

UNIVERSITY OF SWAZILAND
DEPARTMENT OF GEOGRAPHY, ENVIRONMENTAL SCIENCE AND
PLANNING

FINAL EXAMINATION: MAY 2008
B.SC. III, BASS III, BA HUM III, B.ED. III

TITLE OF PAPER : INTRODUCTION TO REMOTE SENSING

COURSE NUMBER : GEP 313

TIME ALLOWED : THREE (3) HOURS

INSTRUCTIONS : ANSWER ANY TWO QUESTIONS FROM
SECTION B
ILLUSTRATE YOUR ANSWERS WITH
APPROPRIATE DIAGRAMS.

MARKS ALLOCATED : QUESTION 1 CARRIES 40 MARKS THE
OTHER QUESTIONS CARRY 30 MARKS
EACH.

THIS PAPER IS NOT TO BE OPENED UNTIL PERMISSION HAS BEEN
GRANTED BY THE INVIGILATOR

SECTION A: COMPULSORY QUESTION

QUESTION 1

- a) In July 2007, a series of devastating fires swept throughout Swaziland, resulting in extensive damage to infrastructure and loss of lives. You have been employed as remote sensing specialist by the Disaster Management Agency to assess the dynamics and impacts of the July 2007 fires on affected areas in Swaziland. Using the principles of thermal remote sensing and general remote sensing principles describe the process you would follow to reach your conclusion including, but not limited to, the methods of interpreting your data, and choice of platforms.

(30 marks)

- b) Briefly describe the geostationary satellite platform. (10 marks)

[40 marks]

SECTION B: ANSWER ANY TWO QUESTIONS

QUESTION 2

- a) Define an atmospheric window. (5 marks)
- b) Compare and contrast lidar aerial photography and high resolution satellite remote sensing. (20 marks).
- c) Briefly discuss the colour additive theory. (5 marks)

[30 marks]

QUESTION 3

- a) Describe how a hybrid between supervised and unsupervised classification system is used to classify satellite or digital airborne remote sensing. (10 marks).
- b) Concisely describe the specifications/characteristics of ONE of the following sensors:
- i. MODIS
 - ii. Quickbird
 - iii. AATSR

(20 marks)

[30 marks]

QUESTION 4

- a) The Tropical Rainfall Measuring Mission (TRMM) carries a lightning detection sensor, the LIS, for the mapping of global lightning activity. Briefly explain the functioning of such as a system using remote sensing principles (15 marks)
 - b) Define modern remote sensing. (3 marks).
 - c) Using examples and illustrations outline the principles of hyperspectral remote sensing. (12 marks).
- [30 marks]**

QUESTION 5

- a) Discuss the **Maximum likelihood** and **Minimum-distance-to-means** algorithm to digital image classification. (15 marks)
 - b) Describe the key steps in aerial photo interpretation. (15 marks)
- [30 marks]**