國立雲林科技大學資訊管理系 112 學年度第 1 學期博士班資格考(Ph.D. Qualify Exam)
考試科目 Subject:資料庫系統 Database Systems
時數與方式 Hour and type：四小時 (4 hours)；Close book

第一部份：(以下 6 題中請自行選擇 5 題作答；作答超過 5 題，僅計作答的前 5 題之分數)
Part 1: (Please choose 5 of the following 6 questions to answer; if you answer more than 5 questions, only the first 5 answered questions will be graded.)

1. Define the following two terms of the relational data model: *relational database schema* and *degree of a relationship type*. (10%)

2. Discuss the entity integrity and referential integrity constraints. Why is each considered important? (10%)

3. In Enhanced ER (EER) model, please discuss the mechanism of attribute/relationship inheritance. Why is it useful? (10%)

4. When are two sets of functional dependencies equivalent? How can we determine their equivalence? (10%)

5. What is meant by the attribute preservation condition on a decomposition during normalization? (10%)

6. Discuss the system of propagation of privileges and the restraints imposed by horizontal and vertical propagation limits in database security. (10%)

第二部份：(以下 5 題請全部作答)
Part 2: (Please answer the following 5 questions.)

7. Describe the factors that influence physical database design. (10%)

8. Describe the differences among the primary index, clustering index, and secondary index. (10%)

9. Describe the difference between logical data independence and physical data independence. Which one is easier to achieve? Please explain. (10%)

10. Distinguish database, data warehouse, and data mining. (10%)

11. Web programs and applications that access a database can send commands and data to the database. In an SQL injection attack, the attacker injects a string input through the application, which changes or manipulates the SQL statement to the attacker’s advantage. There are three types of injection attacks, namely SQL manipulation, code injection, and function call injection. Please propose the counter measurements to tackle the attacks. (10%)