

**National University of Lesotho - Faculty of Agriculture  
Department of Soil Science & Resource Conservation**

**SSR 4502 - Fertilizer Technology**

**Final Examination Paper**

**JANUARY 2023**

**Total marks: 100**

**Time: 3 hours**

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**Instructions:**

**The paper consists of four (4) questions**

**All questions carry equal marks**

**Answer all questions**

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### Question 1 (25 marks)

- a) What is a response curve? **(2)**
- b) Which economic principles are applied to response curves to determine optimum fertilizer rates? **(6)**
- c) What is the difference between a fertilizer number and a ratio on blended/combined fertilizers and give an example of each. **(4)**
- d) Write the fertilizer numbers of the following single fertilizers **(6)**
  - i)  $\text{NH}_4\text{NO}_3$  which contains 35% N
  - ii) Potassium Sulphate containing 42-44 K(55% $\text{K}_2\text{O}$ ) and 17% S
  - iii) Triple superphosphate high analysis P fertilizers containing 46% P.
- e) Fertilizer materials are salts, why are fertilizer salts a problem? **(5)**
- f) What is salt index of a fertilizer? **(2)**

### Question 2 (25 marks)

- a) Describe the N cycle – explaining at least 5 Nitrogen transformations **(10)**
- b) Mention any five (5) commercial N fertilizers **(5)**
- c) In the light of the N transformations, explain any five (5) ways in which nitrogen fertilizers impacts negatively in the environment? **(10)**

### Question 3 (25 marks)

- a) If 160 kg of  $\text{KNO}_3$  (14-0-46) were applied per ha, how many kg of N,  $\text{P}_2\text{O}_5$ , and  $\text{K}_2\text{O}$  are applied? **(10)**
- b) Soil laboratory gave a farmer recommendation of 30, 40, 10 kg NPK per ha, how many 50kg bags of 6:2:1 (31) will the farmer need to meet the nutrients requirements **(15)**

### Question 4 (25 marks)

- a) Mention and define any three fertilizer systems **(9)**
- b) Define the following fertilizer system terminologies **(10)**
  - i) Caking
  - ii) Dusting
  - iii) Coating
  - iv) Conditioners
  - v) Segregation
- c) For optimal results of fertilizer use it is not enough to choose the appropriate material but the **methods of fertilizer application** are also equally important. Describe any three (3) methods of fertilizer application **(6)**