Roll No. ..... Total Pages : 3

MCA/DX **5526**

DATABASE SYSTEMS

Paper : MCA-301

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *five* questions in all. Q. No. 1 is compulsory. Attempt remaining four questions by selecting one question from each unit.

1. Differentiate between the following :

(a) Before Image and After Image.

(b) Cardinality and Degree of a Relation.

(c) Conceptual, Logical and Physical Schema

(d) Theta-Join, Equi-Join and Natural-Join.

(e) BCNF and 3NF.

(f) Relation, Table and File.

(g) Serial Schedule, Non-Serial Schedule, Recoverable Schedule.

(h) Atomicity Property and Isolation Property. 2×8=16

UNIT–I

2. Explain the ANSI-SPARC architecture of DBMS. Explain how this architecture helps to achieve the following :

(i) Logical Data Independence

(ii) Physical Data Independence. 16

3. (a) What do you understand by ER Model ? How does an ER diagram help in analyzing a problem ? 7

(b) Create an ER diagram showing following relationships. Indicate what kind of relationships they are :

(i) The STUDENT may be taught by one and only one TEACHER.

The TEACHER may be the instructor of one or more STUDENTS.

(ii) The TEACHER may be responsible for one and only one CLASS.

The CLASS may be the responsibility of one and only one TEACHER.

(iii) The CLASS may be made up of one or more STUDENTS.

The STUDENT may be the member of one and only one CLASS. 9

UNIT–II

4. (a) Describe various SQL statements that can be used to specify views, constraints and indexes. 10

(b) Discuss the major modeling constructs used in Network and Hierarchical data models. 6

5. (a) Describe the Storage Organization in ORACLE. 6

(b) What is the difference between a view and a base relation ? 4

(c) Trace the history and development of SQL. 6

UNIT–III

6. (a) What is Normalization ? Why Normalization is necessary in relational database design ? 6

(b) A relation R is in 2 NF but not in 3 NF. Discuss the problems that will occur with each of the three basic operations : Insertion, Deletion and Updation. Use suitable examples. 10

7. (a) What is Functional Dependency ? Distinguish between trivial and non-trivial functional dependencies. 7

(b) Define candidate keys in terms of functional dependencies. 4

(c) What is the criterion for a good database design ? Explain the desirable properties of decomposition. 5

UNIT–IV

8. What do you understand by Concurrent Processing ? Describe in detail various concurrency control techniques. 16

9. (a) How does the recovery manager ensure atomicity and durability of transactions ? 4

(b) Differentiate between immediate update and deferred update recovery techniques. 7

(c) How does DBMS ensure that transactions are executed property ? 5
