CANADIAN BOARD OF EXAMINERS FOR PROFESSIONAL SURVEYORS

<div align="center">

E1 - SPATIAL DATABASES   **March 2013**
& LAND INFORMATION SYSTEMS

</div>

Note: This examination consists of 10 questions on 2 pages.   **Marks**

Q. No	Time: 3 hours	Value	Earned
1.	In ArcGIS 10, ESRI introduced the parcel fabric, a dataset for the storage, maintenance and edition of parcels. The features of the database behind the parcel fabric are described in ArcGIS 10 help as: • **Parcel points,** which store x,y,z coordinates derived from a least-squares adjustment. • **Line points**, occur when the corner point of a parcel lies on the boundary of an adjacent parcel, but do not split the boundary. Same attributes as Parcel points. • **Control points,** have accurate, published coordinates (x, y, z) for a physical location. • **Parcel lines**, which store and preserve recorded boundary dimensions such as bearing and length. Parcel Lines can be: connection line, road frontage line or boundary line. • **Parcel polygons,** which store parcel number and area. • **Plans**, which store information about the record of survey such as survey date, surveyor and description. "The following list summarizes the relationships between parcel features themselves and between parcel features and other tables: • A parcel polygon is related to many lines. • A parcel line has two endpoints. • A parcel line is related to only one parcel, resulting in two lines representing common parcel boundaries. • A parcel point is related to one control point. • A parcel point is related to one or more lines. • A line point is related to one or more parcel polygons. • A line point is related to one parcel line. • A parcel point is related to one line point. • A parcel polygon can have many line points. • A parcel polygon is related to one plan." (ArcGIS 10 Online Help) Create a geodatabase using this parcel fabric and having an OWNER table. This OWNER table contains name and address of owners and is linked to parcel polygons. Draw a conceptual database schema (CIM level) using UML or Entity-Relationship modeling formalisms, showing all classes (entities), attributes and associations (relationships) of this geodatabase.	20	

2.	To be imported in parcel fabric, parcel lines and parcel polygons must be topological. Give two examples of topology rules that can be defined between feature classes of the parcel fabric to identify data integrity problems in the parcel fabric. Give the rules and problems solved.	8	
3.	Using the model you have done in #1, give an example of: a) "One to many" relationship b) "Two to many" relationship c) "Many to many" relationship d) "One to one" relationship Show the result of the implementation of these relationships in relational database. Identify primary keys and foreign keys.	1 1 1 1 12	
4.	Give two examples of how you can relate two tables in SQL queries. Give appropriated syntaxes. You can use tables created in #3 in your examples.	6	
5.	Give one legal issue relevant to Data Sharing.	3	
6.	For each conceptual model concept, give the name of the relational database concept. a) Entity or class b) Attribute c) Object	2 2 2	
7.	Give five differences between transactional and multidimensional databases.	10	
8.	What are WMS and WFS? Give a definition of those terms.	2 4	
9.	Give the name of three families of formal methods used to develop geospatial database system. For each, give one characteristic that distinguishes one family from another.	3 6	
10.	Define each of the following: a) LIS b) Database Management System c) Interoperability d) Trigger e) OLAP f) Data type g) DML h) Normal form	16	
	Total Marks:	100	