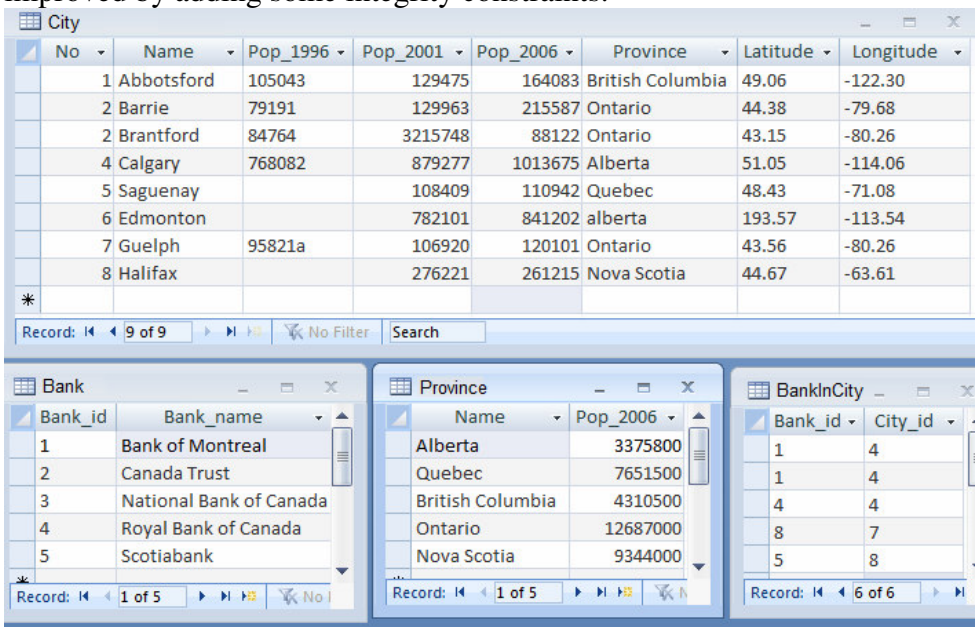
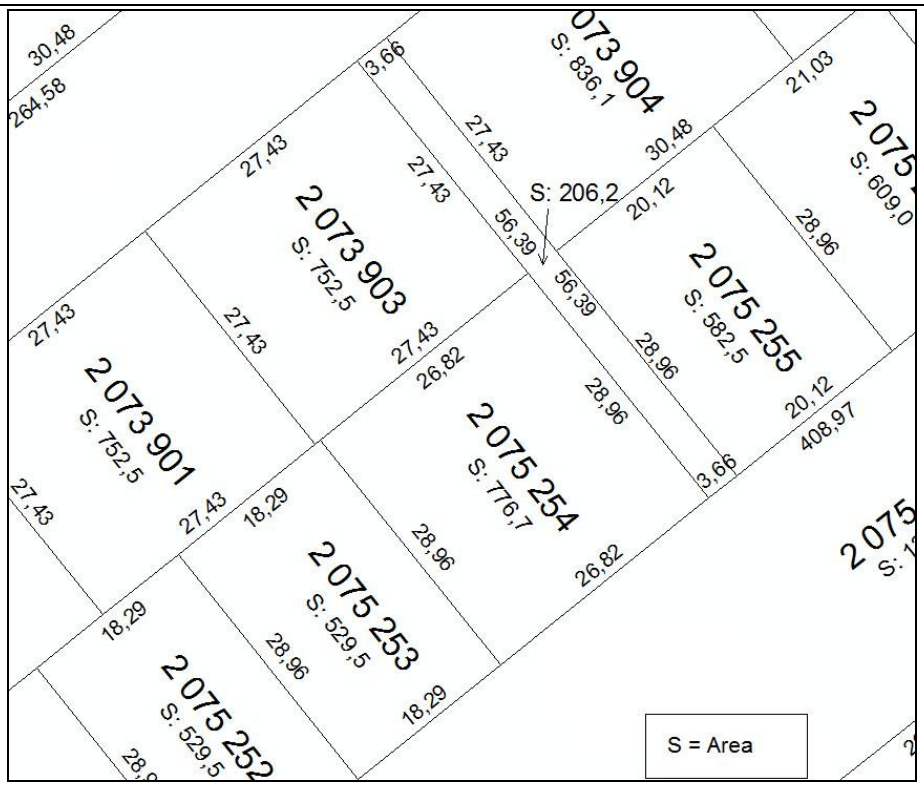
CANADIAN BOARD OF EXAMINERS FOR PROFESSIONAL SURVEYORS
ATLANTIC PROVINCES BOARD OF EXAMINERS FOR LAND SURVEYORS

