



MACHAKOS UNIVERSITY

University Examinations for 2021/2022 Academic Year

SCHOOL OF AGRICULTURAL SCIENCES

DEPARTMENT OF AGRICULTURAL EDUCATION AND EXTENSION

THIRD YEAR SECOND SEMESTER EXAMINATION FOR

DIPLOMA IN AGRICULTURAL EDUCATION AND EXTENSION

AGN 0302: SOIL AND WATER CONSERVATION

DATE: 14/12/2021

TIME: 2.00-4.00 PM

INSTRUCTION TO CANDIDATES:

1. Attempt Question ONE and any other TWO questions.
2. Use neat sketches where appropriate

SECTION A: Answer question one (COMPULSORY)

QUESTION ONE (30 MARKS)

- a) Define the following terms
 - i. Soil erosion (2 marks)
 - ii. Plane survey (2 marks)
 - iii. Geodetic survey (2 marks)
- b) Explain four importance of soil and water management and conservation programmes (4 marks)
- c) Explain four applications of the Universal Soil Loss Equation (USLE). (4 marks)
- d) Discuss three main challenges facing farmers in their effort to practice soil erosion measures in Kenya (6 marks)
- e) Discuss the various processes of runoff generation in a watershed (4 marks)
- f) Discuss six management measures that you would practice in order to prevent wind erosion (6 marks)

SECTION B: Answer any TWO questions (40 Marks)

QUESTION TWO (20 MARKS)

- a) List three causes of land degradation (6 marks)
- b) Explain the importance of the main parameters that are used in the USLE when preparing watershed management plans. (6 marks)
- c) Describe three distinct stages of soil erosion: (3 marks)
- d) Discuss five factors that affects soil erosion in a watershed. (5 marks)

QUESTION THREE (20 MARKS)

- a) Explain how the following factors influence how much soil can be eroded
 - i. Drop size distribution (2 marks)
 - ii. Direction of slope (2 marks)
- b) Explain five principles of soil conservation (5 marks)
- c) With an aid of a well labeled diagrams, describe the four stages of gully development in catchments. (4 marks)
- d) Discuss three off-site problems of soil erosion in a catchment (3 marks)
- e) Citing relevant examples in each case, discuss the four main sustainable land management practices that are mostly used for soil and water conservation in Kenya's farming systems. (4 marks)

QUESTION FOUR (20 MARKS)

- a) Briefly discuss the importance of vegetation in soil and water conservation (4 marks)
- b) Explain the three major principles on conservation agriculture that are practiced in Kenya (3 marks)
- c) Briefly explain how soil erosion rate can be determined in the field using erosion pins (5 marks)
- d) Discuss the main types of water erosion (8 marks)

QUESTION FIVE (20 MARKS)

- a) Describe in-situ rain water harvesting (2 marks)
- b) Differentiate between the following soil management practices in terms of applicability
 - i) Stubble mulch tillage and deep tillage (4 marks)
 - ii) Farmyard manure and green manure (4 marks)
- c) Discuss how in-situ rainwater harvesting can be achieved in crop fields (6 marks)
- d) In the management of soil erosion, explain why one needs to approach it from both crop management and soil management. (4 marks)