NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF APPLIED SCIENCES
DEPARTMENT OF INFORMATICS AND ANALYTICS
GEO INFORMATICS
SCI 4104

SPECIAL EXAMINATION PAPER

This examination paper consists of 3 pages.

Time Allowed: 3 hours
Total Marks: 100
Examiner's Name: Mr S Ncube
External Examiner:

INSTRUCTIONS

1. This examination paper consists of Five [5] questions.
2. All questions carry equal marks.
3. Answer any Four [4] questions.

MARK ALLOCATION

QUESTION	MARKS
1.	25
2.	25
3.	25
4.	25
5.	25

QUESTION ONE
a) What is cartography? [1]
b) Remote sensing makes use of special types of cameras with different types of sensors for imaging. You are required to name at least 5 types of sensors one would use and the type of application areas where such imagery would be relevant. [10]
c) In gathering spatial data from WebGIS like Google Maps or Foursquare, name 5 parameters one would need to have in order to import data onto a Python Notebook through an API. [5]
d) Name and explain clearly 3 relevant libraries you will need to import in your Notebook in order to work with imported data in 1(c) above. [6]
e) Write the line(s) of Python code for importing the 3 libraries mentioned in 1(d) above. [3]

QUESTION TWO
a) To prepare for its review for privatization, NUST has tasked you with creating an extensive GIS map of its campus. Give a thorough explanation of your plan to develop the required solution, including with diagrams. [25]

QUESTION THREE
a) Evaluate why Bulawayo City Council would need a GIS or Geo-Informatics specialist. [10]
b) Discuss 5 tools you will regularly use to efficiently carry out your duties if you were to fill in the position mentioned in 3(a) above. [10]
c) Explain how remote sensing can be used in management of natural resources. [5]

QUESTION FOUR
a) In reference to Geo-statistics, explain in detail using examples and or diagrams the following:
   i.   Normal distribution
   ii.   Outlier
   iii.   Conditional probability
   iv.   Histograms
   v.   Time series analysis [15]
b) Explain the GIS data capture and editing process using a diagram that is clearly labeled. [10]

QUESTION FIVE

a) Define the following terms:
   i.   Geodesy
   ii.   Topology
   iii. Geo-synchronisation
   iv.   Navigation
   v.   Photogrammetry   [5]

b) Explain the five typical issues that can arise during the manual map
   digitization process, using diagrams.   [15]

c) "Zimbabwe is ready to launch its first satellite, ZimSat-1, into orbit this
   month after developing it through the BIRDS project via Japan". Justify our
   need for a satellite.   [5]

END OF QUESTION PAPER