



- Notes :
1. Solve **any five** questions.
 2. All questions carry equal marks.
 3. Due credit will be given to neatness and adequate dimensions.
 4. Assume suitable data wherever necessary.
 5. Diagrams and Chemical equation should be given wherever necessary.

1. a) Which of the following plays an important role in representing information about the real world in a database? Explain briefly. 7
 - i) The data definition language
 - ii) The data manipulation language
 - iii) The buffer manager.
 - iv) The data model.
- b) Why does a DBMS interleave the actions of different transactions instead of executing transactions one after the other? 7
2. a) Explain the strict two-phase locking protocol. 7
- b) A university database contains information about professors (identified by social security number, or SSN) and courses (identified by courseid). Professors teach courses; each of the following situations concerns the Teaches relationship set. For each situation, draw an ER diagram that describes it (assuming no further constraint hold). 7
 1. Professors can teach the same course in several semesters, and each offering must be recorded.
 2. Professors can teach the same course in several semesters and only the most recent such offering needs to be recorded. (Assume this condition applies in all subsequent questions.)
 3. Every professor must teach some course.
 4. Every professor teaches exactly one course (no more, no less).
 5. Every professor teaches exactly one course (no more, no less, and every course must be taught by some professor.
 6. Now suppose that certain courses can be taught by a team of professors jointly, but it is possible that no one professor in a team can teach the course. Model this situation, introducing additional entity sets and relationship sets if necessary.
3. a) What is relation? Differentiate between a relation schema and a relation instance. Define the terms arity and degree of a relation. What are domain constraints? 7
- b) What SQL construct enables the definition of a relation? What constructs allow modification of relation instances? 7

4. a) What are the SQL constructs to modify the structure of tables and de-stray tables and views? Discuss what happens when we destroy a view. 7
- b) What is a foreign key constraint? Why are such constraints important? What is referential integrity? 7
5. a) What is the difference between tuple relational calculus and domain relational calculus? 7
- b) What is an unsafe calculus query? Why is it important to avoid such queries? 7
6. a) Explain the statement that relational algebra operators can be composed. Why is the ability to compose operators important? 7
- b) what is relational completeness? if a query language is relationally complete, can you write any desired query in that language? 7
7. a) What is an unsafe query? Give an example and explain why it is important to disallow such queries. 7
- b) Explain the following terms: Cursor, Embedded SQL, JDBC, SQLJ, stored procedure. 7
8. a) Explain the term stored procedure, and give examples why stored procedures are useful. 7
- b) Why do we need a precompiler to translate embedded SQL and SQLJ? Why do we not need a precompiler for.IDBC? 7
