

**ASSOCIATION OF CANADA LANDS SURVEYORS - BOARD OF EXAMINERS  
WESTERN CANADIAN BOARD OF EXAMINERS FOR LAND SURVEYORS  
ATLANTIC PROVINCES BOARD OF EXAMINERS FOR LAND SURVEYORS**

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**SCHEDULE I / ITEM 5**

**October 2004**

**DATA BASE MANAGEMENT SYSTEMS (INFORMATICS)**

**Note: This examination consists of 7 questions on 1 page.**

**Marks**

**Q. No**

**Time: 3 hours**

**Value   Earned**

1.	In a relational or object-relational database management system, what are Primary Keys? Foreign Keys? What are Primary and Foreign keys used for? What is indexing? Why do we use indexing?	12	
2.	Define "Database Management System" and give examples of ways it can be used for applications in GIS, projects in geodesy and projects in photogrammetry.	10	
3.	What are the differences between: a transactional database and a data warehouse? Data integration and interoperability? Primary key and Identifier?	15	
4.	A client in forestry asks you to build a simple geospatial database that deals with forests (name, total area, perimeter, % of unexploitable land, average area of included forest stands, mapped as polygon), individual forest stands (number, area, perimeter, exploitable: yes/no, trees dominant species, mapped as a polygon), Buildings (camp name, building number, use, mapped as a point), Building owners (name, address of residence, category: private/public), ownership of the forests and exploitation rights (ownership and exploitation rights may be different for a same forest). Describe how you would respond to his request with a conceptual database schema (you can use UML or Entity-Relationship modeling techniques). N.B. Any of the forests in the database may not have any buildings in it. One owner may own several buildings, but there is no co-ownership. Ownership is unique for a forest, but there may be several rights allowing the exploitation of the same forest, for example for different areas or different purposes. N.B. you must specify in your schema what will be represented cartographically and what geometry will be used (point, line, polygon).	18	
5.	What data structure would you implement to run the database described in Question 4 with an RDBMS and a GIS of your choice? (You can use a relational schema, a textual description or SQL commands.)	18	
6.	What are the fundamental elements of relational databases (in other words, what is an RDB made of)? How do most GISs connect their geometric primitives with the content of an RDB?	15	
7.	For the database in Question 4 above, write SQL commands for the following queries: a) Find all owners of private buildings in Forest A, (one of several forests in the database) b) Find all rights allowed for Forest A. c) Find the trees dominant species of the forest stand where building #14 is located.	12	
<b>Total Marks:</b>		100	