Con. 3330-10. (REVISED COURSE) AN–3439

(3 Hours) [Total Marks : 100]

N. B. : (1) Question no. **1** is **compulsory**.
   (2) Solve any **four** questions from remaining.
   (3) Make **suitable** assumptions if needed.

1. (a) Draw an E-R diagram and reduce it to relational database model for a university **10**
      database for scheduling of classrooms for final exams. This database could
      be modelled using entities as
      exam (course_name, section_number, room_number, time);
      course (name, department, C_number),
      room (r_number, capacity, building).
      Entity section is dependent on course.

   (b) What is recoverable schedule ? Why recoverability of schedule is **10**
      desirable ? Explain recovery with concurrent transaction ?

2. (a) Explain view serializability and conflict serializability with proper example ? **10**
   (b) Explain following terms with suitable example :— **10**
      (i) Primary Key (ii) Candidate Key (iii) Foreign Key (iv) Super Key.

3. (a) For the following given database, write SQL queries :—
         person (driver_id #, name, address)
         car (license, model, year)
         accident (report_number, date, location)
         owns (driver_id #, license)
         participated (driver_id, car, report_number, damage_amount)
      (i) Find the total number of people who owned cars that were involved **4**
         in accident in 1995.
      (ii) Find the number of accidents in which the cars belonging to **3**
         "Sunil K." were involved.
      (iii) Update the damage amount for car with licence number "Mum2022" **3**
         in the accident with report number "AR2197" to Rs. 5000.

   (b) Explain following relational algebra with suitable example :— **10**
      (i) Natural Join
      (ii) Assignment
      (iii) Set intersection
      (iv) Generalized Projection.

4. (a) What is transaction ? Discuss ACID properties of transaction ?   10
   (b) Define normalization ? Explain 1NF, 2NF, 3NF and BCNF ?   10

5. (a) What do you mean by deadlock ? What are various techniques for deadlock   10
      prevention and detection ?
   (b) Explain various types of constraints with an example?   10

6. (a) Explain Insertion of entry in B$^+$ tree ?   10
   (b) Explain various functions of a database administrator ? List five responsibilities   10
      of a DBMS ?

7. Write short note on (any two) :—   20
      (a) Generalization and specialization
      (b) Buffer Management
      (c) Security and Authorization in DBMS
      (d) Hashing.