2010

Time : 3 hours

Full Marks : 80

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Answer from both the Groups as directed.

Group – A

(Objective Type Questions)

Answer all questions.

1. Choose the correct answer of the following :
   
   $2 \times 10 = 20$

   (a) Relational Algebra is :
   
   (i) Data Definition Language
   
   (ii) Meta Language
   
   (iii) Procedural query language
   
   (iv) Non procedural language

SB – 27/3 (Turn over)
(b) 4NF is designed to cope with:
   (i) Transitive dependency
   (ii) Join dependency
   (iii) Multi valued dependency
   (iv) None of the above

(c) A schema describes:
   (i) Record Relationship
   (ii) Data Elements
   (iii) Record and files
   (iv) All of the above

(d) Which one of the following is not a valid unary operation in the relational algebra?
   (i) Select
   (ii) Min
   (iii) Project
   (iv) Rename

(e) Which one is lowest level data model?
   (i) Physical data model
   (ii) Logical data model
   (iii) External data model
   (iv) None of the above
(f) In a relational database a referential integrity constraint is specified with the help of:
   (i) Primary key
   (ii) Consistency key
   (iii) Foreign key
   (iv) None of the above

(g) Object based data models are used in describing the abstraction of the following level (5):
   (i) Only physical
   (ii) Conceptual and view
   (iii) Physical and conceptual
   (iv) None of the above

(h) Which of the following is not logical database structure?
   (i) Network
   (ii) Relational
   (iii) Chain
   (iv) Tree
(i) Every BCNF is in:
   (i) 3NF
   (ii) 1NF
   (iii) 2NF
   (iv) None of the above
(j) The database model that uses a series of two-dimensional tables or files to store information is:
   (i) Object-Oriented Database Model
   (ii) Hierarchical-Oriented Database Model
   (iii) Relational-Oriented Database Model
   (iv) Network-Oriented Database Model

Group – B
(Long-answer Type Questions)

Answer any four questions:

2. (a) What is the purpose of 'VIEW' operation in SQL? Explain how is it created. List its advantages.
   (b) Explain what is meant by transaction. Why are transactions important limit of operations in a DBMS.

SB – 27/3 (4) Contd.
3. (a) Suppose we have a functional dependency of the form \( X \rightarrow Y \) on a relation \( R \). Specify the conditions on \( X \) and \( Y \) such that \( X \) is a candidate key for \( R \). How would you capture an arbitrary functional dependency \( X \rightarrow Y \) in ER design? 8

(b) What is multi-valued dependency? Specify the significance of this dependency in case of 4NF. 7

4. (a) List all relational algebra operations and explain any one of them. 8

(b) Identify entities, attributes and relationships giving functionalities and draw E-R diagram for the system. 7

5. (a) Explain any four of the following Database terms with the help of an example: 8

(i) Data Independence

(ii) Domain

(iii) Foreign Key

(iv) Cardinality

(v) Referential Integrity

SB – 27/3 (5) (Turn over)
(b) Explain the 3rd Normal Form with suitable example.  

6. (a) List and explain Armstrong's Axioms.  

(b) Explain the purpose and utility of different normal forms. Specifically define and differentiate between third form and BCNF.  

7. (a) With the help of well labelled diagram, explain the architecture of DBMS.  

(b) Give the advantages and disadvantages of Centralized Database.  

8. (a) Explain any eight rules of Dr. E. F. Codd in brief.  

(b) Discuss the various types of Data Models in brief.  

9. (a) What is referential integrity? Explain with suitable examples.  

(b) State any seven advantages of RDBMS.  

SB – 27/3 (6) Contd.
10. (a) Explain the purpose and scope of Database security and explain the following in terms of providing security for a database: authorization, views, backup and recovery, integrity, encryption and RAID technology.

(b) Explain BCNF with the help of an example.