*Name* : .....

*Roll No.* : .....

*Invigilator's Signature* : .....

**CS/MBA (OLD)/SEM-3 (FT) & 5 (PT)/SM-301/2009-10**

# 2009
# DATABASE MANAGEMENT

*Time Allotted* : 3 Hours | Full Marks : 70

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words as far as practicable.*

## GROUP – A
## ( Multiple Choice Type Questions )

1. Choose the correct alternatives of the following : 10 × 1 = 10

   i) The mapping cardinality for a binary relationship between entity set *A* and *B* can be

      a) one to one only

      b) one to many only

      c) many to one only

      d) one to one, one to many, many to one, many to many.

ii) The operation on relation *X*, produces *Y* such that *Y* contains only selected attributes of *X*. Such an operation is

a) projection b) selection

c) union d) difference.

iii) A dotted oval in E-R diagram represents

a) derived attribute b) composite attribute

c) multivalued attribute d) key attribute.

iv) DBA is a

a) software b) hardware

c) person d) none of these.

v) If a relation has no transitive dependency then it is called

a) 1 NF b) 2 NF

c) 3 NF d) 4 NF.

vi) The collection of information stored in a database at a particular moment is

a) view b) instance

c) scheme d) none of these.

vii) Data about data is termed as

a) database b) data dictionary

c) metadata d) none of these.

viii) Which of these is an aggregate function in SQL ?

a) Select b) SUM

c) Ordered by d) None of these.

ix) Either all operations of the transaction are reflected properly in the database or none is called

a) durability b) consistency

c) isolation d) atomicity.

x) A relation *R* is said to be in 2 NF

a) if it is 1 NF

b) every non-prime key attributes of *R* is fully functionally dependent on each relation key of *R*

c) if it is in BCNF

d) both (a) & (b).

## GROUP – B
### ( Short Answer Type Questions )

Answer any *three* of the following. 3 × 5 = 15

2. Explain primary key, superkey, foreign key with examples.

3. Discuss ACID properties of a transaction.

4. What are the different methods of deadlock detection ? Briefly explain.

5. Describe the three-tier architecture of DBMS.

6. Discuss the disadvantages of file based systems and compare it with DBMS.

## GROUP – C
### ( Long Answer Type Questions )

Answer any *three* of the following. 3 × 15 = 45

7. a) What do you understand by serializability of schedules ? 4

   b) Explain conflict serializability with suitable example. 4

c) How does 2-phase locking protocol guarantee serializability ? 4

d) What is system log ? 3

8. a) What is normalization ? 2

b) What do you understand by functional dependency ? 3

c) Define 3 NF and BCNF. Which one is more desirable ? Give an example that a relation is in 3 NF but not in BCNF. 7

d) Why is cannonical cover essential in relational database design ? 3

9. a) What do you mean by view ? 2

b) View can be used as security mechanism in database system. Explain with a suitable example. 3

c) What are the five levels of database security ? 5

d) Discuss about the failures that occur in centralised system. 5

10. a) Discuss the various component modules of DBMS. 4

b) Construct an E-R Diagram for a BANK database for the following : 5

Each bank can have multiple branches

Each branch can have multiple accounts and loans for customers.

c) What do you understand by indexing of files in database ? Discuss the various types of indices. 6

11. a) What are the typical constructing operations for defining structure of the state of an object ? 4

b) Explain the concept of type hierarchies and inheritance of object oriented database system. 4

c) What are the advantages of Distributed databases ? 3

d) Discuss the following techniques for distributed database design : 4

i) Data fragmentation

ii) Data replication and allocation.

12. Write short notes on any *three* of the following : 3 × 5

a) Query optimization

b) Distributed database

c) 4 NF and Multivalued dependency

d) Database recovery techniques

e) $B^+$ tree indexing.