



# UNIVERSITY OF EMBU

2021/2022 ACADEMIC YEAR

SUPPLEMENTARY/SPECIAL EXAMINATIONS

SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF  
SCIENCE IN MANAGEMENT OF AGROECOSYSTEMS AND ENVIROMENT,  
BACHELOR OF SCIENCE IN HORTICULTURE AND BACHELOR OF  
AGRICULTURAL EDUCATION AND EXTENSION

ASS 307: SOIL FERTILITY AND FERTILIZER USE

DATE: DECEMBER 15, 2021

TIME: 8:30AM-10:30AM

**INSTRUCTIONS:**

Answer Question ONE and ANY Other TWO Question

**QUESTION ONE (30 MARKS)**

- a) Explain is fertilizer use efficiency. (4 marks)
- b) Explain why the efficiency of P fertilizers in soils is usually low. (4 marks)
- c) Define the terms: (i) fertilizer grade, (ii) fertilizer ratio, and (ii) filler materials. (6 marks)
- d) Name three major pathways through which agroecosystems loose nutrients and discuss one of them. (6 marks)
- e) Discuss the two methods of nutrient acquisition by plant roots in the soil. (6 marks)
- f) Explain mobile and immobile ions in the soil. (4 marks)



ISO 27001:2013 Certified *Knowledge Transforms*



ISO 9001:2015 Certified

**QUESTION TWO (20 MARKS)**

- a) Discuss essential plant nutrients. (4 marks)
- b) Explain the deficiency symptoms of essential plant nutrients. (16 marks)

**QUESTION THREE (20 MARKS)**

- a) Explain different categories of fertilizers used in soil fertility management. (8 marks)
- b) Describe the manufacturing process of nitrogen fertilizers. (12 marks)

**QUESTION FOUR (20 MARKS)**

- a) Outline the ammonium and nitrate ion uptake by plants. (8 marks)
- b) Crop yield decline occurs after conversion of a forested land to an arable land. Explain what happens. (12 marks)

**QUESTION FIVE (20 MARKS)**

- a) Name the process in the N-cycle that are controlled by microorganisms. (8 marks)
- b) Describe the different mechanisms by which nutrients move through the soil to the plant roots. (12 marks)

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