

Cork Institute of Technology

Higher Certificate in Science in Applied Biology – Award

(National Certificate in Science in Applied Biology-Award)

(NFQ – Level 6)

Autumn 2005

Environmental Science

(Time: 3 Hours)

Instructions
Answer FIVE questions.
All questions carry equal marks.

Examiners: Ms. B. Murphy
Dr. I. Casey
Dr. A. Petersen
Prof. R. Fitzgerald

Q1. Write notes or illustrate or define **EIGHT** only of the following:-

- (i) hierarchical approach to waste management
- (ii) epilimnion of a lake
- (iii) population equivalent of animal/industrial wastes
- (iv) on-plot disposal of wastes
- (v) sewage fungus (sphaerotilus)
- (vi) detection methods for water-borne pathogens
- (vii) beneficial applications of industrial waste heat
- (viii) Chernobyl nuclear accident of 1986
- (ix) effects of ionising radiations on aquatic organisms
- (x) temporary hardness of water

Q2. (a) Describe the guidelines for assessing the trophic status of a waterbody.

(4 marks)

(b) Discuss the (a) effects and (b) problems of eutrophication on aquatic ecosystems.

(10 marks)

(c) Outline the associations between water quality and phosphorus in Irish surface waters indicating the main source of phosphorus pollution in Ireland.

(6 marks)

Q3. (a) Define the terms 'hazardous' and 'toxic agents' and give an example of each.

(6 marks)

(b) Write summary accounts of the characteristics and effects of

(a) neurotoxins

(b) carcinogens

(10 marks)

(c) Provide arguments for and against animal testing in evaluating the toxicity of substances.

(4 marks)

Q4. (a) Describe the characteristics of a typical freshwater river **or** stream and briefly outline the features of “headstream” and “downstream” zones. (6 marks)

(b) Draw and fully discuss oxygen Sag Curves in relation to

(i) mild

(ii) serious

(iii) gross organic pollution

(10 marks)

(c) Describe the contribution of photosynthesis and turbulence to the reoxygenation of water.

(4 marks)

Q5 (a) Distinguish between derelict and neglected wasteland. (3 marks)

(b) Write a concise account of wasteland reclamation with reference to short term and long term uses. (10 marks)

(c) Outline the steps/stages of landfill operations and identify problems in building on landfill sites. (7 marks)

Q6. (a) Briefly describe the ‘historical’ approach to waste water disposal. (6 marks)

(b) List the major waste treatment processes and discuss any one in detail. (12 marks)

(c) List the features of a good quality effluent. (2 marks)

Q7. Briefly describe the advantages and disadvantages of physical and chemical assessments of water quality. (8 marks)

Write an informative account of biological indicators of river pollution. (12 marks)