



MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)

University Examinations 2015/2016

SCHOOL OF AGRICULTURE AND NATURAL RESOURCES MANAGEMENT

.....SEMESTER EXAMINATION FOR DEGREE IN BACHELOR OF SCIENCE IN

.....

ENS 331: REMOTE SENSING FOR ENVIRONMENTAL MONITORING

Date:

Time:

INSTRUCTIONS:

Answer question one and two other questions

SECTION A: 30 MARKS (COMPULSORY)

QUESTION ONE:

- (a) A remote sensor equipped with a 120 mm focal length lens is used to take a vertical photo from a flying height of 2.78 km above mean sea level. Assuming that the terrain is flat and at an elevation of 380 m, determine the following;
- (i) The scale of the photo? (4 marks)
 - (ii) The area at ground level of a rectangular field measuring 7.45 cm long and 3.33 cm wide on the same photo. (4 marks)
 - (iii) The number of Kei apple seedlings that will be required to fence around the field if spaced at 2 m. (3 marks)
 - (iv) The plant population if maize was to be planted at 35cm by 60 cm. (3 marks)
 - (v) How many 50 kg bags of fertilizer will be required if the recommended rate is 20 kg per ha? (3 marks)

- (vi) How much will this cost if the price of the fertilizer is Kshs. 1800 per 50 kg bag? (3 marks)
- (b) Indicate whether the following statements are true or false:
- (i) Remote sensing data can not be recorded on board the satellite for transmission to a ground receiving station at a later time (1 mark)
 - (ii) The wavelength zones of EMS normally used in remote sensing vary from visible to audio. (1 mark)
 - (iii) Geo-referencing is done during classification stage of digital image processing (1 mark)
 - (iv) Revisit period of a satellite is the same as a complete satellite cycle. (1 mark)
 - (v) Satellites appear to be shifting towards East-ward direction (1 mark)
 - (vi) Images taken by passive microwave sensors are characterized by low spatial resolution (1 mark)
 - (vii) The path followed by a satellite is referred to as orbit (1 mark)
 - (viii) The visible wavelengths cover a range from approximately 0.4 to 0.7 μm . (1 mark)
 - (ix) Without tonal differences, the shapes, patterns, and textures of objects cannot be discerned. (1 mark)
 - (x) The success of many applications of remote sensing is improved by taking a multiple-view approach of data collection. (1 mark)

SECTION B: 40 MARKS

QUESTION TWO:

Discuss the mechanism of radiation absorption in the atmosphere (20 marks)

QUESTION THREE:

Explain the following facts;

- (a) Healthy plants appear greenish to our eyes (4 marks)
- (b) Sky appears yellowish at sunset (4 marks)
- (c) Fog appear whitish to our eyes (4 marks)
- (d) Ultra-violet and far infra-red radiation are not recorded by the commonly used sensors (4 marks)
- (e) Areas in Greece are imaged more frequently than in Kenya (4 marks)

QUESTION FOUR:

Discuss the process of remote sensing (20 marks)

QUESTION FIVE:

- (a) Describe the mechanisms in which remote sensing data are transmitted to the earth surface (6 marks)
- (b) Explain the mechanism which allows complete coverage of earth surface by a satellite (4 marks)
- (c) State the advantages and disadvantages of satellite imagery over the convectional photographs. (6 marks)
- (d) List the most useful regions of the electromagnetic spectrum in remote sensing (4 marks)