

**Bachelor in Information Technology (BIT)**

**Term-End Examination**

**December, 2006**

**CSI-14 : DATA ANALYSIS AND DATABASE DESIGN**

*Time : 3 Hours*

*Maximum Marks : 75*

**Note :** *All questions from Section A are **compulsory**. Questions 1 – 10 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.*

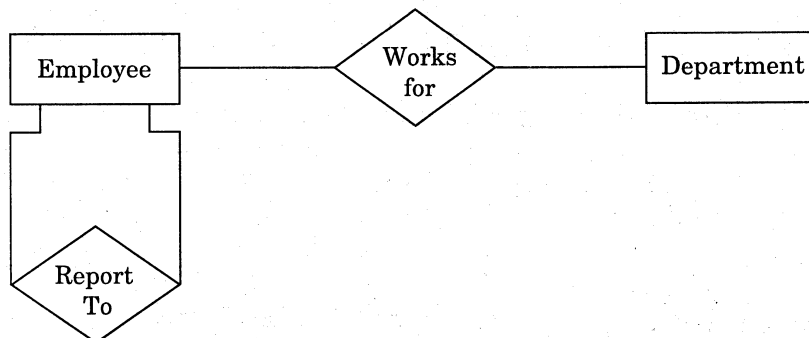
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**SECTION A**

1. The level of database abstraction in which all the database entities and the relationships among them are included is called \_\_\_\_\_ . 1
  - (a) view level
  - (b) conceptual level
  - (c) external level
  - (d) procedural level
  
2. An attribute or combination of two or more attributes of an entity set that is used to identify instance of the set is called 1
  - (a) Tuple
  - (b) Record
  - (c) Relationship
  - (d) Key

3. Identify the relationship sets used in the following diagram :

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- (a) Employee only
  - (b) Works for only
  - (c) Works for and report to
  - (d) Department and employee
4. When the Conceptual scheme can be changed without affecting the existing external schema, it is known as \_\_\_\_\_ .
- (a) physical data dependence
  - (b) logical data independence
  - (c) physical data independence
  - (d) logical data dependence
5. \_\_\_\_\_ contains the data portion of the database.
- (a) Data dictionary
  - (b) System catalog
  - (c) Data files
  - (d) Database manager
6. Which of the following is **not** directly supported by hierarchical model ?
- (a) 1-to-many
  - (b) 1-to-1
  - (c) Many-to-many
  - (d) Many-to-1

1

1

1

7. Which of the following do **not** belong to multi key file organisation ? 1
- (a) Virtual storage access method
  - (b) Cellular partition
  - (c) Inverted file organisation
  - (d) Multilist file organisation
8. An un-normalized relation contains \_\_\_\_\_ values. 1
- (a) diatomic
  - (b) mono-atomic
  - (c) non-atomic
  - (d) multi-atomic
9. In network data model, a set type refers to \_\_\_\_\_ relation between owner and member record type. 1
- (a) 1 : 1
  - (b) 1 : N
  - (c) N : 1
  - (d) N : N
10. If there exists a linear order among data items and transactions request locks in that order, then there **cannot** be any \_\_\_\_\_ . 1
- (a) Cursor
  - (b) Deadlock
  - (c) Rollback
  - (d) Trigger
11. What are views ? How is view defined ? Explain with a suitable example. 5
12. Metro Line Hospital maintains the records/information of their patients, doctors, patient's case history, testing details, rooms and treatment details. You must specify and write your assumptions wherever necessary in this system. Perform the following tasks based on the above system :
- (a) Draw an ER diagram that captures all the required information. Clearly highlight the relationships, primary keys and mapping constraints. 5
  - (b) Derive tables from ER diagram for the required database. (Show proper entries in the tables) 5
  - (c) Produce a table that is in BCNF which corresponds to the ER diagram. 5

**SECTION B**

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

13. (a) Define referential integrity. Define foreign key and explain the concept behind declaration of foreign keys with the help of an example. 6
- (b) What are normal forms ? What is the motivation behind normalizing a database ? Explain the first, second, BCNF normal forms with a suitable example for each. 9
14. The following relations are part of a relational database. The primary key in each table is underlined.
- Project (Project\_No, Project\_Name, Project\_Manager)
- employee (employee\_No, employee\_Name)
- Assigned\_To (Project\_No, employee\_No)
- (a) Write SQL-DDL statement for implementing the above defined database. (Creating tables) 6
- (b) Find the details of employees who are working on both projects, namely 'Project1' and 'Project2'. 2
- (c) List the names of employees working on project 'Project1' but not on 'Project2'. 2
- (d) Delete the record of employee whose employee number is 'A12345'. 2
- (e) List the names of employees who are working on a project for which 'A43210' is the project manager. 3
15. Write at least two differences between the following with the help of examples :  $3 \times 5 = 15$
- (a) Fourth normal form and Third normal form
- (b) Triggers and Assertion
- (c) Outer JOIN and Inner JOIN
- (d) Conceptual data model and Physical data model
- (e) Database instance and Database schema
16. A relational database is to be created to record the information about the entities and relationships for *Shop management system*. It should contain the information about shop, shop owner, customer, requirement, stock and supplies etc.
- Make necessary assumptions wherever required.
- Do the following on the basis of above defined specifications :
- (a) Draw an ER diagram with all relationships. 3

- (b) Give an SQL-DDL definition of the database. Identify referential integrity constraints that should hold, and also include them in the DDL definition. 3
- (c) Write the SQL statement which explains the use of 'Cartesian product', 'Restrict' and 'Join' operations on the above database. 3
- (d) Show the normalized (third form) tables with justification. 3
- (e) Find the names of shops and shop's owners who have earned maximum profit in the financial year 2004 – 2005. 3