

**CORK INSTITUTE OF TECHNOLOGY**  
**INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ**

**Semester 1 Examinations 2012/2013**

**Module Title: Database 3**

**Module Code:** COMP8017

**School:** Science & Informatics

**Programme Title:** BSc (Hons) in Software Development  
BSc (Hons) in Software Development & Computer Networking  
BSc (Hons) in Web Development

**Programme Code:** KSDEV\_8\_Y3  
KDNET\_8\_Y3  
KDWEB\_8\_Y3

**External Examiner(s):** Mr. Aidan.F. Quilligan

**Internal Examiner(s):** Mr Byron Treacy

**Instructions:** Answer Question 1 and any TWO other questions.

**Duration:** 2 Hours

**Sitting:** Winter 2012

**Requirements for this examination:**

**Note to Candidates:** Please check the Programme Title and the Module Title to ensure that you have received the correct examination paper.  
If in doubt please contact an Invigilator.

## **Q1. Mandatory: Database Systems: General terms and concepts**

**(34 Marks)**

### **The Main Features of MySQL**

Internals and Portability:

- Written in C and C++. Tested with a broad range of different compilers.
- The MySQL Server design is multi-layered with independent modules.
- Fully multi-threaded using kernel threads.
- The server is available as a separate program for use in a client/server networked environment. It is also available as a library that can be embedded (linked) into standalone applications i.e. used in isolation or in environments where no network is available.

Q1. Explain the features of MySQL DBMS listed above.

## **Q2. Concurrency:**

**(33Marks)**

- a) “Locks should be always maintained until end of transaction”. Discuss your opinion of this statement. (8 Marks)
- b) What is lock granularity? Why is it of significance in concurrency control? (8 Marks)
- c) Lock escalation and lock promotion. (17Marks)
- Distinguish between lock escalation and lock promotion.
  - Why are both procedures used in concurrency control?
  - Describe why a request for escalation can be denied.
  - Describe why a request for promotion can be denied.

## **Q3. Recovery:**

**(33 Marks)**

- a) As the Database Administrator (DBA) you are responsible for the location and size of the on- line log. In your opinion what are the issues that influence your decisions in these matters? (10 marks)
- b) Checkpoints: (12 Marks)
- As the DBA, setting the frequency of checkpoints is an important issue. Explain.
  - Describe two mechanisms by which the frequency of the checkpoints might be controlled.
- c) Alternative to Undo/Redo: explain the effect on recovery if it is programmed that all modification writes are held until Commit time? (11 Marks)

## **Q4. Security:**

**(33 Marks)**

Write a detailed note on risk assessment in database security?