2 0 2 3

INFORMATION TECHNOLOGY

Paper : ITBHC3076

(Database Management System)

Full Marks : 60

Pass Marks : 24

Time : 3 hours

The figures in the margin indicate full marks for the questions

1. Choose the correct answer (any *five*) :   1×5=5

   (a) What is a database?

      (i) Organized collection of information that cannot be accessed, updated and managed

      (ii) Collection of data or information without organizing

      (iii) Organized collection of data or information that can be accessed, updated and managed

      (iv) Organized collection of data that cannot be updated

(Turn Over)

(b) Which of the following is known as a set of entities of the same type that shares same properties or attributes?

   (i) Relation set

   (ii) Tuples

   (iii) Entity set

   (iv) Entity relation model

(c) The ability to query data, as well as insert, delete and alter tuples is offered by

   (i) TCL (Transaction Control Language)

   (ii) DCL (Data Control Language)

   (iii) DDL (Data Definition Language)

   (iv) DML (Data Manipulation Language)

(d) Which command is used to remove a relation from an SQL?

   (i) Drop table

   (ii) Delete

   (iii) Purge

   (iv) Remove

(e) What is the function of the following command?

       delete from 'R' where 'P'

   (i) Clears entities from relation

   (ii) Deletes relation

   (iii) Deletes particular tuple from table

   (iv) Alter particular tuple from relation

(f) In the _____ normal form, a composite attribute is converted to individual attribute.

   (i) first

   (ii) second

   (iii) third

   (iv) fourth

(g) Which of the following refers to the level of data abstraction that describes exactly how the data actually stored?

   (i) Conceptual level

   (ii) Physical level

   (iii) Logical level

   (iv) View level

(h) In general, a file is basically a collection of all related

   (i) rows and columns

   (ii) fields

   (iii) database

   (iv) records

(i) Key to represent relationship between tables is called

   (i) primary key

   (ii) secondary key

   (iii) foreign key

   (iv) alternate key

(j) Which is ACID properties of DBMS?

   (i) Atomicity, Consistency, Isolation, Database

   (ii) Atomicity, Consistency, Isolation, Durability

   (iii) Atomicity, Consistency, Inconsistent, Durability

   (iv) Atomicity, Concurrency, Isolation, Durability

2. Answer any *five* of the following questions : 2×5=10

(a) What are the advantages of using a DBMS?

(b) What is the entity and entity set in DBMS?

(c) What is the purpose of normalization in DBMS?

(d) What is a project operation?

(e) What do you mean by prime and non-prime?

(f) What are the two types of ordered indices?

(g) What is B-Tree?

3. Answer any *five* of the following questions : 5×5=25

(a) Explain the ANSI/SPARC three-tier architecture. 5

(b) Explain the term 'entity constraint' and 'referential integrity constraint'. 2+3=5

(c) What is functional dependency? Explain the Armstrong axioms for functional dependencies. 2+3=5

(d) What are the two levels of data independence? 5

(e) What are the basic notations in E-R model? 5

(f) What is lossless decomposition in DBMS? Give example. 5

(g) Explain about ACID properties. 5

(h) What is an index? Explain the primary and secondary indexes. 2+3=5

(i) Describe the DBA's functionalities in a DBMS. 5

4. Answer any *two* of the following questions : 10×2=20

(a) What do you mean by Normalization? Explain 1NF, 2NF, 3NF and BCNF. 2+2+2+2+2=10

(b) Write SQL query from the following consider table :

   EMP (Emp_no, Dept_name, E_name, E_Salary, Designation, DOB, City)

   (i) Add attribute name "joining_date" in the EMP relation. 2

   (ii) Display employee name whose salary is more than 75,000. 2

(iii) Display employee_name, department, salary and city from EMP relation. 2

(iv) Display the employees name whose salary is greater than 50,000 and city is "DELHI". 2

(iv) Delete tuples from EMP table where department name is "IT". 2

(c) Compute the closure of the following set of functional dependencies for relation schema :

   $R (A, B, C, D, E, F)$

   $FD\{AB \rightarrow C, C \rightarrow DE,$
   $E \rightarrow F, D \rightarrow A, C \rightarrow B\}$

   List the candidate keys of relation R. 10

(d) Explain the following operation in the relational algebra with the help of an example for each : 2+2+2+2+2=10

   Selection, Projection, Cartesian Product, Union and Set Difference

★ ★ ★