

國立臺北科技大學

一百學年第二學期電機系博士班資格考試

資料庫 試題

第一頁 共二頁

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注意事項：

1. 本試題共【10】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 points] What are the differences among primary, secondary, and clustering indexes? Which of indexes are dense, and which are not?

2. Consider the relational schemes:

Customer (Cid, Cname)

Product (Pid, Pname, Price)

Order (Oid, Cid, Pid, Quantity)

Write SQL queries for the following:

- (i) [5 points] List the names of customers who have ordered at least one product priced over 300.
- (ii) [5 points] List the total cost of every order.

3. [10 points] What is the difference between deadlock prevention and deadlock detection?

4. Consider a relation $R(A, B, C, D, E)$ and the set of the functional dependencies

$$F = \{ A \rightarrow BC, CD \rightarrow E, B \rightarrow D, E \rightarrow A \}.$$

Determine whether the decomposition of R into $D = \{R_1(A, B, C), R_2(A, D, E)\}$ has

- (i) [5 points] the dependency preservation property, and
- (ii) [5 points] the non-additive (lossless) join property, with respect to F .

Show why?

5. [10 points] Describe how to convert an ER diagram into a corresponding relational schema.

6. Consider the relation $R(A, B, C, D, E)$ and the set of functional dependencies

$$F = \{AB \rightarrow CD, ABC \rightarrow E, C \rightarrow A\}.$$

(i) [5 points] What are the candidate keys for R ?

(ii) [5 points] What is the normal form of R ? Why?

7. [10 points] Describe the lost update problem and the dirty read problem in concurrency control.

8. [10 points] Consider the following relations $R1$ and $R2$. What is the result relation if we perform the relational algebra operator: $R1 \div R2$.

R1			R2
P	T		T
p1	t1		t2
p1	t2		t4
p1	t3		
p1	t4		
p2	t1		
p2	t2		
p3	t2		
p4	t2		
p4	t4		

9. For the schedules: $r_2(A); r_1(B); w_2(A); r_2(B); r_3(A); w_1(B); w_2(A); w_2(B)$, answer the following questions [We denote a transaction T_i reads or writes data item X as $r_i(X)$ or $w_i(X)$.]:

(i) [5 points] What is the precedence graph for the schedule?

(ii) [5 points] Is the schedule conflict-serializable?

10. [10 points] Discuss the two main types of constraints on specializations and generalizations in EER model.