

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**10**

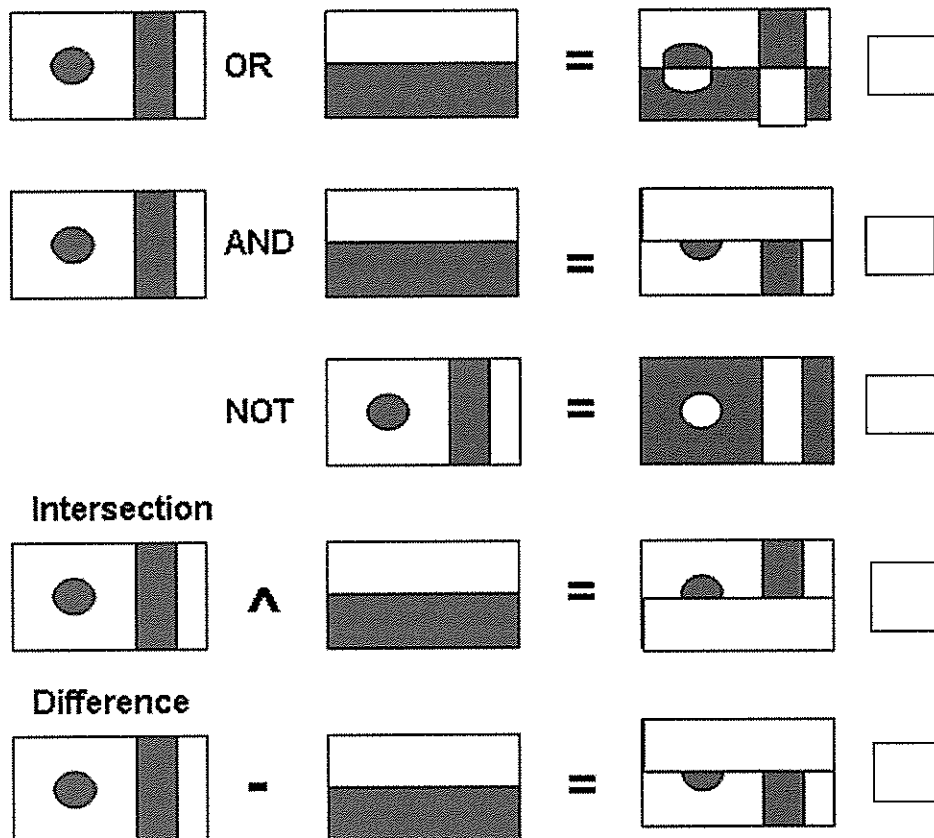
- Give **two** examples where buffer applications of GIS can be used in the problem solving / decision making process. (2)
- In order to carry out a raster overlay operation, the raster layers must meet three basic criteria. What are they? (3)
- List four primary types of operators used in vector overlay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

QUESTION 2**10**

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

QUESTION 3**5**

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



QUESTION 4**10**

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

QUESTION 5

5

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

QUESTION 6

5

In terms of database management; what are the strengths of:

- (i) Vector model?
- (ii) Raster model?

QUESTION 7

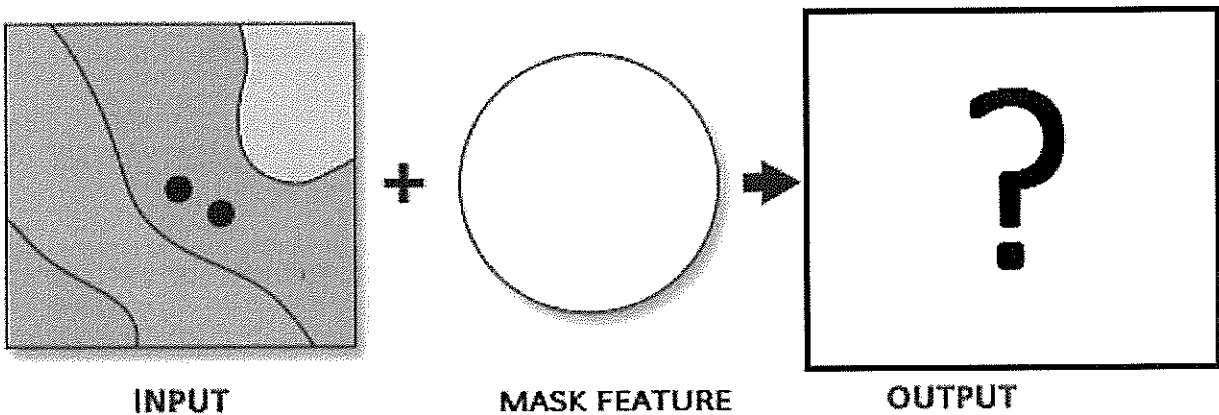
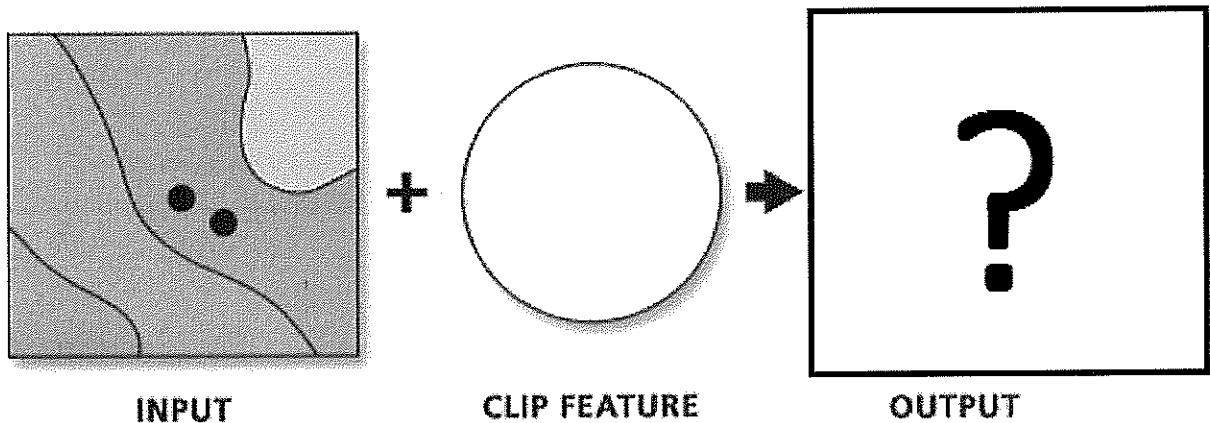
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- (a) **Briefly explain** why conversion between raster and vector formats may be necessary. (5)
- (b) Spatial data can be divided in terms of their dimensions. **Briefly explain** the term 'dimensions' in this context. (5)

QUESTION 8

10

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



QUESTION 9**10**

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

QUESTION 10: CASE STUDY**25**

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.