2022

COMPUTER SCIENCE — GENERAL

Paper : DSE-A-1

(Database Management System)

Full Marks : 50

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

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

1. Answer ***any five*** questions of the following : 2×5

(a) What do you mean by data redundancy?

(b) Define weak entity with example.

(c) Explain derived attribute and multivalued attribute with example.

(d) What is meant by full functional dependency?

(e) Define candidate key with example.

(f) Explain cartesian product operation with example.

(g) Explain Transitive dependency.

(h) Why is Normalization required?

2. (a) Define metadata.

(b) Discuss about any three types of data models of DBMS. 1+(3+3+3)

3. (a) What are the components of ER diagram?

(b) What are the different types of relationship that can be present in an ER model?

(c) Construct an ER diagram to store data in a library of your college. 3+3+4

4. (a) Give an example of unnormalized form of a relation R. Hence, explain the importance of normalization with proper example.

(b) Explain 2NF and 3NF with examples. (2+2)+(3+3)

5. Given the following relational schema :

Book (*BookId*, Bname, Title, Author, Subject, Price, Availability)

Borrower (*Bid*, Bname)

Borrows (*BookId, Bid*, DateOfIssue, DateOfReturn, Fine)

Perform the following :

(a) Write a SQL statement to insert a tuple in Borrows table.

(b) Write a query in relational algebra to display names of all Borrowers.

(c) Find the details of the highest priced book using SQL.

(d) Find all borrowers who have been fined between 01.11.2022 to 31.12.2022 using SQL. 2½+2½+2½+2½

6. (a) Explain different types of 'Join' operation of relational algebra.

(b) Explain with suitable example, Specialization and Generalization. 6+(2+2)

7. (a) Explain with diagram, Three-Schema Architecture of DBMS.

(b) Differentiate between logical data independence and physical data independence.

(c) 'SQL is a relationally complete language'. Justify. 4+4+2

8. (a) Consider a relation R with five attributes A, B, C, D, E having following dependencies :

$A \rightarrow B$, $BC \rightarrow E$ and $ED \rightarrow A$

(i) List all keys for R

(ii) In which normal form the table is? Justify your answer.

(b) Define tuple and cardinality of a relation. (2+4)+4