



GWANDA STATE UNIVERSITY

FACULTY OF ENGINEERING AND ENVIRONMENT

DEPARTMENT OF GEOMATICS AND SURVEYING

GEOGRAPHIC INFORMATION SYSTEMS

EGS5203

Final Examination Paper

This examination paper consists of 4 pages

Time Allowed: 3 hours

Total Marks: 100

Examiner's Name: Mr. T. Mathe

INSTRUCTIONS

Answer ALL questions in chronological order

QUESTION 1**10**

In order to perform hotspot analysis, you have to follow three major steps to assess the input data's spatial distribution.

- a. Describe the three major steps and what is expected in each step. [6]
- b. For each step, describe two types of statistics you would use with supporting diagrams/representations. [4]

QUESTION TWO**20**

You are hired to identify a new site for a dam by Gwanda Rural District Council due to water scarcity in the region. Given the information below, explain the six steps in AHP to determine the weight of each criteria and, the ranking of choices using examples.

Objective

Selecting a new site for a dam

Criteria

Aquifer

Soil Type

Slope

Distance from River

Alternatives

Confined

Loam

Steep

15m

Comparison time

Intensity	Definition
1	Equal importance
2	Equal to moderate importance
3	Moderate importance
4	Moderate to strong importance
5	Strong importance
6	Strong to very strong importance
7	Very strong
8	Very to extremely strong importance
9	Extreme importance

Weights

Aquifer is intensity 2 to soil type, intensity 5 to slope and intensity 4 to distance to river

Soil type is intensity 2 to slope and intensity 3 to distance to river
Slope is intensity 2 to distance to river

QUESTION THREE**10**

Describe five of the following interpolation techniques used in terrain analysis

- Inverse distance weighted
- Spline
- Kriging
- Trend
- Topo to raster
- Density
- Kernel density

QUESTION FOUR**25**

GIS is a powerful tool for manipulation and analysis of spatial data. However, it is sometimes necessary to present data in such a way that it visually encapsulates that database with the spatial element.

Describe the various display techniques that are available for one to graphically present data such that the elements under consideration within the attribute are clearly shown.

QUESTION FIVE**10**

A database management system can limit access to the data stored within it for various reasons. Briefly describe the types of limits that can be imposed and briefly explain why access limitation might be imposed in each way.

QUESTION SIX**15**

In December of 2015, there were major Cholera outbreaks in Mozambique particularly in the province of Nampula. The Mozambican government requires a proximity analysis to be done to discover the source of the outbreak through mapping of the home location of patients from Nampula Provincial Hospital and of suspected sources of contagion. Write a detailed description of the methodology you would follow to perform the proximity analysis.

QUESTION SEVEN**20**

- a. Write a proposal with problem statement and methodology using MCE to identify the site for a new banking hall in GSU Epoch Mine campus. [10]

- b. Explain how Eigenvectors & Eigenvalue are used to determine the weights of criteria and how Eigenvalue products are used to determine the ranking of choices. [10]

END OF EXAMINATION