國 立 臺 北 科 技 大 學

九十七學年第一學期電機系博士班資格考試

資料庫試題

注意事項：

1. 本試題共【8】題，配分共 100 分。
2. 請按順序標明題號作答，不必抄題。
3. 全部答案均須答在試卷答案欄內，否則不予計分。
4. 考試時間:二小時。

1. (10%)Describe the process of mapping ER model concepts to relations.

2. Consider the following definitions.

```
create table Actor (
  Name char(20),
  MarriedTo char(20),
  primary key (Name)
)
```

```
create table Movie (
  Title char(20),
  Director char(20),
  Year integer,
  primary key (Title)
)
```

```
create table WorksOn (
  ActorName char(20),
  MovieTitle char(20),
  Primary key (ActorName, MovieTitle),
  foreign key (ActorName) references
  Actor(Name),
  foreign key (MovieTitle) references
  Movie(Title)
)
```

Specify the following queries in both **SQL** and **Relational Algebra**.

(a) (10%)List the names of all the actors that are married to another actor.

(b) (10%)For each actor, list the number of movies the actor has worked on this year.

3. (10%)Describe the difference between TABLEs and VIEWs.

4. (10%)Define dirty read and describe how it may cause a problem.

5. (10%)Discuss the timestamp ordering protocol for concurrency control.

6. (10%)Given a relation R with attributes {A,B,C,D,E} and FDs {AB→CDE; B→C; D→E}, decompose the relation into 3NF, indicating the primary key of each of the final relations.

7.Study the following transaction schedule:

Time:	T1	T2	T3
1	Read_item(A)		
2	A:=A+100		
3	Write_item(A)		
4			A:=0
5			Write_item(A)
6		Sum:=0	
7		Read_item(A)	
8		Sum:=Sum+A	
9		Read_item(B)	
10		Sum:=Sum+B	
11	Read_item(B)		
12	B:=B-100		
13	Write_item(B)		
14	Commit		
15			Commit
16		Commit	

(a) (5%)Is the schedule (conflict) serializable? Explain why or why not.

(b) (5%)Is the schedule recoverable? Explain why or why not.

(c) (5%)Is the schedule cascadeless? Explain why or why not.

(d) (5%)Is the schedule strict? Explain why or why not.

8. (10%)Assume that each bucket of an extensible hash index can fit exactly two records. Consider the following records, with the corresponding hash key values.

key	hash key value
A	0000
B	0001
C	0010
D	0011
E	0100
F	0110
G	1000

We insert the records in the order given above. Show the extensible hash index after all records have been inserted.