Mastership in Chemical Analysis

Part B Examination

Paper 2

Burlington House

31 October 2007

1000 – 1300

RSC | Advancing the Chemical Sciences

Instructions

Answer **one** question from section 1 and **two** questions from each of sections 2 and 3.

The answers to each section must be returned in the examination script booklets provided. All examination scripts must be handed in at the end of the examination.

The marks allocated to each section are given.

Section 1: Food (answer one question from this section)

1. (a) The Contaminants in Food (England) Regulations 2006 (and the Equivalent Regulations for Scotland and Wales) revoke and re-enact with changes the 2005 Regulations, and make provision for the execution and enforcement of Commission Regulation (EC) No 466/2001, setting maximum levels for the contaminants in foodstuffs as corrected and amended.

Outline the main provisions of the 2006 Regulations, including in your answer the powers of authorised officers and the consequential amendment that they make to the Food Safety (Sampling and Qualifications) Regulations 1990.

(10 marks)

(b) Methods of sampling and analysis for mycotoxins are laid down in Commission Regulation (EC) No 401/2006. Discuss the rationale behind the sampling methods. Include in your answer what a mycotoxin is, those included in the Regulation, and the types of commodities that have limits specified.

(10 marks)

2. Discuss the development of standards for nutritional and health claims on food labels.

(20 marks)

Section 2: Agriculture (answer 2 questions from this section)

3. For **four** of the following feed constituents, discuss their function in animal nutrition. Include in your answers, where appropriate, references to deficiency, excess, toxicity and between-species differences.

(a) Salt
(b) Magnesium
(c) Vitamin D
(d) Copper
(e) Enzymes

(5 marks each part, total 20 marks)

4. Discuss the legislative and organisational changes arising from implementation of **Regulation (EC) No 882/2004 of the European Parliament and of the Council of 29 April 2004 on official controls performed to ensure the verification of compliance with feed and food law, animal health and animal welfare rules** in the field of agricultural sampling and analysis.

(20 marks)

5. Detailing the essential steps, describe the official methods of analysis prescribed in the Fertilisers (Sampling and Analysis) Regulations 1996 for **four** of the following in a fertiliser:

a) Water-soluble potassium in sulphate of potash

b) Determination of nitrate and ammoniacal nitrogen – Devarda method (no other forms of nitrogen present)

c) Biuret in urea

d) Phosphorus soluble in neutral ammonium citrate

e) Molybdenum in an extract (gravimetry)

(5 marks each part, total 20 marks)

Section 3: Water (Answer 2 questions from this section)

6. Describe how water abstracted from a lowland river should be processed in order to make it potable.

(20 marks)

7. Answer **four** of the following:

(a) Explain what is meant by an "indicator organism". Give examples of indicator organisms and explain the significance of each.

(b) Explain what is meant by the term "oxygen demand". Give examples of the differing oxygen demands and explain their significance.

(c) What is *Giardia*? Describe how it enters water, what effect it has on humans, and how it may be controlled in water.

(d) What is the maximum admissible concentration of lead in potable water? Explain how lead enters potable water. What effect does lead have on humans? How are its levels controlled in potable water?

(e) What is turbidity? How is it measured, what is the maximum admissible amount in potable water, and what potential significance does its presence in potable water have?

(5 marks each part, total 20 marks)

8. (a) Describe a programme of testing to establish the suitability of a private water supply to a small dairy producing cream, yogurt and cheese.

(**10 marks)**

(b) Describe in detail the method of analysis for determining trihalomethane compounds in a potable water, identifying all relevant quality controls in the method

(10 marks)