University of Fort Hare

GIS 315

First Semester Examination: June 2018

Subject: Geographic Information Systems

Paper: Spatial Analysis

Time: 3 Hours

Marks: 100

Internal Examiner:
Mr. P. Sibandze

External Examiner
Dr G. Chirima

INSTRUCTIONS:
Read all questions carefully
Answer ALL questions.

TOTAL PAGES: 4
QUESTION 1

a. Give two examples where buffer applications of GIS can be used in the problem solving / decision making process. (2)
b. In order to carry out a raster overlay operation, the raster layers must meet three basic criteria. What are they? (3)
c. List four primary types of operators used in vector overlay analysis
d. What is the difference between Slope and Aspect? (2)
e. List three aspects that influence the accuracy of DEM data. (3)

QUESTION 2

Explain what is meant by the raster map algebra process: Overlay using Maximum. Use clearly labelled diagrams to illustrate your answer.

QUESTION 3

For each of the examples below, indicate whether the results of the specific Boolean and Set Operators in Overlay Analysis are true or false.

[Diagrams of OR, AND, NOT, Intersection, and Difference operations with corresponding results]

QUESTION 4

Discuss any two secondary uses of DEMs and give examples of real world applications.
QUESTION 5

List five properties that can be measured by means of GIS analysis.

QUESTION 6

In terms of database management; what are the strengths of:
   (i) Vector model?
   (ii) Raster model?

QUESTION 7

(a) Briefly explain why conversion between raster and vector formats may be necessary. (5)
(b) Spatial data can be divided in terms of their dimensions. Briefly explain the term ‘dimensions’ in this context. (5)

QUESTION 8

a. Briefly explain the differences between clipping and masking. (5)
b. Draw the output of the clipping and masking operations. (5)
QUESTION 9

Explain what the map algebra process of Raster Overlay using Weights means. Use diagrams to illustrate your answer.

QUESTION 10: CASE STUDY

Background Information:

A wealthy landowner is in the process of developing a lodge in a private game reserve for overseas guests.

Objective:

You are the appointed GIS consultants and have been asked to determine a suitable location for the new lodge. The location must meet with certain criteria listed below.

Criteria:

• The lodge must be within 500 meters of a large water supply (for example: a large dam or a river).
• The lodge site must have access to electricity – it must be within 500m of a power-line.
• There must be road access 500m to the lodge site.
• The lodge may not be located closer than 500m to existing houses.
• The lodge may not be in line of site of an electric fence.

EXAM QUESTION

Draw up a procedure plan as to how you would complete this task using a GIS.