2023

COMPUTER SCIENCE — GENERAL

Paper : DSE-A-1, DSE-A-2 and DSE-A-3

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words

as far as practicable.

Paper : DSE-A-1

(Database Management System)

Full Marks : 50

Answer *question no.* **1** and *any four* questions from the rest.

2×5

1. Answer *any five* questions :

    (a) Define Database Schema.

    (b) Name two DML commands in SQL.

    (c) What do you understand by composite attributes?

    (d) What is weak entity?

    (e) What do you understand by entity integrity?

    (f) What do you understand by domain constraints?

    (g) Define transitive dependency.

    (h) Write the problems of un-normalized database.

2. (a) State the main features of RDBMS.

    (b) What is Data Definition Language?

    (c) Elaborate the main roles of a database administrator.   4+2+4

3. (a) What are the different types of mapping cardinalities in ER-diagram?

    (b) Construct an ER-diagram of a local medicine shop.   4+6

Please Turn Over

4. Consider the following relational schema :

    Department (DepartmentID, DepartmentName)

    Student (StudentID, Name, Age, CourseID)

    Courses (CourseID, Name, Description, DepartmentID, Credit)

    Perform the following using relational algebra.

    (a) Find all students who have enrolled in courses having 4 credits.

    (b) Show the list of courses conducted under the department 'Computer Science'.

    (c) Give name of the student with highest age.   3+3+4

5. (a) Distinguish between Specialization and Generalization with the help of an example.

    (b) Describe any two data models of DBMS.   4+(3+3)

6. (a) Explain logical data independence and physical data independence.

    (b) Define unary relationship with an example.

    (c) What is lossless join decomposition? How can you ensure that?   4+2+(2+2)

7. (a) What is a 3NF relation? Give an example.

    (b) What are the problems of normalization?

    (c) Normalize the following relation to 2NF :

    Student_Course

S_ID	S_Name	C_ID	C_Name	Credits
S1	Abhik Ray	C1	CC1	4
S1	Abhik Ray	C2	CC2	2
S2	Diya Basu	C1	CC1	4
S2	Diya Basu	C3	CC3	4
S3	Rahul Sinha	C2	CC2	2
S3	Rahul Sinha	C3	CC3	4

                                (2+1)+2+5

8. Write short notes on **any two** of the following :   5×2

    (a) ANSI / SPARC Architecture

    (b) Integrity Constraints

    (c) Armstrong's Axiom

    (d) Single-valued versus Multivalued Attributes.