



MACHAKOS UNIVERSITY

University examination for 2024/2025 academic year

SCHOOL OF AGRICULTURE, ENVIRONMENT & HEALTH SCIENCES

DEPARTMENT OF AGRICULTURAL SCIENCES

THIRD YEAR FIRST SEMESTER EXAMINATION FOR

**BACHELOR OF AGRICULTURAL EDUCATION AND EXTENSION / BACHELOR
OF ENVIRONMENTAL SCIENCE**

AGN352: SOIL AND WATER MANAGEMENT

DATE:21/1/2025

TIME:2:00-4:00 P.M

INSTRUCTION: Answer question ONE and any other two.

QUESTION ONE (30 MARKS)

- a) Define the following:
 - i. Land survey (2 marks)
 - ii. Irrigation (2 marks)
 - iii. Drainage (2 marks)
- b) Explain the importance of survey in land development and environmental management. (3 marks)
- c) Explain five factors that influence soil erosion by water. (5 marks)
- d) Explain how to achieve accuracy and precision of area measurements during survey (3 marks)
- e) Elaborate two factors you will consider in selecting the kind of draining system to install in a given land. (4 marks)
- f) Explain two factors taken into consideration when designing cut-off drains. (2 marks)
- g) Explain the principles of distance measurement in surveying. (2 marks)

- h) Explain three ways of managing hardsetting soils (3 marks)
- i) Discuss two implications of salinity on soil fertility and plant nutrition. (2 marks)

QUESTION TWO (20 MARKS)

- a) Estimate soil loss from a watershed having topographic factor equal to 1.5 and average value of soil erodibility factor equal to 0.6. The soil conservation practice factor is equal to 0.8. Rainfall erosivity factor is 65 and crop management factors of 0.25 respectively. (10 marks)
- b) Explain levelling in relation to the determination of relative heights of different points on a surface. (10 marks)

QUESTION THREE (20 MARKS)

- a) Discuss any three types of irrigation delivery systems. (12 marks)
- b) With relevant examples, explain four factors that influence the frequency of irrigation (8 marks)

QUESTION FOUR (20 MARKS)

- a) Explain why mulching is not widely adopted by many farmers in Kenya. (10 marks)
- b) Describe gully development processes (10 marks)

QUESTION FIVE (20 MARKS)

- a) Discuss two on-site and three off-site effects of soil erosion by water. (10 marks)
- b) Describe briefly any four methods used for conserving water in dryland farming systems (10 marks)