MCA (Revised)

Term-End Examination

December, 2013

10290

MCS-043 : ADVANCED DATABASE MANAGEMENT SYSTEMS

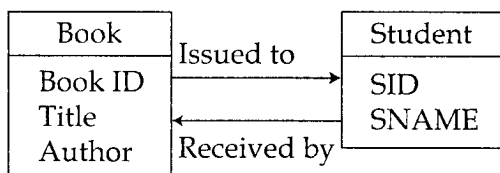*Time : 3 hours*   *Maximum Marks : 100*

Note :   *Question number 1 is compulsory. Answer any three questions from the rest.*

1. (a) Consider the following situation :   8

    "A company has two employee named "A" and "B". The company has two projects P1 and P2 project P1 uses languages C and C++, whereas project P2 uses languages C and JAVA. Employee whose name is "A" works on both the projects P1 and P2, whereas employee named "B" works on project P2 only."

    (i) Represent the information given above as a relation/table S (employee name, project, language).

    (ii) List the FDs and MVDs in the table above.

    (iii) Normalise the table upto 4th Normal Form.

(b) Define the term - "view" with the help of an example. **2**

(c) Consider the following relations. **6**

Supplier (sid, Sname)

parts (pid, pname)

Supp-part (sid, pid, quantity)

(i) Write a relational algebraic expression for the following query :

"List the names of the supplier's who have supplied the part whose pname is "Bolt".

(ii) Draw the query tree for the query given above.

(d) How is a checkpoint useful in log based recovery ? Explain it with the help of an example/diagram **4**

(e) Represent the following using Object Definition language (ODL) **5**

Book	Issued to	Student
Book ID Title Author	→ Received by ←	SID SNAME

Please note that diagram indicates that a book is issued to a student who receives it. The attributes of Book objects are Book ID, Title and Author; and the attributes of student objects are SID and SNAME.

(f) What is a data warehouse ? Why is it needed **5** by an organisation ? Explain the process of Data Extraction, Transformation and Loading (ETL) in the context of a data warehouse

(g) What is ODBC ? Why is it needed ? What **5** are the various components needed to implement ODBC ?

(h) What are control files in Oracle ? What does **5** a control file contain ? What is the role of control file in starting an instance of oracle. What is the purpose of redo log file during this time.

2. (a) Draw an EER diagram for the following **4** situation : A vehicle can be owned by an Individual or an organisation. In case the vehicle is owned by an organisation then the database should store the name and designation of contact person in the organisation, the office address, and the name of the organisation along with name of the head. However, for an individual owner just name, address and phonenumber of owner needs to be recorder. "You may assume that the basic information that is to be stored about the vehicle should be - vehicle registration number type, date of model, date of purchase."

(b) Convert the EER diagram created in part (a) to equivalent RDBMS tables having proper keys and constraints. **4**

(c) Define the term data mining. How data mining is different from Knowledge Discovery in data bases (KDD) ? Explain the steps of KDD with the help of an example. **6**

(d) Explain any three common database security failures. Explain with the help of an example, how SQL can be used to enforce access control in a database. **6**

3. (a) Assume the following three transactions : **8**

T1 : "Increment the X account by an amount Rs. 1000/- and Decrement Y is account by an amount. Rs. 1000/-"

T2 : Decrement X account by an amount of Rs. 2000/- and increment Z's account by Rs. 2000/-

T3 : Add the amount present in the accounts X, Y and Z to Total amount use the shared (s) mode and exclusive (k) mode locks to write the pseudo code of transactions T1, T2 and T3, such that they can be executed concurrently. Explain your answer.

(b) What is embedded SQL ? Give an example **6**
of embedded SQL statement in 'C'
language. What is the role of cursor in
embedded SQL ? Explain with the help of
an example.

(c) Differentiate between the following : **6**
    (i)   JDBC versus ODBC
    (ii)   Distributed Database versus centralized
          Database
    (iii) Redo versus undo

4. (a) Consider the following XML document : **6**

```
<?xml version = "1.0" encity = "UTF – 8"?>
<Customer>
<name>
        <fname>Lokesh </fname>
        <lname> Jain </lname>
</name>
        <type>Home</type>
        <phone>297511</phone>
</customer>
<customer>
        <name>
        <fname> Ramesh</fname>
        <lname>Nagesh</lname>
        </name>
        <type> Company</type>
        <phone>293575</phone>
        <phone>33333</phone>
</customer>
```

Write the DTD for the XML document given
above.

(b) What is the role of a trigger ? Explain with the help of an example. How is a trigger different to a stored procedure ? Explain. **6**

(c) Consider the following Relation schema R (Faculty, Dean, Department, Chairperson, professor, Rank, student) and the following set of functional dependencies : **8**

Faculty $\rightarrow$ Dean

Dean $\rightarrow$ Faculty

Department $\rightarrow$ Chairperson

Professor $\rightarrow$ Rank, chairperson

Department $\rightarrow$ Faculty

Student $\rightarrow$ Department, Faculty, Dean

Professor, Rank $\rightarrow$ Department, Faculty

Obtain 3NF decomposition of the above relation schema and show each step explicitly

5. (a) Explain the following with the help of an example/diagram, if needed. **15**
   (i) Role of system catalogue
   (ii) Nested loop join
   (iii) Timestamp and its use
   (iv) Deadlock
   (v) Fragmentation and allocation schema
   (vi) Snoflake schema in data warehouse

   (b) Explain the multidimensional Data Modeling for a Datawarehouse with an example. **5**

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