



**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND  
TECHNOLOGY**

**SCHOOL OF AGRICULTURAL AND FOOD SCIENCES**

**THIRD YEAR SECOND SEMESTER UNIVERSITY EXAMINATION FOR  
THE DEGREE OF BACHELOR OF SCIENCE IN SOIL SCIENCE**

**2017/2018 ACADEMIC YEAR**

**REGULAR**

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**COURSE CODE: ALS 3325**

**COURSE TITLE: SOIL CONTAMINATION AND REMEDIATION**

**EXAM VENUE:**

**STREAM: BSc. (Soil Science)**

**DATE:**

**EXAM SESSION:**

**TIME: 2 HOURS**

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**Instructions:**

- 1. Answer ALL questions in section A and ANY other 2 Questions in section B.**
- 2. Candidates are advised not to write on question paper.**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room.**

**SECTION A [30 MARKS]**

**Answer ALL questions from this Section.**

1. Define the following terms:
  - a. Soil (2 Marks)
  - b. Soil contamination (2 Marks)
  - c. Soil degradation (2 Marks)
  - d. Soil remediation (2 Marks)
2. Mention 4 ways in which heavy metals can be added to the soil. (4 Marks)
3. Describe the factors that determine the phytoavailability of heavy metals (4 Marks)
4. Explain the mechanism of phytoremediation (2Marks)
5. Briefly explain the following characteristics that a soil should possess in order to be suitable for Physical and chemical treatment.
  - Heterogeneity (3Marks)
  - Permeability (3Marks)
  - Clay content (3Marks)
  - Humus content (3Marks)

**SECTION B [40 MARKS]**

**Answer ANY TWO questions from this Section.**

6. Residents in Mbita town are complaining of increased fish prices and unstable fish markets. It has been realized that the number of fish species have declined in the lake and there is a lot of agricultural activities going on along the lake.
  - a. Apart from overfishing, what are the other possible causes for the decline in fish? Discuss. (16Marks)
  - b. In case the above situation is due to contamination, describe the pathway for the contaminants? (4 Marks)
7. Discuss in details In situ physical treatment of organically contaminated soil under the points. (20 Marks)
  - a. Soil vapour extraction in the Vadose zone
  - b. Air sparging
  - c. Soil flushing
8. Discuss Phytoremediation under the following: (20 Marks)
  - a. Phytoextraction.
  - b. Phytodegradation.
  - c. Rhizofiltration.
  - d. Phytostabilization.
  - e. Phytovolatilization