T.E. (Comp./I.T.) (Semester – I) (2003 Course) Examination, 2009
DATABASE MANAGEMENT SYSTEMS

Time : 3 Hours | Max. Marks : 100

SECTION – I

1. a) What are the superclass and subclass entity types ? Explain. 4
   b) Explain the difference between disjoint and overlapping design constraints. 4
   c) A musical company has decided to store information about musicians who perform in their albums. Each musician is identified with unique identifier. The instruments are used in songs. Song has title and an author. Each musician may play several instruments and a given instrument may be played by several musicians. Each album has exactly one musician. Who acts its producer ? A musician may produce several albums. 8
      i) Draw an E-R diagram.
      ii) List the key attributes.

OR

2. a) What do you mean by connectivity, cardinality and dependency of a relationship ? 4
   b) Specify CODD's norms to be satisfied by RDBMs. 6
   c) Discuss the entity integrity and referential integrity constraints. 6

3. a) Consider the relational database : 8
   dept (dept-no, dname, LOC)
   emp (emp-no, ename, designation)
   project (proj-no, proj-name, status)
   dept and emp are related as 1 to many.
   project and emp are related as 1 to many.
   Write relational or sq 1 expressions for the following :
      i) List all employees of 'INVENTORY' department of 'PUNE' location.
      ii) Give the names of employees who are working on 'Blood Bank' project.
      iii) Give the name of managers from 'MARKETING' department.
      iv) Give all the employees working under status 'INCOMPLETE' projects.

b) Specify the need for embedded SQL. List and explain various embedded commands. 6

c) Explain : stored procedures and triggers with example. 4

OR

4. a) The outer-join operation extend the natural-join operation so that tuples from the participating relations are not lost in the result of the join. How the theta join operation can be extended so that tuples from the left, right or both relations are not lost from the result of a theta join ? Explain. 8

b) What is view ? List two major problems with processing update operations expressed in terms of views. 4

c) State and prove Arm Strong's axioms for functional dependency. 6

5. a) Consider a relation R with attributes ABCDE. You are given following dependencies :

$A \rightarrow B,\ BC \rightarrow E,\ ED \rightarrow A$

i) List all keys for R ii) Is R in 3 NF. 8

b) Explain why 4 NF is more desirable than BCNF. Rewrite the definitions of 4 NF and BCNF using the notions of domain constraints and general constraints. 8

OR

6. a) Let R = (A, B, C, D, E) and let M be the following set of multivalued dependencies.

$A \rightarrow\rightarrow BC\ \ B \rightarrow\rightarrow CD\ \ E \rightarrow\rightarrow AD$

List the non trivial dependencies in M^+. 8

b) Which are different fact finding techniques ? State advantages and disadvantages of each. 6

c) Define : User Interface design. 2

SECTION – II

7. a) Write in detail various RAID levels and the factors to be taken into account when choosing a RAID Level. 8

b) Construct a B^+ tree for following set of the key values. 8

(2, 3, 5, 7, 11, 17, 19, 23, 29, 31)

Assume order of tree is 4.

OR

8. a) Describe a hash-join technique to implement a natural join. 4

b) How can we estimate a cost of query ? 4

c) Explain basic steps involved in query processing. What is the role of relational algebra in query processing ? 8

9. a) Explain the concept of 'transaction'. Describe ACID properties for transaction. 8

b) Why concurrent executions or transactions is desirable ? Support your answer with example. 4

c) Explain time stamp based concurrency control. 4

OR

10. a) Explain deferred database modification and immediate database modification and their difference in the context of recovery. **8**

    b) Differentiate between serial and serializable schedule. **2**

    c) Explain two-phase locking protocol. How does it ensure serializability ? **6**

11. a) Differentiate between persistent and transient object. How persistence is handled in a typical object oriented databases ? **8**

    b) State and explain the advantages of distributed database systems. **6**

    c) Explain the need for Backup and Replication. **4**

OR

12. a) Explain in detail ODMG language constructs for object definition and object manipulation. **8**

    b) How does the concept of an object in the object oriented model differ from the concept of an entity in the E-R model. **6**

    c) Explain how a persistent pointer is implemented. **4**