SCHEDULE I / ITEM 5 **October 2007**

DATA BASE MANAGEMENT SYSTEMS (INFORMATICS)

Note: This examination consists of 7 questions on 2 pages. **Marks**

Q. No	Time: 3 hours	Value	Earned
1	For the following relational database structure, data integrity should be improved by adding some integrity constraints.  City No | Name | Pop_1996 | Pop_2001 | Pop_2006 | Province | Latitude | Longitude 1 | Abbotsford | 105043 | 129475 | 164083 | British Columbia | 49.06 | -122.30 2 | Barrie | 79191 | 129963 | 215587 | Ontario | 44.38 | -79.68 2 | Brantford | 84764 | 3215748 | 88122 | Ontario | 43.15 | -80.26 4 | Calgary | 768082 | 879277 | 1013675 | Alberta | 51.05 | -114.06 5 | Saguenay | | 108409 | 110942 | Quebec | 48.43 | -71.08 6 | Edmonton | | 782101 | 841202 | alberta | 193.57 | -113.54 7 | Guelph | 95821a | 106920 | 120101 | Ontario | 43.56 | -80.26 8 | Halifax | | 276221 | 261215 | Nova Scotia | 44.67 | -63.61 Record: 9 of 9 No Filter Search Bank Bank_id | Bank_name 1 | Bank of Montreal 2 | Canada Trust 3 | National Bank of Canada 4 | Royal Bank of Canada 5 | Scotiabank Record: 1 of 5 Province Name | Pop_2006 Alberta | 3375800 Quebec | 7651500 British Columbia | 4310500 Ontario | 12687000 Nova Scotia | 9344000 Record: 1 of 5 BankInCity Bank_id | City_id 1 | 4 1 | 4 4 | 4 8 | 7 5 | 8 Record: 6 of 6 a) for each table give the column (or columns) name that should be used as primary key. Indicate what should be corrected in the data before adding this constraint (possible to have no correction to do). b) indicate where foreign keys should be implemented in this database. Give the column name, the table name and the related table name. Indicate what should be corrected in the data before adding this constraint (possible to have no correction to do). c) what should you do to improve the integrity of: • column Pop_1996 of the table City. • columns Latitude and Longitude.	20	
2	Given the information provided in question #1, write the appropriate SQL query to answer the given questions: a) How many banks are in Nova Scotia? b) What is the percentage of Guelph population in 2006 in comparison with Ontario population? c) Which provinces have a Royal Bank of Canada ? d) How many banks are located in a city between the latitude 42° and the latitude 44°?	20	

3	 A client asks you to translate all the content of this CAD parcel plan into a spatial database. He also wants to manage, in his spatial database, buildings (address, value and use) and wants to know on which parcel buildings are built. He would like to represent parcels and buildings as polygons. Draw the conceptual schema (CIM) that might represent this spatial database (class, attribute and association). You can use a UML object-class diagram notation or Entity/Relationship formalism.	15	
4	Translate your CIM (no 3) into a PIM relational data model. In your schema, write the appropriate generic data types for each field including the geometry (use OGC geometry data types (GM_point, GM_curve and GM_surface)).	12	
5	Explain how “one to one”, “one to many” and “many to many” associations of a Conceptual model (CIM) are translated into an implementation model (PIM relational data model) and give one example for each.	12	
6	Give three differences between transactional and multidimensional technology.	9	
7	Give the meaning of these acronyms: a) CASE b) OLAP c) GML d) DBMS e) SQL f) OGC	12	
	Total Marks:	100	