INSTITUTE OF TECHNOLOGY

BLANCHARDSTOWN

Year	Year 1
Semester	Semester 2
Date of Examination	
Time of Examination	

Prog Code	BN002	**Prog Title**	Higher Certificate in Science in Computing in Information Technology	**Module Code**	COMP H1029
Prog Code	BN013	**Prog Title**	Bachelor of Science in Computing (Information Technology)	**Module Code**	COMP H1029
Prog Code	BN104	**Prog Title**	Bachelor of Science (Honours) in Computing (Information Technology)	**Module Code**	COMP H1029

Module Title	Databases – Autumn paper

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External Examiner(s): ***Dr Richard Studdert,***
Mr John Dunnion

Instructions to candidates:

1) **To ensure that you take the correct examination, please check that the module and programme which you are following is listed in the tables above.**
2) **Candidates should attempt ALL parts of Question 1, and any other THREE questions.**
3) **Question 1 is worth 40 marks. The remaining questions are worth 20 marks each.**

DO NOT TURN OVER THIS PAGE UNTIL YOU ARE TOLD TO DO SO

SECTION A – COMPULSARY

Question 1.
Answer all parts to question 1. Each part is worth 4 marks.

a) What was the **objective** of the ANSI SPARC architecture?

b) Explain the significance of the **ACID properties** in DBMS transaction management. Also briefly explain any **two** of the four properties.

c) Explain what a **checkpoint** is in relation to a transaction log.

d) What is a database? Include at least **two** points in your answer.

e) Identify the entities in the following description: "A travel agent keeps details on holiday packages, their customers, and when a customer books a holiday package."

f) Explain, and given an example of, a **ternary** relationship between two entities.

g) Explain, and given an example of, a **composite** attribute.

h) Why would you include a **foreign key** in a database table? Illustrate your answer with an example.

i) Explain the following excerpt from a SQL Create statement:

```
CREATE TABLE  jobs
(job_desc varchar(50) NOT NULL DEFAULT 'New Position', . . . )
```

j) Explain the difference between an **INNER** join and a **FULL OUTER** join when joining two tables in SQL.

SECTION B – Answer ANY THREE questions

Question 2.

The shop keeps a catalog of all DVDs in stock, and how many are available for rental. A DVD ID, film name, and a short description is recorded for each DVD. The shop also maintains a record of all members including their card ID, name, address and amount owing from overdue DVD's. A member can take out a number of DVD's at a time, or may have none out on loan. A DVD can be borrowed by a number of members. When a member borrows a DVD the shop records the date the DVD is due back, and the date the customer actually returned the DVD.

a) Represent the system description above as an Entity-Relationship Diagram. Ensure you have the correct cardinality and participation for each relationship. Include attributes in your diagram.

13 marks

b) Convert the ERD from part a) above to a relational model.

7 marks

Question 3.

a) Explain what is meant by saying an attribute is **functionally dependent** on the primary key. In your answer, give examples of **three** different categories of attributes that are not functionally dependent on the primary key.

8 marks

b)

ReceiptID(PK)	Receipt date	Staff member	Description	Quantity ordered	Price
R001	20/08/2010	Eileen	Jumper	1	40
R001	20/08/2010	Eileen	T-shirt	3	30
R002	21/08/2010	James	Slippers	1	10

Convert the table above into a set of relations in 3rd normal form. At each step of the process, identify if you are handling a repeating group, a partial dependency or a transitive dependency.

12 marks

Question 4.

a) Explain the role of a Database Management System?

4 marks

b) Explain, with the aid of an example, how the 'lost update' problem can arise?

10 marks

c) Explain one technique to solve the lost update problem. Show how it would work in your example from part b) above.

6 marks

Question 5.

a) Give the SQL statement to create the following relation. Use appropriate data types and constraints. The attribute **chaletCategory** should be limited to the following values: (standard, large, luxury).

Chalet (ChaletID(PK), chaletCategory, pricePerWeek, NumberOfBeds)

8 marks

b) Give the SQL to insert ONE row of data into the Chalet table created in part a) above. Pick suitable values for each attribute.

2 marks

a) Write SQL statements to select the following data from the Chalet table created above:

i. Show the chaletID and chalet category for all chalets costing less than €700.00 per week

2 marks

ii. List all details of chalets where the ChaletID starts with the letter 'C'.

2 marks

iii. What is the average price per week for each chaletCategory?

3 marks

iv. How many chalets in the table have more than 4 beds?

3 marks