2022

1st Semester Examination

MCA

Paper : MCA 101

(Advanced Database Management System)

Full Marks : 70 Time : Three Hours

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

Group - A

Answer any *five* questions : 2×5=10

1. What do you mean by data independence?
2. What is super key? Give an example.
3. Define normalization.
4. What is a weak entity set in ER diagram? How to represent it?
5. Define Schema.
6. What is data redundancy?
7. What is functional dependency?
8. Explain about integrity constraints.

P.T.O.

Group - B

Answer any ***four*** questions : 15×4=60

9. (a) Explain the merits and demerits of the database system.

   (b) Who are the different database users? Explain their interfaces to database management system.

   (c) Explain three level architecture in DBMS. 4+6+5

10. (a) Consider the following schema :

   Suppliers (sid, sname, address)

   Parts (pid, pname, color)

   Catalog (sid, pid, cost)

   Write the SQL queries for the following :

   (i) Find the sids of suppliers who supply some red or green part.

   (ii) Find the sids of suppliers who supply every red or green part.

   (iii) Find the pids of parts supplied by at least two different suppliers.

   (b) Discuss in detail the operators SELECT, PROJECT, UNION with suitable examples. 3×3+6

11. (a) Explain the roles of normalization in database design.

(b) Translate the above E-R diagram to a relational model, in particular, specify your primary key and foreign key constraints clearly. 7+8

14. (a) Explain the role of a database administrator.

(b) What are the different data models present? Explain briefly.

(c) Explain 3NF & BCNF. What is the difference between them? 3+5+(4+3)

15. (a) What is an instance?

(b) Explain the derived key with example.

(c) Given a relation R with 5 attributes ABCDE and the following FDs : $A \rightarrow B$, $BC \rightarrow E$, and $ED \rightarrow A$. Is R in 3NF? Justify.

(d) Write two aggregate functions of SQL. 2+4+7+2

16. (a) What is multi valued dependency? State and explain fourth normal form based on this concept.

(b) Define transaction and explain desirable properties of transactions. (4+5)+(1+5)

(b) Normalize following relation up to 3NF :

Bank (acno, cust_name, ac_type, bal, int_rate, cust_city, branchId, branch_nm, br_city).

(c) What is meta data? 5+8+2

12. Explain the following (any *three*) : 5×3=15

(a) DML operations,

(b) Identifier,

(c) Boyce Codd normal form,

(d) Data Dictionary.

13. Suppose you are asked to design a club database system based on the following information. Each student has a unique student id, a name, and an email; each club has a unique club id, a name, a contact telephone number, and has exactly one student as its president. Each student can serve as a president in at most one of the clubs, although he/she can be the members of several clubs. Clubs organize activities and students can participate in any of them. Each activity is described by a unique activity id, a place, a date, a time and those clubs that organize it.

(a) Draw an E-R diagram for the system that represents constraints appropriately. Write down your assumptions if necessary.

P.T.O.