



UNIVERSITY OF SWAZILAND  
RESIT EXAMINATION PAPER

PROGRAMME: BSc. AGRICULTURAL AND BIOSYSTEMS ENGINEERING YR 2

COURSE CODE: ABE210

TITLE OF PAPER: REMOTE SENSING AND GIS

TIME ALLOWED: TWO (2) HOURS

SPECIAL MATERIAL REQUIRED: NONE

INSTRUCTIONS: ANSWER QUESTION ONE AND ANY TWO OTHER  
QUESTIONS

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CHIEF INVIGILATOR

**QUESTION ONE: COMPULSORY QUESTION**

- a) Calculate the cost of Landsat ETM satellite data for a farm that is 20 km by 30 km in size. The spatial resolution of the ETM data is 10m by 10m, and the price of the data is E60 per MB. (20 marks)
- b) Using an example, illustrate how organic matter of a soil would affect its reflectance. (10 marks)
- c) Using examples, discuss how the energy of quanta is related to the wavelength of electromagnetic energy. (10 marks)

**Total** **40 marks**

**QUESTION TWO**

- a) Describe how the Normalised Difference Vegetation Index (NDVI) is calculated, and how it can be used to differentiate landscape features. (20 marks)
- b) Using examples, discuss how the energy of quanta is related to the wavelength of electromagnetic energy. (10 marks)

**Total** **30 marks**

**QUESTION THREE**

- a) Describe three sources of data that can be used in vector GIS, highlighting the format at which the data is sourced. (15 marks)
- b) Discuss how the total energy that is emitted by an object is related to the temperature of the object. (15 marks)

**Total** **30 marks**

**QUESTION 4**

- a) Using illustrations, discuss how binary masking (also called level thresholding) can be used to prepare a map showing presence and absence of water bodies from satellite data. (15 marks)
- b) Using examples, discuss the type of data that can be shown in each of the following forms:
- i. Ratios (8 marks)
  - ii. Ranks (7 marks)

**Total** **30 marks**