B.Sc. 4th Semester (Honours) Examination, 2023 (CBCS)

Subject : Computer Science

Course : CC-X

Time: 2 Hours   **Full Marks: 40**

The figures in the margin indicate full marks.
Candidates are required to give their answers in their
own words as far as practicable.

1. Answer *any five* questions: 2×5=10

   (a) Define candidate key.

   (b) Write down functions of DDL.

   (c) Define generalization technique.

   (d) Give one reason that leads to the occurrence of null values in a relation.

   (e) What is lossless join?

   (f) Write syntax to delete a table.

   (g) What is data abstraction?

   (h) What is transitive dependency?

2. Answer *any two* questions: 5×2=10

   (a) Consider the Universal Relation

   $R = \{A, B, C, D, E, F, G, H, I, J\}$ and the set of functional dependencies

   $F = \{\{A, B\} \rightarrow \{C\}, \{A\} \rightarrow \{D, E\}, \{B\} \rightarrow \{F\}, \{F\} \rightarrow \{G, H\}, \{D\} \rightarrow \{I, J\}\}$

   (i) What is the key of R?

   (ii) Decompose R into 3NF relation.

   (b) Explain ACID properties of transaction.

   (c) Write down natural join and projection operations of relational algebra.

   (d) Consider the following schema's

   Employee Schema

   ENo (PK), Ename, Job-type, Dept, Dno, Salary.

   Department Schema

   Dno (PK), Dname, Location.

   Answer the following queries using SQL:

   (i) Write the query to display the name(s) of each employee who earns salary > 25k.

   (ii) Write the relational algebra for the following—

   Find the names of all employees who work in 'Sales' department and located in 'Mumbai'.

27735   **Please Turn Over**

3. Answer *any two* questions: 10×2=20

   (a) (i) Define entity integrity and referential integrity.

        (ii) Write the advantages of DBMS over File Management system. 3+7

   (b) (i) What is the need of concurrency control in DBMS? Explain with an example.

        (ii) What is 'view'? 8+2

   (c) Draw a E-R diagram that records the marks of students that they get in different examinations of different courses. Reduce the E-R diagram into relational schema by defining all the constraints and assumptions. 10

   (d) (i) Define insertion, deletion and updation anomalies of DBMS. Explain them with examples.

        (ii) Describe the following normal form: 6+4

           (I) 3NF

          (II) BCNF