(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 7310 Roll No. | | | | | | | | | | |

MCA
(SEMESTER-III) THEORY EXAMINATION, 2012-13
DATABASE MANAGEMENT SYSTEMS

Time : 3 Hours] *[Total Marks : 100*

Section – A

Attempt **all** questions. **All** carry equal marks. **2 × 10 = 20**

1. Define the following terms: database system, DBA, end user and database catalog.

2. List the various cases where use of a null value would be appropriate.

3. When does integrity constraints are specified and enforced in a DBMS ?

4. What is a Key constraint ? Elaborate.

5. What is lossless join decomposition ? Explain briefly.

6. What are normal forms in DBMS ?

7. What is view serializable schedule ?

8. What are the causes of transaction failure ?

9. What is multiple granularity ?

10. What is timestamping ?

Section – B

Attempt any **three** questions. **All** carry equal marks. **10 × 3 = 30**

11. A database is being constructed to keep track of the teams and games of a sports league. A team has a number of players, not all of whom participate in each game. It is desired to keep track of the players participating in each game for each team, the position they play in the game, and the result of the game. Designs an ER schema diagram for this application, stating any assumptions you make. Choose your favorite sport (e.g., soccer, baseball, football).

12. Answer each of the following questions briefly. The questions are based on the following relational schema

    Emp (*eid:* integer, *ename:* string, *age:* integer, *salary:* real)

    Works (*eid:* integer, *did:* integer, *pct_time:* integer)

    Dept (*did:* integer, *dname:* string, *budget:* real, *managerid:* integer)

    a. Give an example of a foreign key constraint that involves the Dept relation. What are the options for enforcing this constraint when a user attempts to delete a Dept tuple ?

    b. Write the SQL statements required to create the preceding relations, including appropriate versions of all primary and foreign key integrity constraints.

    c. Define the Dept relation in SQL so that every department is guaranteed to have a manager.

    d. Write an SQL statement to add John Doe as an employee with *eid* =101, age = 32 and *salary* = 15,000.

    e. Write an SQL statement to give every employee a 10 percent raise.

13. Define 4NF and 5NF, and explain how they prevent certain kinds of redundancy that BCNF does not eliminate. Describe tests for 4NF and 5NF that use only FDs. What key assumption is involved in these tests ?

14. Discuss how serializability is used to enforce concurrency control in a database system. Why is serializability sometimes considered too restrictive as a measure of correctness for schedules ?

15. Describe how a typical lock manager is implemented. Why must lock and unlock be atomic operations ? What is the difference between a lock and a latch ? What are convoys and how should a lock manager handle them ?

Section – C

Attempt **all** questions. **All** carry equal marks. **10 × 5 = 50**

16. Attempt any **two** parts :

(a) Compare and contrast between file systems and DBMS.

(b) What must a user guarantee with respect to a transaction and database consistency ? What should a DBMS guarantee with respect to concurrent execution of several transactions and database consistency ?

(c) Explain the difference between logical and physical data independence.

17. Attempt any **two** parts :

(a) What is *referential integrity* ? What options does SQL give application programmers for dealing with violations of referential integrity ?

(b) What are cursors in SQL ? What is its use ?

(c) Enlist and discuss advantages of SQL.

18. Attempt any **two** parts :

(a) Define *multivalued dependencies*, Join dependencies, and inclusion dependencies.

(b) Illustrate redundancy and the problems that it can cause. Give examples of *insert, delete*, and *update* anomalies,

(c) Write short note on alternative approaches to database design.

19. Attempt any **two** parts :

(a) Distinguish between deadlock prevention and avoidance.

(b) What are checkpoints ? Why are they used in database ?

(c) Write short note on testing of serializability.

20. Attempt any **two** parts :

(a) Describe *multi-version concurrency control.* What are its benefits and disadvantages in comparison to locking ?

(b) What are different replication techniques for distributed database ? Explain, in brief.

(c) What are distributed database ? How is recovery done in it ?