

LAIKIPIA



UNIVERSITY

UNIVERSITY EXAMINATIONS

2ND SEMESTER 2023/2024 ACADEMIC YEAR

FOURTH YEAR EXAMINATIONS FOR BACHELOR OF SCIENCE IN AGRICULTURAL EXTENSION AND EDUCATION

AGED 422: SOIL AND WATER MANAGEMENT

STREAM: R

TIME: 2 HRS

DAY: MONDAY (8.30-10.30AM)

DATE: 15/4/24

THIS QUESTION PAPER CONSISTS OF THREE (3 PAGES)

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

QUESTION ONE (30 MARKS)

- a) Define a hydrograph [1 mark]
- b) Define the following terminologies as used in survey
- i. Datum [2 marks]
 - ii. Soil erosion [2 marks]
 - iii. Soil loss tolerance [2 marks]
 - iv. A contour [2 marks]
- c) Give the **two (2)** methods of booking in profile levelling [2 marks]
- d) State any **two (2)** visual indicators of soil erosion [2 marks]
- e) List **five (5)** types of survey based on technique used in the surveying [5 marks]
- f) During a profile leveling exercise for road construction at Laikipia University, the following readings were taken; 5.323 (at BM1), 4.929, 4.364, 4.662, 4.008, 4.542, 5.462, 3.206, 4.837, 5.673, 4.153 and 3.881. Given that the leveling instrument was changed after the fifth and ninth readings, enter the readings in a standard booking sheet using the Rise and fall method. If the elevation of the BM1 is 1031.541 m asl and the stations were spaced at equal intervals of 50 m and that the last reading was on a second BM2 (1034.070);
- i. Calculate the elevation at each station [7 marks]
 - ii. Carry out the arithmetic check [2 marks]
 - iii. Determine the error of closure [3 marks]

QUESTION TWO (20 MARKS)

- a) Define a gulley [2 marks]
- b) Outline **four (4)** activities of water that leads to soil erosion [4 marks]
- c) Differentiate between accuracy and precision in measurement [6 marks]
- d) Describe **four (4)** main stages of gulley development [8 marks]



QUESTION THREE (20 MARKS)

- a) Outline the procedure for carrying out differential levelling **[10 marks]**
- b) A field 81 m in length is marked into 9 equal intervals and the consecutive offsets are marked as follows; 8, 15, 18, 23, 25, 27, 24, 26, 24 and 16 m. this field is partitioned into 3 portions; 35 % and 45 % of the total land is used for growing of irrigated vegetable and fruit trees respectively, the rest is used for the construction of temporary storage of farm produce. With the aid of a sketch and the above information;
- i. Estimate the total area of the field using trapezoidal method **[4 marks]**
- ii. Determine the actual areas in hectares under vegetable, fruit trees and storage structure **[6 marks]**

QUESTION FOUR (20 MARKS)

- a) Discuss **five (5)** uses of terraces on an agricultural land **[10 marks]**
- b) Explain **five (5)** physiographic factors that affect direct runoff **[10 marks]**

QUESTION FIVE (20 MARKS)

- a) Define the following terms as used in soil and water management
- i. Benchmark **[2 marks]**
- ii. Back sight **[2 marks]**
- iii. Fore sight **[2 marks]**
- iv. Datum **[2 marks]**
- b) With the aid of a diagram explain the components/characteristics of a hydrograph **[12 marks]**

