Total No. of printed pages = 5

19/5th Sem/DCSE501

2021

DATABASE MANAGEMENT SYSTEM

Full Marks – 100

Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer any *five* questions.

1. (a) Fill in the blanks : 1×10=10

   (i) The term _____ is used to refer to a row in a relation.

   (ii) To remove a relation from an SQL database, we use the _____ command.

   (iii) An entity set that does not have sufficient attributes to form a primary key is termed a _____.

   (iv) The _____ clause allows us to select only those rows in the result relation of the ____ clause that satisfy a specified predicate.

[Turn over

(v) _____ data type can store unstructured data.

(vi) The overall description of a database is called _____.

(vii) A data dictionary is a repository that manages _____.

(viii) _____ helps in efficient retrieval, inserting and deleting of data.

(ix) _____ is a software for creating and managing databases.

(x) Users of the _____ can share the data among themselves.

(b) Define the following terms : 2×5=10

(i) Schema

(ii) Instance

(iii) Data model

(iv) Multivalued attribute

(v) Foreign key.

2. (a) Explain briefly the three-schema architecture. 5

(b) What is an attribute in DBMS ? Define various types of attributes with appropriate examples. 5

(c) What are the physical, logical and view level data abstraction ? 5

(d) Explain selection and project operations with examples. 5

3. (a) Discuss the component modules of a Database Management System and their interactions with neat diagram. 15

(b) What are the advantages of using database approach ? 5

4. Consider the following Relational schema. 20

EMPLOYEE (Fname, Mname, Lname, Ssn, Bdate, Address, Salary, Super_ssn, Dno.)

DEPARTMENT (Dname, Dnumber, Mgr_ssn, Mgr_start_date)

DEPT_LOCATION (Dnumber, Dlocation)

PROJECT (Pname, Pnumber, Plocation, Dnum)

WORKS_ON (Essn, Pno, Hours)

DEPENDENT (Essn, DE_name, Bdate, Relationship)

Write Relational Algebra expression and SQL query for the following :

(i) Retrieve the name and address of all employees who work for the research department.

(ii) For every project located in Stafford, list the project number, the controlling department number and the department manager's last name, address and birth date.

(iii) Find the name of all employees who work on all projects controlled by department number 5.

(iv) Retrieve the name of all employees who have no dependent.

(v) List the name of all employees with two or more dependents.

5. (a) Explain the 3-tier client-server architecture. 5

(b) Discuss ACID properties of transaction. 5

(c) Explain the following keys : 2×3=6

(i) Super key

(ii) Candidate key

(iii) Primary key

(d) Explain functional dependency. 4

6. Write short notes on any *four* : 5×4=20

(i) Database languages

(ii) Referential integrity

(iii) Data Independence

(iv) Normalization

(v) Specialization and Generalization.