Dt: 27.02.2016 AN   Weightage: 20%   Time: 60 Mins   Type: Close Book

<u>Instructions:</u> (i) Write your answers for PART-A, on the first page of your main answer booklet.   (ii) Overwriting not permitted for PART-A answers.   (iii) No additional sheets are supplied. Hence use the space in main booklet accordingly.

PART-A   (1X10=10M)

1. Relational model is an example of_____.   [   ]
    (a) high level data model   (b) logical data model (c) table data model (d) representational data model
2. The number of tuples in a table (relational instance) is known as _____.   [   ]
    (a) degree of the relation (b) cardinality of the relation   (c) entity set   (d) arity of the relation
3. The relationship between a weak entity type and its owner entity type is known as _____   [   ]
    (a) identifying relationship (b) weak relationship (c) partial relationship (d) regular relationship
4. In overall database design process, translation ER diagrams to set of relational schemas is known as___   phase.   [   ]
    (a) structured DB design   (b) implementation DB design   (c) conceptual DB design
    (d) logical DB design
5. Tuple Relational Calculus is less expressive than Relational Algebra.   [T / F]
6. If the Entity type hierarchy is resulting from generalization process then, every entity in super type has membership in at least one sub type.   [T / F]
7. Two tables can be joined if and only iff one table has a FK pointing to PK of other table.   [T / F]
8. Assume that we have two tables *EMP(eid, name, sal, dno)* and *DEPT(dnum, dname , dloc)*. In EMP, the field *dno* is FK to *dnum* in DEPT. Further EMP has 20 tuples and DEPT has 4 tuples. We have no null values for *dno* in EMP table. Now the SQL query- *SELECT * FROM EMP, DEPT;* will return ___ number of tuples.   [   ]
    (a) 20   (b) 24   (c) 4   (d) 80
9. Which of the following DBMS is based on Network data model?   [   ]
    (a) IBMs IMS(Information Management System) (b) Informix   (c) GE's IDS (Integrated Data Store)
    (d) IBMs DB2
10. All alternate keys are candidate keys.   [T / F]

PART-B

Q1. For a Library of a College, we need to design a database. The business rules are as follows. Library user can be a student/ faculty /staff(non-teaching). A user can borrow books from the Library. User must belong to at least one category, and not more than one category.
Each book belongs to a category like- Engg/Management/Arts/Science (only one category)
Each book has Title, bookID (unique) , ISBN#, Price etc.

Books are available in racks and each rack has a unique ID and location like Ground Floor/ First Floor/ Second Floor, and type (Wooden/ metal/ Synthetic).
One user can borrow up to 3 books.
We need to store the publisher related Info also like- Publisher name (unique), address, contact phone. Every pub has at least one book in library. A book is published by only one publisher.
We also capture books issued details with date of issue, expected return date etc. We store only the info of currently issued books, not for the returned ones.
Each library user will have a userID (unique), name, address. A student will have roll#(unique), and branch; faculty will have department and Designation ; non-teaching staff will have division as specific attributes. Each student belongs to a hostel. For each hostel we store information like hostel name (unique), capacity, warden, no_rooms as attributes. Some students may not stay in hostels. Each hostel will have at least 200 students.
Now, draw the **EER** diagram for the above description. Indicate- cardinality, keys, attributes, min-max, and participation constraints for entity-types involved in the relationships. Assume necessary data. (6M)

Q2. Translate your ER/EER diagram (in Q.1 Part-B) to relational DB schema. (6M)

Q3. Look at the following Database schema. (3X6=18M)

> *Student(<u>sid</u>, sname, sbranch)*
> *Company(<u>cid</u>, cname, clocation)*
> *Interview(<u>sid</u>, <u>cid</u>, idate)*
> *Placement(<u>sid</u>, <u>cid</u>, salary)*

Now, write Relational Algebra and SQL (both) queries for the following.
- (i) Get the sid and the sname for those students who have been interviewed by at least 5 companies and not been placed by any company.
- (ii) Get the cid and cname for those companies who have not selected any student, from CIVIL branch, for placement.
- (iii) Get the sid and sname for those who have got offers from all companies located in 'DELHI'.

Note: No need to rename attributes in results. Do not define VIEWS. Do not use Outer joins.

END