一 選擇題（30%）

1) The set of allowable values for an attribute is the _____ of the attribute.

   A. Tuple

   B. Cardinality

   C. Domain

   D. Degree

2) The following are advantages of DBMS except

   A. Reduction of redundancy

   B. Data independency

   C. Security

   D. Scalability

3) A relation is first normal form if

   A. The relation contains no foreign key.

   B. The relation contains no multi-valued attributes.

   C. The relation contains the same number of rows and columns.

   D. None of the above

4) Which one of the following is not a benefit of using a view?

   A. Providing a level of security

   B. Improving access speed

   C. Providing a mechanism to customize the appearance of the database

   D. Presenting a consistent, unchanging picture of the structure of the database

5) Which one of the following is not in the ANSI/SPARC three-schema architecture?

   A. External Level

   B. Conceptual Level

   C. Middle Level

   D. Internal Level

6) Assuming $D1 = \{2,4\}$, $D2 = \{1,3,5\}$, the Cartesian product $D1 \times D2 =$

   A. $\{(2,1),(2,3),(2,5),(4,1),(4,3),(4,5)\}$

   B. $(2+4) \times (1+3+5) = 6 \times 9 = 54$

   C. $(2 \times 4) + (1 \times 3 \times 5) = 8 + 15 = 23$

   D. None of the above

7) A _____ is a set of attributes that contains a key.

   A. Composite key

   B. Superkey

   C. Candidate key

   D. Foreign key

8) What is the technique to segment the data into equal-size partitions distributed over multiple disks?

(背面仍有題目,請繼續作答)

    A.   Data striping

    B.   Data independence

    C.   Data integration

    D.   Data streaming

9) XML has the following features except

    A.   It allows users to define new collections of tags.

    B.   It has the potential to make database systems more tightly integrated into Web applications than ever before.

    C.   It was developed to have much of the power of SGML while remaining relatively simple.

    D.   It replaces HTML.

10) A _____ index has at least one data entry for every search key value that appears in a record in the indexed file.

    A.   Sparse

    B.   Primary

    C.   Secondary

    D.   Dense

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. _____ relationally complete	A.	A set of properties that guarantee database transactions are processed reliably
2. _____ discretionary access control	B.	A SQL clause that combines records from two or more tables in a database
3. _____ ACID	C.	A language that can be used to produce any relation that can be derived using the relational calculus.
4. _____ ASP	D.	A source code based specification intended to be used as an interface by software components to communicate with each other
5. _____ API	E.	A strategy that partitions the database into disjoint parts, with each part assigned to one site
6. _____ Join	F.	A means of restricting access to objects based on the identity of subjects and/or groups to which they belong

7. _____ XML　　　　　　　G. A web-scripting interface by Microsoft

8. _____ Fragmentation　　H. A technique which defines an action that the database should take when some event occurs in the application

9. _____ Funneling　　　　I. A markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable

10. _____ Trigger　　　　　J. A method that allows a larger number of users to access the available DBMSs with a potentially much smaller number of connections

三 問答題

1. Explain the following terms: natural join, left outer join, insertion anomaly. (9%)

2. The following tables form part of a database held in a relational DBMS:

　　Hotel (<u>hotelNo</u>, hotelName, city)

　　Room (<u>roomNo</u>, <u>hotelNo</u>, type, price)

　　Booking (<u>hotelNo</u>, <u>guestNo</u>, <u>dateFrom</u>, dateTo, roomNo)

　　Guest (<u>guestNo</u>, guestName, guestAddress)

　　where Hotel contains hotel details and hotelNo is the primary key;

　　　　Room contains room details for each hotel and (roomNo, hotelNo) forms the primary key;

　　　　Booking contains details of bookings and (hotelNo, guestNo, dateFrom) forms the primary key;

　　　　Guest contains guest details and guestNo is the primary key.

(1) Identify the foreign keys in this schema. Explain how the entity and referential integrity apply to these relations. (6%)

(2) Describe the relations that would be produced by the following relational algebra operations: (6%)

　　i.　　$\Pi_{hotelNo} (\sigma_{price > 50} (Room))$

　　ii.　　$\sigma_{Hotel.hotelNo = Room.hotelNo} (Hotel \times Room)$

(3) Write SQL queries for each of the following questions: (9%)

　　i.　　List full details of all hotels in London.

　　ii.　　How many hotels are there?

　　iii.　　List the number of rooms in each hotel.

(背面仍有題目,請繼續作答)

3.Given two relations R1 and R2, where R1 contains N1 tuples, R2 contains N2 tuples, and N2 > N1 > 0, give the minimum and maximum possible sizes (in tuples) for the result relation produced by each of the following relational algebra expressions. In each case, state any assumptions about the schemas for R1 and R2 that are needed to make the expression meaningful:

(1) R1 ∪ R2, (2) R1∩R, (3)R1-R2, (4) R1×R2 (20%)