-R model.
3. Define partial key.
4. Describe the role of Database Administrator (DBA) in Database Management System.
5. Define DDL and DML terms.
6. Explain following relational algebra operators.
7. Outer join
8. Division
9. What is a foreign key constraint? Why are such constraints important? What is referential integrity?
10. Consider the join of relation R with a relation S. If R has m tuples and S has n tuples, then the maximum and minimum size of the join respectively are

**(A)** m+n and 0 **(B)** m+n and |m-n|

**(C)** mn and 0 **(D)** mn and m+n

1. The division operator divides a dividend A of degree m+n by a divisor relation B of degree n and produces a result of degree

**(A)** m – 1 **(B)** m + 1

**(C)** m \* m **(D)** m

1. Relational Algebra does not have

**(A)** Selection operator. **(B)** Projection operator.

**(C)** Aggregation operators. **(D)** Division operator.

**Section-B**

**Note:** Attempt any **six** questions. Each question has equal marks. **6\*2=12**

1. Explain the two and three tier architecture.
2. Differentiate between database system and file system.
3. Draw an E-R diagram for a hospital with a set of patients and a set of medical doctors; with each patient a log of the various conducted tests is also associated.
4. Explain the generalization and aggregation with example.
5. Explain data abstraction model.
6. Consider the following relational schemas:

Employee (person\_name, street, city)

Works (person\_name, company\_name, salary)

Company (company\_name, city)

Manages (person\_name, manager\_name)

Write the following queries in relational algebra expression:-

* + 1. Find the names of all employees who live in the same city and on the same street as do their managers.
    2. Find the company with the most employees.

1. Consider the following relation schema:

R = (A, B, C) S = (D, E, F)

Let relations r(R) and s(S) be given. Give an expression in the tuple relational calculus that is equivalent to each of the following:-

* + 1. r Х s
    2. πA, F (σ C=D (r Х s))

1. Consider the following relations with underlined primary keys.

Product(P-code, Description, Stocking\_date, QtyOnHand, MinQty, Price, Discount,V\_code)

Vendor(V-code, Name, Address, Phone)

Here a vendor can supply more than one product but a product is supplied by only one vendor. Write SQL queries for the following:

**(i)** List the names of all the vendors who supply more than one product.

**(ii)** List the details of the products whose prices exceed the average product price.

**Section-C**

**Note:** Attempt any **two** questions. Each question has equal marks. **2\*4=8**

1. What is purpose of the E-R diagram? Construct an E-R diagram for a University system which

should include information about students, departments, professors, courses, which students are enrolled in which course, which professors are teaching which courses, student grades, which course a department offers. Make suitable assumptions whatever required.

1. Consider the following relational schemas:

Person (driver\_id, name, address)

Car (license, model year)

Accident (report\_number, date, location)

Owns (driver\_id, license)

Participated (diver\_id, license, report number, damage\_amount)

Write the following queries in SQL:-

* + 1. Find the total number of people who owned cars that were involved in accidents in 1989.
    2. Add a new accident to the database; assume any values for required attributes.
    3. Delete the Mazda belonging to “**John Smith**”.
    4. Update the damage amount for the car with license number “**AABB2000**” in the accident with report number “**AR2197**” to **$3000**.

1. Consider the following schema:

Suppliers(*sid:* integer, *sname:* string, *address:* string)

Parts(*pid:* integer, *pname:* string, *color:* string)

Catalog(*sid:* integer, *pid:* integer, *cost:* real)

Write the following queries in relational algebra, tuple relational calculus, and domain relational calculus:

1. Find the *sid*s of suppliers who supply some red or green part.
2. Find the *sid*s of suppliers who supply every red or green part.