National Exams May 2017

04-Geom-A7, Geospatial Information Systems

Duration 3 Hours

NOTES:

1. If doubt exists as to the interpretation of any question, the candidate is urged to submit with the answer paper, a clear statement of any assumptions made.
2. This is a CLOSED BOOK EXAM.
3. Any non-communicating calculator is permitted.
4. Fifteen (15) questions constitute a complete exam paper.
5. Each question has varied value.
6. Most questions require an answer in essay format. Clarity and organization of the answer are important.

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1. List and briefly explain at least five criteria that are commonly used to describe geospatial data quality. **(5 Marks)**

2. Describe relative advantages and limitations of raster and vector data, in terms of data model/structure, data collection and storage, attribute handling, data processing and analysis, and output quality. **(10 Marks)**

3. a) What is "address matching"? **b)** Why is address matching an important vector geoprocessing technique? **(5 Marks)**

4. Assume a GIS modeling problem of finding suitable site for new school, which cannot be within 300 m of major roads and cannot be within 500 m of streams. Given road map, stream map and land use data, draw a flowchart to show each step, including data input layers, processing functions and output, of the problem solving process. **(10 Marks)**

5. Compare and contrast thin-client and thick-client strategies in designing a web mapping application. **(5 Marks)**

6. a) Define map projection **(2 Marks). b)** Explain why map projections are needed. **(3 Marks)**

7. Define briefly the process from **a)** Spatial Data, **b)** Spatial Information, **c)** Spatial knowledge, to **d)** decision-making. **(10 Marks)**

8. What is the purpose of georeferencing when using geospatial information systems? **(5 Marks)**

9. a) What is metadata? **b)** Name two common standards used to create metadata. **(5 Marks)**

10. In the context of geospatial Information design a reality captured from remote sensing devices or manual surveying can be represented with three different types of models, which include: 1) Conceptual Model; 2) Logical Model; 3) Physical Model. Please explain how each model can be defined, produced and represented. **(10 Marks)**

11. Buffer is used extensively in GIS. How buffer is being used in proximity analysis? **(5 Marks)**

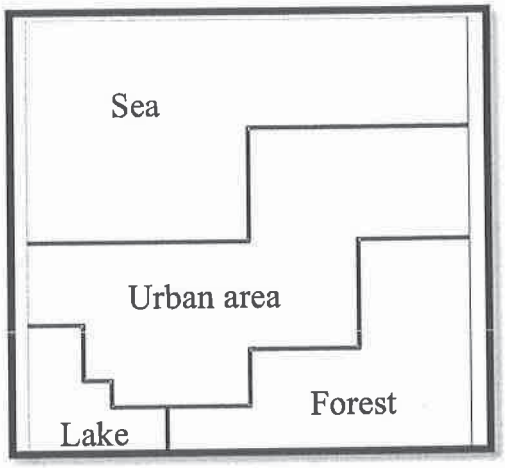
12. Discuss the difference between the discrete object and continuous field concepts in the context of GIS database. **(5 Marks)**

13. What is DBMS and how it is used in GIS? Justify your answer with an example. **(5 Marks)**

14. Compare and contrast the following pairs: **(10 Marks)**

- **a)** Object-oriented data model and relational data model
- **b)** Spatial functions and spatial constraints

15. Given the land use map below, represent its raster image using a quad-tree data indexing structure. **(5 Marks)**



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