**3 Hours / 70 Marks**     Seat No.

**Instructions :**  (1)  All Questions are *compulsory.*

  (2)  Answer each next main Question on a new page.

  (3)  Illustrate your answers with neat sketches wherever necessary.

  (4)  Figures to the right indicate full marks.

  (5)  Assume suitable data, if necessary.

  (6)  Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

**1.**   **Attempt any FIVE of the following :**     **10**

  (a)  List any four DBMS softwares.

  (b)  Define Domain and Attribute.

  (c)  List and draw any four symbols used in ER-Model.

  (d)  Define Constraint.

  (e)  Define Database. List any two advantages of database system.

  (f)  Define database model.

  (g)  List advantages of Normalization.

2. **Attempt any THREE of the following :** 12

   (a) Define data abstraction. Explain the levels of data abstraction with neat diagram.

   (b) Distinguish between network database model and relational database model.

   (c) Describe enhanced ER model with the help of example.

   (d) Compare file system and database system.

3. **Attempt any THREE of the following :** 12

   (a) Explain any four Codd's rules.

   (b) Describe functional dependency with example.

   (c) Explain different types of attributes.

   (d) Explain different operations performed with Data Definition Language.

4. **Attempt any THREE of the following :** 12

   (a) Explain BCNF with example.

   (b) Explain client/server database system.

   (c) Explain terms primary key and candidate key with example.

   (d) Explain entity integrity constraint with example.

   (e) Describe centralized database system with example.

**5.** **Attempt any TWO of the following :** **12**

(a) Consider a single table consisting following columns. Convert it into 2NF and 3NF Table :

(supplier_no, supplier_name, supplier_city, order_no, order_quantity, order_amount, product_code, product_name)

(b) Draw ER diagram of library management system in which library maintain the data of books, borrowers, issue return details, fine collection, supplier of books etc. Assume suitable data and display the relationship among entities.

(c) Consider the relation R with five attributes L, M, N, O, P

You are given following dependencies :

$L \rightarrow M$, $MN \rightarrow P$, $PO \rightarrow L$

(i) List all keys for R.

(ii) Is R in 3 NF ?

Justify your answer.

**6.** **Attempt any TWO of the following :** **12**

(a) Consider the following schemas :

(i) Dept (Dept_no, Dept_name, Dept-loc)

(ii) Staff (Staff_id, Staff_name, Dept_no, Joint_date)

Draw and explain parent-child relationship for above schemas and find out foreign key with justification.

    (b)   Draw enhanced ER diagram for loan payment system. Consider the following entities :

        (i)    Loan (Loan_id, Loan_amount, Loan_date)

        (ii)   Payment (Payment_id, Payment_date, Balance_amount)

        (iii)  Personal Loan (Personal Loan_no, Interest rate)

        (iv)  Home Loan (Home Loan_no, Interest rate)

        Show strong entity set, weak entity set, super class and sub class.

    (c)   Consider 'Employee' database with appropriate details. Write a procedure to manipulate given database by adding, modifying and deleting records.

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