系所組別： 會計學系乙組

考試科目： 資料庫管理系統

※ 考生請注意：本試題 □可 ☑不可 使用計算機 請勿在本試題紙上作答，否則不予計分

一 選擇題（30%）

1) The expression (R ∪ S)-((R-S) ∪ (S-R)) is equivalent to

A. R / S

B. R ∩ S

C. $S_{(condition)}$ (R×S)

D. p(R×S)

2) Consider the join of a relation R with a relation S. If R has m tuples and S has n tuples. Then the maximum and the minimum size of the join of the two relations respectively are

A. m+n and 0

B. m+n and |m-n|

C. mn and 0

D. mn and m+n

3) _____ is a normal form in which every determinant is a key.

A. 2NF

B. 3NF

C. BCNF

D. 4NF

4) Which of the following relational algebra operators is used to filter out unwanted rows of a table?

A. Selection

B. Join

C. Union

D. Projection

5) A relation schema describes

A. The relation's name

B. The name of each field

C. The domain of each field

D. All of the above

6) In a multiuser database, if two users wish to update the same record at the same time, they are prevented by doing so by

A. jamming

B. password

C. documentation

D. record-lock

7) Which of the following is not an advantage of distributed databases?

A. Improved availability

B. Less complexity

C. Local autonomy

(背面仍有題目,請繼續作答)

D. Improved performance

8) Choose the most appropriate choice with respect to conceptual design.

A. Conceptual design is a documentation technique. Once the relation schemes are defined one can draw E-R diagrams from the relation schemes for documentation.

B. Conceptual design needs data volume and processing frequencies to determine the size of the data base.

C. Output of any conceptual design is an E-R diagram.

D. Conceptual design involves modeling the data requirements independent of the DBMS operating system and the hardware.

9) A functional dependency of the form $X \rightarrow Y$ is trivial if

A. $Y \subseteq X$
B. $Y \subset X$
C. $X \subseteq Y$
D. $X \subset Y$ and $Y \subset X$

10) Manager's salary details are hidden from the employees. This is

A. Conceptual level data hiding
B. Physical level data hiding
C. External level data hiding
D. None of the above

二 For each of the terms in the left-hand column below, select the term in the right-hand column that best matches it. (20%)

1. _____ Data Model	A. If it is in 1NF and every non-prime attribute A in R is fully functionally dependent on primary key
2. _____ VDL	B. It translates DML statements in a query language into low-level instruction that the query evaluation engine can understand
3. _____ 2NF	C. A collection of conceptual tools for describing data, data relationships data semantics and constraints.
4. _____ The degree of Relationship type	D. A method for indexing data for fast retrieval
5. _____ ISAM	E. It is a particular property, which describes the entity.

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6. _____ DML Compiler
7. _____ Weak Entity set
8. _____ Attribute
9. _____ Foreign key
10. _____ E-R model

F. It specifies user views and their mappings to the conceptual schema.
G. The number of entity type participating
H. This data model is based on real world that consists of basic objects called entities and of relationship among these objects. Entities are described in a database by a set of attributes.
I. An entity set may not have sufficient attributes to form a primary key, and its primary key compromises of its partial key and primary key of its parent entity
J. A field in one record pointing to a key field of another record

三 問答題

1. What are partial, alternate, artificial, compound and natural key? (10%)
2. What is join dependency and inclusion dependency? (6%)
3. Explain which relational database problems can be solved by using XML databases.Use an example to illustrate the identified problems. (4%)
4. Explain the ACID properties in transaction processing. (8%)
5. Several types of transparencies are possible in a distributed database. Name and briefly explain them. (10%)
6. The examination branch uses a relational database to record and process student examination results. The following are some of the relations of this student database. Here, Student relation records student data and Subject relation records subject data. Actual marks gained by the students for respective subjects are recorded in the Marks relation along with a grade. (12%)

   Student(index_no, name, address)
   Subject(subject_code, subject_name, lecturer)
   Marks(index_no, subject_code, mark, grade)

(1) Write an SQL statement to list all the students taking the subject called "Database Systems" giving the index no, name and grade of each.

(2) Draw the optimized query tree for the above query.