國立雲林科技大學 106 學年第一學期期末考　科目：資料庫管理系統
系級：四資管三 **應考人數：**74 人 **日期:** 107/01/08 **時間：**14:10~16:00

注意：1. 不可使用任何字典。2. 手機關機且收藏妥當不得置於桌面。
3. 請注意作答文句的通順與完整；詞不達意或作答不完整，會被扣分

1. Which method is used in Python to present the statistics of numeric columns in a DataFrame? (5%)
   (a) find (b) explain (c) type (d) describe.

2. In Python Pandas package, which data type is like a relation in the relational database? (5%)
   (a) DataFrame (b) Set (c) List (d) Array.

3. In Mongo DB, two ways to establish the connection between two documents are _____ and _____. (5%)
   (a) sharding (b) foreign key (c) linking (d) embedding.

4. In terms of NoSQL, what are the problems with SQL? (5%)
   (a) Requires unintuitive joins (b) Rigid schema (c) Not easily scalable. (d) Complex query language.

5. Define the following terms: (20%)
   (a) Loss of integrity in DB Threats (b) Denial of Service (DOS) attack
   (c) Partition tolerance in CAP theorem (d) Simple security property of Dell-LaPadula Model

6. (a) What is replication in MongoDB? What is the purpose of replication? (5%)
   (b) What is sharding? What is the purpose of sharding? (5%)

7. Please describe the limitations of XML DTD (Document Type Definition). (10%)

8. What element is the variable $x bound to in XQuery 1 and XQuery 2, respectively? (10%)

XQuery 1.

```
FOR  $x  IN
     doc(www.company.com/info.xml)
     //employee [employeeSalary gt 70000]/employeeName
     RETURN  <res>  $x/firstName, $x/lastName  </res>
```

XQuery 2.

```
FOR  $x  IN
     doc(www.company.com/info.xml)/company/employee
     WHERE  $X/employeeSalary gt 70000
     RETURN  <res>  $x/employeeName/firstName,
                    $x/emplyeeName/lastName  </res>
```

9. (a) What is SQL injection? (5%)
   (b) There are three protection techniques against SQL injection: (1) bind variables (2) filtering input (3) function security. Please explain these three protection techniques. (15%)

10. What is the output of the follow Python code? (5%)

```
> A = [3, 4, 5, 3, 4, 5, 5, 6, 8, 9]
> newA = set(A)
> B = {6, 8, 9, 10, 11}
> print (newA & B)
```

(背面還有試題 ...)

11. Given the following Python code, please describe what the output will be for line 407. (5%)

```
396 companyInDataframe = pandas.read_sql("SELECT * FROM employees", con=connect)
397
398 print(companyInDataframe)
399 '''output:
400     emp_no  birth_date first_name last_name gender   hire_date  salary
401 0       1  1990-12-31       Chen      Andy      M  2018-01-01   28000
402 1       2  1991-01-23        Lin     Helen      F  2018-01-01   30000
403 ...
404 (total have 15 record)
405 '''
406
407 print(companyInDataframe.groupby(["first_name", "gender"]).agg({"salary": "mean"}))
```