

OLLSCOIL NA hÉIREANN
THE NATIONAL UNIVERSITY OF IRELAND

NATIONAL UNIVERSITY OF IRELAND, GALWAY

SEMESTER 1 EXAMINATIONS 2002

SECOND YEAR BA EXAMINATION
THIRD BIOMEDICAL SCIENCE EXAMINATION

INFORMATION SYSTEMS 1 (CT241) (CT219)

Prof. D. Bell
Prof. G. Lyons
S. Hughes

Time allowed: **Two hours**

Candidates are required to answer Question One in SECTION A and two other questions from SECTION B

SECTION B

- Q2.** (i) Given the following requirements of a newspaper database system, create an ER model to represent the entities (and their attributes) and the relationships between them.

A round consists of all the customers who are grouped together geographically for a particular delivery. A customer may order any number of newspapers. Details of each customer such as name and address are held. Newspaper details such as price, day(s) of delivery etc. are held. The round name and person responsible for delivery are stored for each round. A round may be set up before customers are allocated to it. Customers can be set up before it has been decided which round they will be on or before they have indicated which newspapers they are to order. Customers can only order newspapers which have been set up. Customers notify the newsagents of stoppages i.e. when they want delivery suspended. Customers can give notification of many stoppages at the same time, but they cannot overlap. They are used to determine whether a delivery to a customer takes place. A customer must be set up before stoppages can be notified.

(State any assumptions made)

- [ii] Describe the two principle integrity rules for the relational model. Discuss why it is desirable to enforce these rules, giving examples where appropriate.

[35 Marks]

- Q3.** [i] In the context of relational modeling, write notes on each of the following giving examples where appropriate:
- Meta Data,
 - Components of a DBMS
 - Selection of primary keys.
- [ii] What is the function of indexes? When are they desirable and what is their costs?
- [iii] "Transactions are the key to concurrent access in a multi-user database". Discuss this statement paying particular attention to the desirable properties of a transaction and the types of locking mechanisms that can be implemented to deal with this issue.

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SECTION B

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[35 Marks]

Q4. (i) Normalisation is often used to guarantee correctness in relational databases. Explain and illustrate how anomalies may arise in relations that are not normalised.

(iii) Indicate how the following document would be represented in a normalised relational database, outlining the steps involved clearly:

EXPENSE FORM				
Rep No:	008955EF	Rep Grade:	5	
Car Reg:	02 G 4567	Form Date:	31/10/02	
CAR EXPENSES				
Project No	Trip Date	Journey	Miles	Amount
2378	1/9/02	Dublin	220	50
1234	10/9/02	Cork	280	60
5454	15/9/02	Belfast	320	80
OTHER EXPENSES				
Project No	Expense Date	Description	Amount	
2378	1/9/02	Lunch	10	
1234	10/9/02	Dinner	20	
5454	15/9/02	Hotel	100	
TOTAL AMOUNT: €320				

[35 Marks]