國立雲林科技大學資訊管理系
109 學年度第 1 學期博士班資格考
科目：資訊庫系統
時間：4 小時 (Closed book)
作答時，請注意各題之比例配分，並清楚標示題號

第一部份：(7 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)

1. Define the following two terms of the relational data model: *entity integrity constraint* and *referential integrity constraint*. (10%)

2. When is the concept of a weak entity used in data modeling? Define the terms *owner entity type*, *weak entity type*, *identifying relationship type*, and *partial key*. (10%)

3. What is the lossless (or nonadditive) join property of a decomposition? Why is it important? (10%)

4. Discuss the various reasons that lead to the occurrence of NULL values in relations. (10%)

5. What is meant by the closure of a set of functional dependencies? Illustrate with an example. (10%)

6. What risks are associated with SQL injection attacks? (10%)

7. What preventive measures are possible against SQL injection attacks? (10%)

第二部份：

1. Consider a database that consists of the following relations:
   SUPPLIER (Sno, Sname)
   PART (Pno, Pname)
   PROJECT (Jno, Jname)
   SUPPLY (Sno, Pno, Jno)
   The database records information about suppliers, parts, and projects, and includes a ternary relationship between suppliers, parts, and projects. This relationship is a many-many-many relationship. Specify the following queries in relational algebra.
   a. Retrieve the names of suppliers who supply more than two parts to project 'J1'. (5%)
   b. Retrieve the project names that are supplied by supplier 'S1' only. (5%)

2. Define Boyce-Codd normal form. How does it differ from 3NF? Why is it considered a stronger form of 3NF? (10%)

3. Discuss the advantages and disadvantages of using (a) an unordered file, (b) an ordered file, and (3) a static hash file with buckets and chaining. Which operations can be performed efficiently on each of these organizations, and which operations are expensive? (10%)

4. Discuss the two main types of constraints on specializations and generalizations. (10%)

5. Discuss the deferred update technique of recovery. What are the advantages and disadvantages of this technique? Why is it called the NO-UNDO/REDO method? (10%)