Bachelor in Information Technology (BIT)

Term-End Examination

June, 2007

CSI-14 : DATA ANALYSIS AND DATABASE DESIGN

Time : 3 Hours   *Maximum Marks : 75*

Note :   *All questions from Section A are **compulsory**. Questions 1 – 15 in Section A are multiple choice questions and carry **one** mark each. There are four options for each multiple choice type question. Mark the correct option. If more than one option is marked, your answer will be treated as wrong. Answer any **three** questions from Section B.*

SECTION A

1.   Consider the SQL statement *SELECT * FROM PRODUCT*. Here * refers to

   (a)   Every row of product

   (b)   Every column of product

   (c)   Every row and column of product

   (d)   None of the above

2.   Which one of the following is **not** a normal form (normalization) rule w.r.t. relational model ?

   (a)   All fields within a table must relate to or directly describe the primary key

   (b)   Repeating groups must be eliminated from the table

   (c)   Fields that can contain non numeric data are to be removed

   (d)   All of the above

3. When used in a create table command, which of the following begins the section that establishes foreign key relationship ?

(a) Foreign key

(b) Order key

(c) Constraint

(d) Primary key

4. Select the command that will remove students table from the database.

(a) Remove students

(b) Alter students

(c) Drop students

(d) None of the above

5. To make corrections to a table, which command is to be used ?

(a) Insert

(b) Delete

(c) Update

(d) Rollback

6. Which of the following represents correct order of 3 levels in DBMS architecture from lower to higher ?

(a) External, Conceptual, Internal

(b) Conceptual, Internal, External

(c) Internal, Conceptual, External

(d) None of the above

7. Language used to perform Access control and Transaction control over a database is

(a) DDL

(b) DML

(c) DCL

(d) DSDL

8. The concept of column atomicity is implemented by which normal form ?

    (a) 1NF

    (b) 2NF

    (c) 3NF

    (d) All of the above

9. Redundancy in data due to multivalued dependency is resolved by which normal form ?

    (a) 3NF

    (b) BCNF

    (c) 4NF

    (d) 2NF

10. Data independence between conceptual level and external level is known as

    (a) Logical data independence

    (b) Physical data independence

    (c) Both (a) and (b)

    (d) None of the above

11. GRANT, REVOKE, COMMIT, ROLLBACK are commands of which language ?

    (a) DCL

    (b) DDL

    (c) DML

    (d) DSDL

12. Date of Birth of a person is an example of which type of attribute ?

    (a) Single valued

    (b) Derived

    (c) Multivalued

    (d) None of the above

13. Primary key should not be null represents

    (a) Entity integrity

    (b) Referential integrity

    (c) Domain integrity

    (d) None of the above

14. An attribute or combination of attributes which may not be candidate key but classifies entity set on a particular characteristic is known as

    (a) Super key

    (b) Primary key

    (c) Secondary key

    (d) None of the above

15. Virtual tables are represented by

    (a) Views

    (b) Indexes

    (c) Clusters

    (d) None of the above

16. What is normalization ? Why is a database normalized ? Discuss the approaches for normalization with small example. Write short notes on all normal forms (1NF to 5NF) with emphasis on the functional dependencies they are removing.

SECTION B

*Answer any **three** questions from this section. Each question carries 15 marks.*

17. Prove the statement "Every relation which is in BCNF is in 3NF but converse is not true". With the help of an example discuss the anomalies associated with a relation not in 3NF.

18. (a) Consider the relation Department1 and Department2 given below :

Department1		Department2	
Empcode	Empname	Empcode	Empname
101	Jay	103	Shyam
103	Shyam	104	Lal
104	Lal	106	Balram
107	Ehsan	110	Dev
110	Dev		
112	Sukhdev		

Perform the operations given below and determine the resulting relation.

(i) Department1 ∪ Department2

(ii) Department1 ∩ Department2

(iii) Department1 – Department2

(iv) Check Department1 ∩ Department2
= Department1 – (Department1 – Department2)

(v) Department1 × Department2

(b) List and explain any five Codd's Commandments with the help of a suitable example for each.

19. What are the languages used at different levels of DBMS 3 level architecture ? Discuss all SQL commands with at least one example for each of the languages used at respective levels.

20. (a) Prepare ER diagram for the situation given below :

In an institution affiliated to some university, several teachers teach several students of different disciplines.

Use meaningful attributes with all the entities and also incorporate the concept of keys, aggregation etc. in your diagram.

(b) Now transform your ER diagram to a relational model.

(c) Considering the schema given below, perform the given Queries using SQL and relational algebra.

Teacher (Tcode, Tname, Tqual, Tcontact)

Student (SRegno, SRollno, Sname, SAdd, Scourse)

Teaches (Tcode, Scourse, SRollno, Subject)

(i) Find the details of teachers who possess **Ph.D.** Qualification.

(ii) Find details of teacher who taught DBMS subject to MCA students.

(iii) Find details of students who are in MCA.