Paper Code: MCA-313	**Roll No.**										

MCA
THIRD SEMESTER EXAMINATION, 2016-17
DATABASE MANAGEMENT SYSTEM

[Time: 3 hours]   [Max. Marks: 100]
Note: All questions are compulsory. All question carry equal marks.

1. Attempt any **FOUR** parts of the following:-   (5×4=20)

   (a) Define and differentiate the generalization and specialization.
   (b) Design ER diagram for school admission process. Assume entities and their attributes.
   (c) Identify various types of DBMS languages and explain their applications.
   (d) Define the super key, candidate key and foreign key.
   (e) Describe important characteristics extended ER model.
   (f)   Describe architecture of DBMS. Explain its important components.

2. Attempt any **TWO** parts of the following:-   (10×2=20)

   (a) (i) Consider the following relations for a database that keeps track of student enrollment in courses and the books adopted for each course-
STUDENT(SSN, Name, Major, Bdate)
COURSE (Course#, Cname, Dept)
ENROLL(SSN, Course#, Quarter, Book_ISBN)
TEXT(Book_ISBN, Book_Title, Publisher, Author)
Specify the foreign keys for this schema, state if you have any assumption.

    (ii) Write and explain basic types of relational algebra operations.

   (b) Consider the following relational database, where the primary keys are underlined
      Employee(person_name, street, city)
      Works(person_name, company_name, salary)
      Company(company_name, city)
      Manages(person_name, manager_name)
      Write SQL command for each of the following queries:
    (i)   Find the name of all employees who live in the same city and on the same street as do their managers.
    (ii) Find the name of all employees in this database who do not work for "First Bank Corporation".
    (iii) Find the name of all employees who earn more than every of "Small Bank corporation".
    (iv) Give all managers in this database a 10 percent salary raise.

   (c) (i) Describe insertion and deletion and updation anomalies.
     (ii) Write and explain the schema based constraints in RDBMS.

3. Attempt any **TWO** parts of the following:- **(10×2=20)**

   (a) (i) Consider following set of FDs for the relation R(A,B,C,D,E):

$$F=\{A\textsf{k}B, AB\textsf{k}C, D\textsf{k}AC, D\textsf{k}E\}$$
$$F'=\{A\textsf{k}BC, D\textsf{k}AE\}$$

      Check whether these are equivalent sets.

    (ii) A set of FDs for the relation R(A,B,C,D,E,F) is AB k C, Ck A, BCkD, ACDkB, BEkC, ECkFA, CFkBD, DkE. Find a minimum cover for this set.

   (b) (i) Normalize following relation up to 3NF:

$$R=(A,B,C,D)$$
$$F=\{AB{\rightarrow}D, AC{\rightarrow}BD, B{\rightarrow}C\}$$

    (ii) BCNF is stricter than 3NF, describe through an example.

   (c) Describe MVD. Explain the fourth and fifth normal with suitable example

4. Attempt any **TWO** parts of the following:- **(10×2=20)**

   (a) What is the concurrent execution of database transaction? Describe the desirable properties of transactions. Explain transaction states in brief.

   (b) Describe the serializability? Explain view serializability in detail.

   (c) What is schedule? Define the concept of recoverable, cascadeless, and strict schedules, and compare them in terms of their recovrability.

5. Attempt any **TWO** parts of the following:- **(10×2=20)**

   (a) Describe two-phase locking technique for concurrency control? Explain. How does it guarantee serializability?

   (b) Describe the shadow paging recovery technique. Under what circumstances does it not require a log?

   (c) Define deadlock and starvation. Describe the important types of algorithms for dealing the deadlock.