UNIVERSITY OF KWAZULU-NATAL
SCHOOL OF AGRICULTURAL, EARTH AND ENVIRONMENTAL SCIENCES
DISCIPLINE OF GEOGRAPHY
EXAMINATION: NOVEMBER 2012
MODULE NAME AND CODE: GIS AND REMOTE SENSING
ENVS316H2

DURATION: 3 HOURS **TOTAL MARKS: 200**

INTERNAL EXAMINER: **DR N NGETAR**
EXTERNAL EXAMINER: **PROF S GRAB,**
UNIVERSITY OF WITWATERSRAND

INSTRUCTIONS:

1) THIS PAPER CONSISTS OF TWO SECTIONS.
2) CHOOSE TWO QUESTIONS FROM SECTION A AND TWO QUESTIONS FROM SECTION B.
3) ALL QUESTIONS ARE WORTH 50 MARKS.

SECTION A

ANSWER TWO QUESTIONS.

1. Discuss the different categories of errors and their assessment methods in Geographic Information Systems (GIS). (50)

2. Define the three standard properties of map projections: equal-area, equidistant and conformal. Discuss the relative importance of each for different applications. In your answer, elaborate on what types of applications require which properties. (50)

3. What is metadata? Describe the four main elements of metadata. What is the value of metadata from both the user and producer perspective? (50)

4. Spatial interpolation uses a number of methods to predict spatial locations. Explain four of these methods and briefly discuss their advantages and disadvantages. (50)

5. Provide an overview of the various spatial analyses in GIS and define the function classes used. (50)

6. A good GIS should be able to support a variety of vector and raster data formats. Describe and discuss the different vector and raster data formats used in GIS. (50)

SECTION B

ANSWER TWO QUESTIONS.

7. Radiometric distortions are common phenomena in remotely sensed data. With the aid of diagrams, discuss the different sources and types of radiometric distortions, as well as their methods of correction. (50)

8. Distinguish between unsupervised and supervised digital image classification. In addition, discuss the different methods used in supervised image classification. (50)

9. Spectral reflectance is a function of wavelength and the characteristic of the target. Discuss this statement with reference to examples. (50)

10. What is satellite image enhancement? Give a detailed account of the techniques used in digital image enhancement. (50)

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SECTION A

ANSWER TWO QUESTIONS.

1. Discuss the different categories of errors and their assessment methods in Geographic Information Systems (GIS). (50)

2. Provide an overview of GIS, paying particular attention to: GIS building blocks, components of geographic data, feature spatial relationships and GIS capabilities. (50)

3. GIS data from different sources can present problems during integration and analysis. Discuss the different sources of GIS data, the possible difficulties during integration, and how they can be resolved. (50)

4. Spatial interpolation uses a number of methods to predict spatial locations. Explain four of these methods and briefly discuss their advantages and disadvantages. (50)

5. Suppose you were employed by an organization as a GIS specialist to help them implement a new GIS program as part of its practice and functionality. Discuss the entire implementation process. (50)

SECTION B

ANSWER TWO QUESTIONS.

6. "Not all energy from a source is incident on a target". Discuss this statement with reference to energy interactions within the atmosphere. (50)

7. Explain and discuss the importance of different resolutions used in remote sensing applications. (50)

8. Describe and discuss geometric image distortions in remotely sensed images. Explain how such distortions can be restored or corrected. (50)

9. What is satellite image enhancement? Give a detailed account of the techniques used in digital image enhancement. (50)