CANADIAN BOARD OF EXAMINERS FOR PROFESSIONAL SURVEYORS

SCHEDULE I / ITEM 5 **October 2009**
DATABASE MANAGEMENT

Note: This examination consists of 9 questions on 2 pages. **Marks**

Q. No Time: 3 hours Value Earned

1.	Name and then explain three tasks done in the Design phase of a Geospatial Database.	9	
2.	A municipality asks you to build a simple geospatial database to store cadastral and ownership information. The geospatial database must include: • Municipality: name, population, validity date of population, polygon geometry • Building: building number, civic number, street name, number of floors, value, polygon geometry • Parcel: number, area, polygon geometry. • Right: type of right (property, possession, ..) • Person/Rightful claimant: name, address Relationships: • Building belongs to "Person/Rightful claimant" according to a given right. Ex. Building 24 belongs to John Smith, who is the owner (property right). • Land belongs to "Person/Rightful claimant". Ex. Parcel 125 is a land object belonging to Jane Myers, who is the owner (property right). • A building is included in a Parcel. Ex. The Parcel 125 includes the building 24. • A Municipality includes Parcel and Building. Describe this demand with a conceptual database schema (CIM level) (you can use UML or Entity- Relationship modeling formalisms).	20	
3.	With the data model that you have created in #2, can you answer the following questions (using one or many queries) with a GIS? If the data model is implemented in a geospatial database? (yes/no) Explain how you can answer these questions or why you can not. 1. How many parcels are inside Albany municipality? 2. Select the building where John Smith lives? 3. What is the number of parcels touching the boundary of parcel number 125? 4. How many buildings are owned by a different owner of the parcel?	8	
4.	Name and explain three steps needed to translate a conceptual model to a logical model for a relational database.	9	

5.	Identify 5 errors in the following data that would have been avoided had the integrity constraints been created. For each error, name the integrity constraint and explain how the error could have been avoided. **ROAD**

ROAD SEGMENT ID	ROAD CLASS	ROUTE NUMBER	NUMBER OF LANES	PAVAMENT STATUS	STRUCTID
4957	Collector	25	3	Paved	
5059	Collector	25	2	Paved	
5161	COLLECTOR	25	2a	Paved	256
5435	Collector	118	2	Paved	
5911	Collector	118	2	Paved	
5911	Coll	12	2	Paved	234
6016	Collector	12	2	Paved	
6045	Collector	12	2	Paved	2341

STRUCTURE

STRUCTID	STRUCTURE TYPE	STRUCTURE NAME	BUILDING DATE	AGE
234	Bridge	Basin Head Bridge	21/07/1990	19
256	Bridge	Midgell Bridge	14/06/1979	30

15	
6.	Using the tables in number 5 (supposing that the data has been corrected), write the appropriate SQL queries to answer these questions: 1. What is the building date of the bridge "Midgell Bridge"? 2. What is the route number of the segment passing over the Basin Head Bridge? 3. What are the minimum and the maximum number of lanes of the road number 25? 4. How many bridges are on a road segment having Collector classification? 5. What is the mean of age of the bridges of the road number 25?	15	
7.	Name 4 OGC standard geometry types and for each, give two examples of geospatial entity which can use it.	8	
8.	Name and define three components of an UML diagram or an ER diagram.	6	
9.	Define each of the followings terms: a) Primary key b) Data Warehouse c) Relational Table d) Entity/Relationship (ER) e) Structured Query Language	10	
	Total Marks:	100	