

2023

Time - 3 hours

Full Marks - 60

*Answer all groups as per instructions.
Figures in the right hand margin indicate marks.*

GROUP – A

1. Answer all questions and fill in the blanks as required. [1 × 8]
- (a) Define DBMS.
 - (b) What is a functional dependency ?
 - (c) What is meant by a data model ?
 - (d) A _____ is a collection of names, attributes about data elements.
 - (e) A domain is a set of _____ values.
 - (f) Degree of a table means the number of _____ in the table.
 - (g) A _____ is a unit of program execution.
 - (h) A _____ specifies the chronological order in which instructions of concurrent transaction are executed.

[2]

GROUP – B

2. Answer any eight of the following questions within two to three sentences each. [1½ × 8]

- (a) What is the job of a database administration ?
- (b) What is a weak entity ?
- (c) What is meant by a multivalued dependency ?
- (d) Give the levels of data abstraction.
- (e) Name some popular relational databases.
- (f) What are constraints ?
- (g) What is a serializable schedule ?
- (h) Name the basic operations included in relational algebra.
- (i) Define conceptual schema.
- (j) What is an attribute ?

GROUP – C

3. Answer any eight of the following questions within 75 words each. [2 × 8]

- (a) List the types of data models in use.
- (b) How are instance and schema different ?
- (c) Define normalisation.

[3]

- (d) What is a join dependency ?
- (e) What is meant by data redundancy ?
- (f) Name various datatypes used in SQL.
- (g) What is the advantage of concurrent execution ?
- (h) Define user serialisability.
- (i) How are relational algebra and relational calculus different ?
- (j) What are the types of time stamp ordering protocol ?

GROUP – D

Answer all questions within 500 words each.

4. Briefly describe about the ER naming conventions. Also, list the elements in an ER diagram alongwith their respective notations. [6]

OR

What is a key ? Describe about the various types of keys used in database design.

5. Given a relation $R = (A, B, C, D, E)$ with FDs $\{BC \rightarrow ADE, D \rightarrow B\}$. Find all the candidate keys. [6]

OR

How is 3NF different from BCNF ? Given a relation $R(A, B, C, D, E)$, $F = \{AB \rightarrow C, AB \rightarrow D, D \rightarrow A, BC \rightarrow D, BC \rightarrow E\}$. Is this relation in BCNF ? If not, show all dependencies that violate it.

[4]

6. What are some common clauses used with SELECT query in SQL ? [6]

OR

How to remove duplicate rows in SQL ? Illustrate with an example.

7. Describe the ACID properties needed to preserve the integrity of database. [6]

OR

Briefly describe about the various transaction states.