



MACHAKOS UNIVERSITY

University Examinations for 2018/2019 Academic Year

SCHOOL OF AGRICULTURAL SCIENCES

DEPARTMENT OF AGRICULTURAL EDUCATION AND EXTENSION

..... YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE IN AGRICULTURAL EDUCATION AND EXTENSION

AGN 352: SOIL AND WATER CONSERVATION

DATE:

TIME:

INSTRUCTIONS:

Answer question ONE and any other TWO questions

QUESTION ONE (30 Marks)

- a) Differentiate between (1 mark)
- i. land and soil degradations (1 mark)
 - i) Accuracy and precision (1 mark)
 - ii) Back site and fore site (1 mark)
 - ii. Explain briefly what you understand by the term error with respect to survey (1 mark)
 - iii. What are the advantages of plane tabling (3 marks)
 - iv. Explain the factors that affect amount and distribution of precipitation (5 marks)
 - v. Explain three methods of precipitation measurement (3 marks)
 - vi. Calculate the annual water loss a 5km^2 reservoir when $U=10.3\text{km/h}$ and e_s and e_a are 14.2 and 11mm of mercury respectively (6 marks)
 - vii. Explain the factors affecting water erosion (3 marks)
 - viii. Explain how the following factors affect erosion
 - i) Erosivity (1 mark)
 - ii) Erodibility (1 mark)

- b) Define the following terms
- i. Land degradation (1 mark)
 - ii. Bench Mark (1 mark)
 - iii. Hydrology (1 mark)

QUESTION TWO (20 MARKS)

- a) What is land conservation? (2 marks)
- b) State using a schematic diagram, the processes of soil erosion (6 marks)
- c) Differentiate between mechanical and chemical soil erosion (6 marks)
- d) State two main Effects/Consequences of Soil Erosion Soil (4 marks)
- e) State and explain methods of making linear measurements (3 marks)

QUESTION THREE (20 MARKS)

- a) Explain the basic rules of levelling (5 marks)
- b) Explain simple steps of setting up a tripod (5 marks)
- c) During a profile leveling, readings were taken from points A to F. The reading at point A was 1.317 taken on a TBM (20.794), point B was 3.018 taken underside of bridge, point C was a change point with readings 2.894, and 1.427, point D was 2.905 taken underside of bridge, point E was 3.602 taken underside of bridge, and F was 1.498 taken on a TBM (19.144). Book the above readings in a leveling field notebook using RISE and FALL method (10 marks)

QUESTION FOUR (20 MARKS)

- a) List and describe at least six (6) major processes in the hydrologic cycle (6 marks)
- b) Briefly explain how evaporation can be measured from a weather station (5 marks)
- c) Determine the soil loss from a field with the following characteristics: (3 marks)

Rainfall erosivity = 2564

Erodibility = 0.015

Slope length = 2.6

Steepness = 1.2

Management = 0.55

Conservation = 0.4

- d) There are four rain gauge stations existing in a river catchment. The average annual rainfall values at these stations are 800, 620, 400 and 540mm respectively. (2 marks)
- e) Determine the optimum number of rain gauges for the catchment if it is desired to limit the error in the mean value of rainfall to 10%. (2 marks)
- f) How many more gauges will be required to be installed? (2 marks)

QUESTION FIVE (20 MARKS)

- a) Explain five types of land surveying (10 marks)
- b) Explain the Purpose and scope of terraces: (10 marks)