Bachelor in Information Technology (BIT)

Term-End Examination

December, 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. Logical data independence exists between

    (a) External and conceptual level

    (b) Conceptual and physical level

    (c) External and physical level

    (d) None of the above

2. The operation that combines two relations on a particular parameter to produce a single new relation is

    (a) Selection

    (b) Join

    (c) Union

    (d) Projection

3. Minimal super key is known as

    (a) Candidate key

    (b) Alternative key

    (c) Secondary key

    (d) Primary key

4. Foreign key should *not* be null is imposing

   (a) Entity integrity
   (b) Domain integrity
   (c) Referential integrity
   (d) None of the above

5. Language based on Relational Algebra is

   (a) SQL
   (b) QBE
   (c) QUEL
   (d) All of the above

6. Select * From Student : This Query works like which relational operation ?

   (a) Projection
   (b) Selection
   (c) Join
   (d) Union

7. Partial functional dependency is removed in

   (a) 1NF
   (b) 3NF
   (c) BCNF
   (d) 2NF

8. DDL works at which level of ANSI/SPARC 3 level architecture :

   (a) External level
   (b) Conceptual level
   (c) Internal level
   (d) None of the above

9. Query optimization technique involves

   (a) Relational algebra
   (b) Relational calculus
   (c) Both
   (d) None of the above

10. BCNF is strong 3NF. This statement is

    (a) True

    (b) False

    (c) Can't say

    (d) Both BCNF and 3NF are same

11. 4NF removes which functional dependency ?

    (a) Transitive

    (b) Trivial

    (c) Partial

    (d) Multivalued

12. The statement "Central pool of data that can be shared" defines

    (a) Database

    (b) Filebase

    (c) Both

    (d) None of the above

13. CREATE, ALTER, DROP are SQL commands. These commands work at which level of 3 level architecture ?

    (a) Conceptual

    (b) External

    (c) Internal

    (d) None of the above

14. DCL performs which of the following tasks on database ?

    (a) Access control

    (b) Transaction control

    (c) Both

    (d) None of the above

15. Database view is a

(a) Virtual table

(b) Virtual function

(c) Inline function

(d) All of the above $15 \times 1 = 15$

16. Write short notes (on any **three**); your short note should have some example or diagram in support of your note. $3 \times 5 = 15$

(a) Views : advantages and disadvantages

(b) Anomalies of 2NF

(c) Normalization approaches and types of normalization

(d) Functional dependencies and its types

(e) 5th Normal Form

SECTION B

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

17. Differentiate between any **three** of the following : $3 \times 5 = 15$

    (a) Logical Data Independence and Physical Data Independence

    (b) 3NF and BCNF

    (c) DDL and DML

    (d) Cartesian cross-section and join

    (e) Projection and Selection

    (f) Group by clause and Order by clause

18. (a) Give detailed description of any four Codd's commandments. Also, give an example for each. *8*

    (b) "File oriented approach to data processing was entirely wrong and the correct approach to data processing should only be through databases." Give justification in support of the above statement. *7*

19. Give detailed explanation of ANSI/SPARC 3 level architecture. How does this architecture support basic definition of database ? Discuss the commands of several languages used at several levels with at least one example each. *15*

20. Draw ER diagram for the situation given below. Use appropriate attributes for respective entities. In a company several projects are under process. Instead of producing all the parts required in a project, the company has shortlisted some suppliers from open market who supply several parts required in respective projects. *15*

    Map the ER diagram to relational model. Using schema given below perform the given queries using SQL and Relational algebra.

    Supplier (Sup#, Sname, Scontact)

    Supply (Sup#, Part#, Proj#, Compname)

    Part (Part#, Pname, Pcolon, Plot)

    Project (Proj#, Projname, Projstaff, Projhead)

    (i) · Find name and code of all red colon parts.

    (ii) Find contact information of Supplier# 007.

    (iii) Find details of Project code 2347.