**UNIVERSITY OF SWAZILAND**

**DEPARTMENT OF GEOGRAPHY, ENVIRONMENTAL SCIENCE AND PLANNING**

**FINAL EXAMINATION PAPER MAY 2013**

**B.A., BASS, B.ED & B.Sc.**

**TITLE OF PAPER** : **INTRODUCTION TO REMOTE SENSING**

**COURSE NUMBER** : **GEP 313**

**TIME ALLOWED** : **THREE HOURS**

**INSTRUCTIONS** : 1.Section A carries 40 marks and is **COMPULSORY.**

2. Choose any **TWO** questions from Section B, each of which carries 30 marks.

3. Remember to use appropriate terminology and Illustrations.

***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 and August 2008,a series of devastating fires caused extensive damage to infrastructure and the loss of lives in Swaziland. You have been employed as a remote sensing specialist by the National Disaster Management Agency to assess the area burnt and fire activity during those periods. Using remote sensing principles, with focus on the relevant portion of the electromagnetic spectrum, 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 two major types of satellite orbits. (10 marks)

**[40 MARKS]**

**SECTION B : ANSWER ANY TWO QUESTIONS**

**QUESTION 2**

a) Explain the two models of light. (6 marks)

b) Explain the advantages and disadvantages of high-resolution commercial satellites such as World View-2 and GeoEye over medium-resolution government satellites like the Landsat and SPOT series? (15 marks)

c) Why do thermal sensors typically have lower spatial resolution than sensors that measure shorter wave reflected radiation? (9 marks)

**[30 MARKS]**

**QUESTION 3**

a) Using appropriate examples, describe the operations of active and passive remote sensors. (5 marks)

b) Outline the process of aerial photo interpretation using a pair of stereoscopes and the issues that one has to know before the process of stereo interpretation. (15 marks).

c) Briefly describe pixel and object-oriented approaches to image classification. (10 marks)

**[30 MARKS]**

**QUESTION 4**

a) In many situations, either a supervised versus unsupervised approach is used to classify satellite or digital airborne remote sensing imagery. Describe how a hybrid between supervised and unsupervised can also be used. (10 marks)

b) Concisely describe the specifications/characteristics of ONE of the following sensors:
   i. MODIS or
   ii. Landsat 8 (LCDM) or
   iii. WorldView -2

(20 marks)

**[30 MARKS]**

**QUESTION 5**

a) Briefly describe the following:
   i) Range Resolution (5 marks)
   ii) Azimuth Resolution (5 marks)
   iii) The Doppler Shift Principle (5 marks)

b) Briefly discuss the role of ground truthing in projects relying on a range of remotely sensed data. (15 marks)

**[30 MARKS]**