

**BINDURA UNIVERSITY OF SCIENCE EDUCATION**  
**BACHELOR OF ENVIRONMENTAL SCIENCE DEGREE**

ES 407

**ES PART 4 EXAMINATION**  
**SOIL FERTILITY**

**2 HOURS**

JUN 2023

**INSTRUCTIONS**

Answer **three** questions out of the **five** questions. You must answer question **one** from SECTION A and any **two** from SECTION B

**SECTION A (COMPULSORY)**

1. (a) Discuss how the soils' physical properties affect plant growth. [10 Marks]
- (b) Discuss the role of root interception, mass flow and diffusion in nutrient uptake. [10 Marks]
- (c) What are the benefits of applying organic amendments to agricultural Lands? [10 Marks]

**SECTION B**

2. (a) With the aid of a diagram, describe the N cycle. [10 Marks]
- (b) Discuss the measures that can be used to increase N availability in cropped lands in the smallholder farming areas of Zimbabwe. [10 Marks]
3. (a) Phosphorous is one of the most deficient nutrients in agricultural lands. Discuss the sources and deficiency symptoms of P. [10 Marks]
- (b) How can the problems of P deficiency in the smallholder farming areas be addressed? [10 Marks]
4. (a) Describe the functions of the following nutrients in plant growth;  
(i) Manganese (ii) Boron (iii) Zinc (iv) Sulphur. [10 Marks]
- (b) Describe the deficiency symptoms of each of the nutrients described in 4a. [10 Marks]
- 5 (a) How does agriculture contribute to greenhouse gas emissions? [10 Marks]
- (b) Suggest ways of reducing GHG emissions from agricultural land. [10 Marks]

**END OF PAPER**