Summer Examinations 2016

ENV200116N

Module Title: Contaminated Land
Level: Five
Time Allowed: Two hours

Instructions to students:
- Enter your student number **not** your name on all answer books.
- Answer **all** questions from Section A and **two** questions from Section B.
- **Section A** carries 40% of the overall marks. **Section B** carries 60% of the overall marks.
- You do not need to use separate answer books for the questions in Section A, but begin a separate answer book for each of the answers to questions from Section B. Label each answer book with the number of the question you are answering.
- Neither books nor notes may be taken into the examination.
- The use of electronic calculators of an approved type is permitted.
- Erasmus/overseas students are permitted to take a bilingual dictionary into the examination room but will **not** be permitted any extra time.
- Students are permitted to remove this examination paper at the end of the examination.

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Section A

Answer all questions.

1. Explain what is meant by the term “Soil Guideline Values”? Indicate how they are used in the assessment of contaminated land. (5 marks)

2. Chemical treatment technologies utilised a range of chemical reactions in the treatment of contaminated land. Define the following:
   a. Oxidation
   b. Reduction
   c. Hydrolysis (6 marks)

3. According to Part IIA of the EPA 1990, what is the definition of contaminated land? (2 marks)

4. What is Soil Vapour Extraction? (3 marks)

5. What are the two fundamental mechanisms of stabilisation? (2 marks)

6. The biodegradation of contaminants normally occurs via three routes, one of which is the use of the contaminant as a primary substrate. Name the other TWO routes. (2 marks)

7. Advection and biodegradation are just two of the important processes which affect solute fate and transport during the process of natural attenuation. Describe three more process which could affect such contaminants. (6 marks)
8. Identify and outline the **three** phases used in constructing a conceptual model.  
   (6 marks)

9. Discuss briefly how *In situ* vitrification is used in the treatment of contaminated land.  
   (8 marks)

Total: 40 marks
Section B

Answer two out of four questions.

10. Discuss and describe the following stages carried out during a site investigation:

   a. Desk study/ Walkover
   b. Site investigation

   Total: (30 marks)

11. Discuss the role of biospraging and bioventing in the remediation of contaminated land. Your answer should include:

   a. A labelled diagram
   b. Technology highlights and limitations
   c. Applicable contaminants

   (30 marks)

12. *In situ* thermal treatments use elevated temperatures to remove/destroy toxic substances from contaminated soil. Identify and evaluate these treatments and their effectiveness as a remediation solution.

   (30 marks)

13. Using the Olympic Park, London, as an example fully appraise the use of soil washing in the remediation of contaminated soils.

   (30 marks)