



## **MASENO UNIVERSITY**

### **UNIVERSITY EXAMINATIONS 2015/2016**

**FIRST YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF  
BACHELOR OF SCIENCE IN GEOSPATIAL INFORMATION SCIENCE  
WITH INFORMATION TECHNOLOGY**

**CITY CAMPUS - REGULAR**

**PGS 112: REMOTE SENSING I**

Date: 4<sup>th</sup> December, 2015

Time: 2.00 - 4.00 pm

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#### **INSTRUCTIONS:**

- Answer question ONE and any other TWO questions.



**PGS112: REMOTE SENSING 1**

**INSTRUCTIONS:** Answer question ONE and any other TWO questions

- 1.a) Write short notes on the following
- i. Mie scattering
  - ii. Non selective scattering
  - iii. Multi-spectral systems
  - iv. Atmospheric window
  - v. Imaging sensors
- 10 marks**
- b) Explain the common components of a sensor system **6 marks**
- c) There are three main options for transmitting data acquired by satellites to the surface. Explain how data collected by spaceborne sensor is transmitted to the ground receiving station. **6 marks**
- d) Using examples differentiate between the space shuttles, space stations, low level satellites and high level satellites. **8 marks**
- 2.a) Define Remote Sensing? **2marks**
- b) Identify the 7 stages of remote sensing **4 marks**
- c) In the absence of particles and scattering the sky would appear black. Discuss **4 marks**
- d) Identify major earth observing satellites in space stating their characteristics **10 marks**
- 3.a) Due to side looking viewing geometry radar images suffer from serious geometric and radiometric distortions. Using a clear diagram, explain these distortions. **12 marks**
- b) Explain the four factors that influence the amount of energy backscattered. **8marks**

- 4 a). Discuss the various 3-D spaces that are used to describe and define colors. **9 marks**
- b). To increase contrast 3 bands can be subjected to linear contrast stretch or histogram equalization. Explain the three modes of display for the color composites. **6 marks**
- d) Describe the pre-processing of image data in the context of image processing and interpretation. **5 marks**

5.a) The table below is an example of a confusion matrix obtained from the classification of six land use classes.

Reference Class	W	B	F	U	V	G	Row Total
W	226	0	0	12	0	1	239
B	0	216	0	92	1	0	309
F	3	0	360	228	3	5	599
U	2	108	2	397	8	4	521
V	1	4	48	132	190	78	453
G	1	0	19	84	36	219	359
Column Total	233	328	429	945	238	309	2480

Compute the user accuracy, producer accuracy, error of omission, error of commission and the overall accuracy. **10 marks**

- b). Explain the application of the Ultra Violet portion of the electromagnetic spectrum in Remote Sensing. **3 Marks**
- c). The recent rains have caused devastating effects in various parts of the country. As a GIS expert, explain how the disaster management committee can go about using remote sensing data to assess the damage. **7 mark**

6.a) Differentiate between Across track scanning system and Along track Scanning system. **5 marks**

b) State 5 applications of Thermal Remote Sensing **5 marks**

c) Discuss the three approaches commonly employed in remote sensing for atmospheric correction **10 marks**