(3 Hours)   [Total Marks : 100

N.B. : (1)   Question No. **1** is **compulsory**.
        (2)   Attempt any **four** questions out of the remaining **six** questions.

1. Consider a university database that keeps track of student and their majors, transcripts
    and registration and the university courses. Several sections of each course are offered
    and each section is related to the instructor who is teaching. It also keeps track of the
    sponsored research project of faculty and graduate students of the academic depart-
    ments of the particular college. The database also keeps track of research grants and
    contracts awarded to the university. A grant is related to one principle investigator and to
    all researchers it supports.
    (a) Draw an extended ER diagram for the above system.   7
    (b) Show mapping of EER diagram into relational schema.   7
    (c) Take two typical queries and write them in SQL.   6

2. (a) Explain different architecture for parallel database.   10
    (b) Explain different joins such as EQUIJOIN, NATURAL JOIN, LEFT AND RIGHT 10
         OUTER JOIN with suitable example.

3. (a) Explain query processing in distributed database.   10
    (b) Explain with example nested relation in ORDBMS.   10

4. (a) Explain heuristic query optimization with given example :—   10
         Select e-lname
         from Employee e, Works-on w, Project p
         where P. pname   = 'Database' And
               p. pnumber = w.pno   And
               e.essn   = w.ssn   And
               e.bdate > '1977 – 12 – 31'
    (b) In SQL 3 how type inheritance and table inheritance is implemented ? Explain with 10
         suitable example.

5. (a) What is Data transparency ? Explain the type of transparencies distributed data- 10
         base should achieve.
    (b) What is well formed and valid XML document ? With example explain what is XML 10
         Schema file.

6. (a) Explain Nested-loop join and Block Nested-loop join algorithm.   10
    (b) Explain database design and implementation process.   10

7. Write short notes on (any **four**) :—   20
    (a) Replication in distributed DBMs
    (b) Aggregate functions in SQL
    (c) XML Schema elements
    (d) EXIST and NOT EXIST clause in SQL
    (e) Query processing in typical DBMs system.