



# MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

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## University Examinations 2013/2014

THIRD YEAR, SECOND SEMESTER EXAMINATION FOR THE DEGREE OF

BACHELOR OF SCIENCE IN HORTICULTURE

**AHS 2402 – REMOTE SENSING (GIS)**

**DATE: DECEMBER 2013**

**TIME: 2HOURS**

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**INSTRUCTIONS:** Answer question *one* and any other *two* questions

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### QUESTION ONE – 30 MARKS

- (a) Differentiate between the following concepts. (2Marks)
- (i) Mapping and Map
  - (ii) Reference system and coordination system
  - (iii) Remote sensing and insitu measurements
- (b) With the aid of an illustrative diagram, explain the logical steps necessary to put a GIS (Geographic Information System) to work. (4Marks)
- (c) With an aid of a diagram, explain the concept of remote sensing. (5Marks)
- (d) With an aid of an illustrative diagram, explain the relationship between ellipsoid, earth and the geoid. (4Marks)
- (e) State any three (3) parameters that an ideal reference system must specify. (3Marks)
- (f) Briefly explain five (5) factors that influence the quality of spatial data in GIS. (5Marks)
- (g) Explain the three (3) types of atmospheric scattering remote sensing. (6Marks)

### QUESTION TWO (20MARKS)

- (a) Briefly describe the five (5) components that make up a geographic information system (GIS). (10Marks)
- (b) List and describe four characteristics of image data. (4Marks)

- (c) What are the benefits that an organization could gain in adopting a GIS in its daily running of affairs? (6Marks)

### QUESTION THREE – 20 MARKS

- (a) GIA software can be classified into six categories based on their functionality. List these categories and briefly outline what each entails. (12Marks)
- (b) Distinguish between ideal and real remote sensing. (6Marks)
- (c) State any four (4) functions of database in GIS and remote sensing. (2Marks)

### QUESTION FOUR – 20 MARKS

- (a) As an expert in geospatial science and specialist in remote sensing, the Ministry of Agriculture has approached you seeking advice on how to monitor wide range of environmental changes. The ministry is specifically interested in monitoring vegetations variation, land degradation and deforestation using multi-spectral remote sensing data. In your response to the ministry, explain
- (i) The spectral bands you would use for this application. (1Mark)
  - (ii) Data analysis techniques that you would use (8Marks)
  - (iii) Any additional data (1Mark)
- (b) Explain the following co-ordinate systems.
- (i) Terrestrial co-ordinate system
  - (ii) Celestial co-ordinate system
  - (iii) Orbital co-ordinate system (3Marks)
- (c) With the aid of a diagram explain the concept of energy interaction in the atmosphere and on the land in remote sensing technique. (7Marks)

### QUESTION FIVE – 20 MARKS

- (a) Explain how remote sensing and GIS complement each other. (6Marks)
- (b) With an aid of a diagram, explain remote sensing and ground-based approach of data collection. (4Marks)
- (c) Stating an example in each case, explain the following data values.
- (i) Nominal data values
  - (ii) Ordinal data values
  - (iii) Ratio data values (6Marks)
- (d) Explain the need for remote sensing in Horticulture/Agriculture. (4Marks)