9.   Write short notes on the following :

a)   Advantage of DBMS over file processing system.   4

b)   Security features in DBMS.   4

c)   Transaction and its states.   4

d)   Two phase locking protocol.   4

e)   Primary index.   4

Master of Computer Application Engineering
Examination 2012

(2nd Year, 2nd Semester)

Database Management System

Time : Three hours   Full Marks : 100

Answer any **Five**

1.   a)   What is ER diagram?   3

b)   A weak entity type must totally participate in a relation with strong entity type. Why?   4

c)   What is the difference between ─
i)   Singlevalued and multivalued attributes
ii)   Stored and derived attributes.   3

d)   Draw the ER diagram for the following system -

A bookseller stores information regarding the publishers, authors and books. A publisher may publish one or more books. A book may have multiple authors. An author may write number of books. Books are classified as Tent and Reference Accordingly additional information has to be stored for the books. School information and which books are ordered by which schools are also to be noted.   10

[Turn over

2. a) Why do we normalize a schema?   5

    b) Consider a schema that stores following information for each item —

    itemcode, itemname, category, excise duty, salestax, size, qty-stock, rate.

    Assume, each item has unique item code. An item may have different size, qty-stock and rate of on item also depends on its size. Excise duty and salestax depend solely on category of the item.

    — Normalize the schema so that 3 NF is satisfied.   10

    c) Compare 3 NF and BCNF. Show that, in order to be in 3 NF a schema must be in 2 NF.   5

3. a) Define functional dependency.   3

    b) Explain, Armstrong's anioms are sound and complete. 3

    c) For the schema R (A, B, C, D) consider the FDs as A $\longrightarrow$ B and C $\longrightarrow$ D. Find the candidate key.   3

    d) A schema R is decomposed into R1 and R2 which have primary key foreign key relationship. Explain, whether the decomposition is loss-less or not.   3

    e) In the context of relational model, define intension and extension of relation and referential integrity.   8

ACCOUNT (AC_NO, CUST_NAME, OPEN_DT)

TRANSACTION (TRANS_ID, AC_NO, AMOUNT)

Write a trigger so that when an account is deleted from ACCOUNT relation, is deleted from ACCOUNT relation, automatically corresponding records from TRANSACTION will be deleted.   10

    b) Explain, the following exception in ORACLE_NO _DATA _FOUND, TOO_MANY_ROWS.

    Consider the following relations :

    STUDENT (ROLL, NAME) SUBJECT (SCODE, SNAME) RESULT (ROLL, SCODE, MARKS)

    Write a PL/SQL block to show SNAME and name of the students with highest marks in the subject. It will show the same for all subjects.   10

8. a) Explain checkpoint based recovery for a concurrent environment.   8

    b) Timestamp based protocol is free from deadlock. Why?   4

    c) What is a conflict serializable schedule?   4

    d) Why is steal / no-force preferred in transaction processing?   4

the order). The list must in the ascending order of total value. 5

b) Increase the price by 10% for all items whose present value is Rs.5,000 or more. 3

c) From ITEM table delete the items which do not appear in any of the orders. 4

d) For each item, show itemcode and total quantity ordered. The list will consider only those items for which total quantity exceed 500. 5

e) For each order show order-id and customer name. 3

6. a) What are the reasons behind the records of variable length? 3

b) Compare ordered and unordered file. 3

c) Explain the principle of multilevel indexing. 4

d) Suppose R1 and R2 are two relations to be joined. Both are sorted on joining attributes. Describe an efficient join strategy and also mention number of block accesses required. 10

7. a) What is a trigger? Consider two relations

4. a) Consider two relations A (a1, a2, a3) and B (b1, b2, b3). From A to B there exists one to many relation. Write down the SQL statements to create the optimal number of tables to represent the scenario. 8

b) Consider the following relations -

PROJECT (PROJ_ID, PROJ_NAME, CO_ORDINATOR)
PROGRAMMER (PROG-ID, PROG_NAME) WORKS_IN (PROJ_ID, PROG_ID)

Write down the relational algebra and relational calculus expression for the following :

i) Find out the name of the programmers who work in all projects. 3+3

ii) Find the programmer IDs who do not work in any of the projects. 3+3

5. Consider the following tables :

CUSTOMER (CUST_ID), CUST_NAME)
ITEM (ICODE, INAME, RATE)
ORDER (ORDER_ID), ORDER_DT, CUST_ID)
ORDER_DETAILS (ORDER_ID, ICODE, QTY)

Write down the SQL statements for the following :

a) For each order show ORDER_ID and total value (sum of the product of QTY and RATE for all items in