



**UNIVERSITY OF SWAZILAND  
FINAL EXAMINATION PAPER**

**PROGRAMME: BSC AGRIC. 4 (LWM)**

**COURSE CODE: LUM 409**

**TITLE OF PAPER: REMOTE SENSING**

**TIME ALLOWED: TWO (2) HOURS**

**SPECIAL MATERIAL REQUIRED: NONE**

**INSTRUCTIONS: ANSWER QUESTION ONE AND ANY TWO OTHER  
QUESTIONS.**

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GRANTED BY THE CHIEF INVIGILATOR**

**QUESTION ONE: COMPULSORY QUESTION**

- (a) Compare and contrast the Landsat TM data and NOAA data in terms of spatial resolution and temporal resolution. Giving reasons state the data that can be ideal for monitoring deforestation at regional (SADC) level. (15 marks)
- (b) Using examples, illustrate how the relationship between NIR waveband and Red waveband can be used to differentiate between grass, dense forest, water, bright soil and wet soil. (25 marks)

**QUESTION TWO**

- (a) Describe how atmospheric absorption and atmospheric scattering affect the radiation reaching the terrain. (15 marks)
- (b) Describe how the Normalised Difference vegetation Index (NDVI) can be used to estimate biomass (harvest) of sugarcane in Swaziland. (15 marks)

**QUESTION THREE**

- (a) Describe the factors that affect the spectral reflectance of vegetation, stating how the effects are used to differentiate vegetation. (15 marks)
- (b) Describe how the temperature of a material affects the total radiation coming from surface of material. (15 marks)

**QUESTION FOUR**

- a. Briefly describe how the pixel size will have an effect on the size of an object to be detected by a sensor in remote sensing. (10 marks)
- b. Using examples, illustrate the algorithm that is applied during the process of contrast contrast stretch in digital image analysis. (20 marks)