BT-4/M-23　　　　　44219

DATABASE MANAGEMENT SYSTEM
PC-CS-AIDS-210A

Time : Three Hours]　　　　　　[Maximum Marks : 75

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. (a) Describe the relationship between the terms database, data models, and schemas. How are data models characterized ?

   (b) Specify the three-level architecture of a DBMS and explain data independence in the context of this architecture.

2. What is the role of an E-R model in database design ? Explain the basic E-R model concepts of entities and their attributes with the help of an example.

Unit II

3. Answer the following with suitable examples :

   (a) What is a primary key in a relation ?

   (b) Discuss the entity integrity and referential integrity constraints.

   (c) Give one example of each of SQL commands for data definition and for retrieving information from a database.

4. What is the role of foreign key in JOIN operation ? Give the illustration of the following relational algebra operations on a database of your choice :

   (a) SELECT

   (b) PROJECT

   (c) DIVISION

   (d) JOIN.

Unit III

5. Design a relation schema that has updation anomalies. Describe 2nd and 3rd normal forms in terms of removing these anomalies.

6. What is functional dependency ? Show how functional dependencies are used to define normal forms for relation schemas.

Unit IV

7. What is Serializability and what are its benefits in the context of transaction processing ? Explain serializability using a suitable example. Also, describe in brief the main types of serializability in DBMS.

8. What problems and failures can occur in the concurrent execution of transactions in a multiuser system ? What is the effect of timestamp ordering on concurrency ? Also, describe how an optimistic concurrency control technique can be used to control concurrency.