

系所組別：會計學系乙組

考試科目：資料庫管理系統

考試日期：0308，節次：1

※ 考生請注意：本試題 可 不可 使用計算機

一 選擇題 (30%)

- 1) The following are all database models except
 - A. Hierarchical model
 - B. Network model
 - C. Relational model
 - D. Algebraic model
- 2) Two-phase locking is a concurrency control protocol that is used to enforce which of the following transactional properties?
 - A. Atomicity
 - B. Consistency
 - C. Isolation
 - D. Durability
- 3) Redundant array of independent disks or RAID is a technology that employs the simultaneous use of two or more hard disk drives to achieve all of the following goals except
 - A. Performance
 - B. Reliability
 - C. Large data volume sizes
 - D. Security
- 4) Which of the following relational algebra operators is used to filter out unwanted columns of a table?
 - A. Union
 - B. Join
 - C. Selection
 - D. Projection
- 5) Which of the following file types supports fastest Insertion operation?
 - A. Sorted file
 - B. Heap file
 - C. Clustered file
 - D. Unclustered file
- 6) Which of the following should be used when a column value is unknown or inapplicable?
 - A. Irrelevant
 - B. Incomplete
 - C. Null
 - D. None of the above

(背面仍有題目,請繼續作答)

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- 7) If one wants to enforce a constraint that involves multiple tables, which of the following SQL features is the best choice?
- A. Create trigger
 - B. Create assertion
 - C. Check clause
 - D. None of the above
- 8) The following features are commonly offered by DBMS except
- A. Backup and replication
 - B. Automated optimization
 - C. Platform independence
 - D. Change and access logging
- 9) What is a weak entity set?
- A. An entity set A whose number of attributes is smaller than that of another entity set B, and A and B are associated by some foreign key
 - B. An entity set where some or all of the attributes making up its key belong to another entity set
 - C. An entity set that has too few tuples in it
 - D. None of the above
- 10) Which of the following index is a file with pairs of keys and pointers for every record in the data file
- A. Dense index
 - B. Bitmap index
 - C. Secondary index
 - D. Sparse index

二 For each of the terms in the left-hand column below, select the term in the right-hand column that best matches it. (30%)

- | | |
|------------------------------|---|
| 1. _____ Insertion anomalies | A. More operational, very useful for representing execution plans |
| 2. _____ Decomposition | B. It may not be possible to store certain information unless some other, unrelated, information is stored as well. |
| 3. _____ Relational algebra | C. Rules used to guard against database errors due to performing transactions simultaneously |
| 4. _____ Relational calculus | D. Application programs are insulated from changes in the way the data is structured and stored. |

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5. _____ Concurrency control E. Requirements that must hold for data in the database to be correct
6. _____ Metadata F. All foreign key constraints are satisfied
7. _____ Referential integrity G. Lets users describe what they want, rather than how to compute it
8. _____ Integrity constraints H. A table that is derived from other tables
9. _____ Data independence I. Data that describes the database structure, constraints, applications, authorizations
10. _____ View in SQL J. Replacing a relation with a collection of smaller relations

三 問答題

1. Given the following two facts, what is the functional dependency that one can infer (use the attributes given in parenthesis)? (4%)
- A. Each athlete (A_ID) may compete in several events (E_ID).
- B. For each event, a given athlete has only one coach (C_ID).
2. Given two relation schemas R(A1,A2) and S(A2,A3), define a relational algebra expression which is the equivalent of R JOIN S using only operations from the following list: union, difference, Cartesian product, projection, selection, renaming. (6%)
3. Consider the following schema:
- ```
CREATE TABLE Books (
 isbn CHAR(20) PRIMARY KEY,
 bname CHAR(50),
 type CHAR(9) CHECK (type IN ('technical', 'fiction', 'self-help'))
);
```
- ```
CREATE TABLE Authors (  
  ssn CHAR(9),  
  isbn CHAR(20),  
  PRIMARY KEY (ssn, isbn)  
);
```

(背面仍有題目,請繼續作答)

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- A. Write an SQL query that will return the SSNs of authors who have written any book that is not of TYPE 'fiction'. (5%)
- B. Write an SQL query that will return the ISBNs of books written by more than one author. (5%)
- C. Write an SQL query that will return the SSNs of authors along with the number of books written by each author. (5%)
4. Enumerate the three kinds of anomalies (redundancy anomaly, update anomaly, deletion anomaly) that can occur when too much is crammed into a single relation, and illustrate each with respect to the following relation. (12%)

<u>studentSSN</u>	<u>majordept#</u>	<u>deptPhone</u>
123456789	CS	5357
123456789	MA	5241
111222333	CS	5357

5. Modify the following declaration of TABLE Authors to declare an attribute-based CHECK constraint that ISBN in Authors should have a value that is the same as the ISBN in some tuple from another table Books. (3%)

```
CREATE TABLE Authors (  
    ssn CHAR(9),  
    isbn CHAR(20),  
    PRIMARY KEY (ssn, isbn)  
);
```