



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 3 pages

Time Allowed: 3 hours

Total Marks: 100

Examiner's Name: Mr. J.B. Manyati

INSTRUCTIONS

Answer ALL questions in chronological order

QUESTION 1 **20**

- a. Discuss the advantages and disadvantages of vector and raster data. [5]
- b. Describe five of the following interpolation techniques used in terrain analysis
- Inverse distance weighted
 - Spline
 - Kriging
 - Trend
 - Topo to raster
 - Density
 - Kernel density [10]
- c. In order to perform hotspot analysis, you have to follow three major steps to assess the input data's spatial distribution. Describe the three major steps and what is expected in each step. [5]

QUESTION 2 **20**

- a. Distinguish between nominal, ordinal, interval and ratio data with the help of appropriate examples. [10]
- b. Discuss on the theory of site suitability analysis. [10]

QUESTION 3 **10**

- a. 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. [8]
- b. In order to perform hotspot analysis, you have to follow three major steps to assess the input data's spatial distribution.
- i. Describe the three major steps and what is expected in each step [6]
 - ii. For each step, describe two types of statistics you would use with supporting diagrams/representations. [6]

QUESTION 4 **20**

You are hired to identify a new site for Tuli-Manyange dam by ZINWA for irrigation purposes in the region. Given the information below, explain the six steps in Analytic Hierarchy Process (AHP) to determine the weight of each criteria and, the ranking of choices using examples.

Objective	Criteria	Alternatives
Selecting a new site for a dam	Aquifer Soil Type Slope Distance from River	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 5

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