UNIVERSITY OF KWAZULU-NATAL
SCHOOL OF AGRICULTURAL, EARTH AND ENVIRONMENTAL SCIENCES
DISCIPLINE OF GEOGRAPHY
EXAMINATION: JUNE 2013
MODULE NAME & CODE: GIS AND REMOTE SENSING, ENVS316H1

DURATION: 3 HOURS   **TOTAL MARKS: 300**

INTERNAL EXAMINERS: **DR M GEBRESLASIE AND DR N NGETAR**
EXTERNAL EXAMINER: **PROF S GRAB, UNIVERSITY OF THE**
                                             WITWATERSRAND

INSTRUCTIONS: **THIS PAPER CONSISTS OF ONE PAGE.**
                               ANSWER <u>THREE</u> QUESTIONS.
                               ANSWER ONE QUESTION FROM SECTION A AND ONE
                               QUESTION FROM SECTION B, AND THE THIRD
                               QUESTION FROM EITHER SECTION A OR SECTION B.
                               EACH QUESTION IS WORTH 100 MARKS.

SECTION A – ALL QUESTIONS ARE WORTH 100 MARKS

1. Describe and discuss some of the most important spatial analysis functions that a standard GIS provides.

2. Differentiate between data quality, accuracy and precision in GIS. Outline the methods used in assessing error in spatial data.

3. Describe a typical application of GIS in an area of your choice. In your description, include a statement of the problem, how the data would be collected and analyzed, and how the results are best presented.

SECTION B – ALL QUESTIONS ARE WORTH 100 MARKS

4. Image rectification, restoration and resampling are methods of geometric image correction. Provide a detailed discussion of these methods, including the advantages and disadvantage of each resampling method.

5. In the electromagnetic spectrum, atmospheric windows play a great role in remote sensing. Give an overview of the electromagnetic spectrum in which you describe and discuss the various wavelengths used in remote sensing and their capabilities.

6. Compare the different ways in which incident radiation will interact with features on the earth's surface and explain the spectral reflectance characteristics of water, green vegetation and soil.

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SECTION A – ALL QUESTIONS ARE WORTH 100 MARKS

1. 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.

2. You are employed by an organization as a GIS specialist to help them implement a new GIS program as part of its practice and functionality. Discuss in detail the entire implementation process.   .

3. Differentiate between data quality, accuracy and precision in GIS. Outline the methods used in assessing error in spatial data.

SECTION B - ALL QUESTIONS ARE WORTH 100 MARKS

4. Explain and discuss the different resolutions and associated issues in remote sensing.

5. Not all energy from a source is incident on a target. Discuss this statement, with reference to energy interactions within the atmosphere.

6. Geometric distortions are common phenomena in remotely sensed data. Using diagrams, discuss the different types of geometric distortions and their correction.