Mastership in Chemical Analysis

Part B Examination

Paper 2

Online

Thursday 14th October 2021

1000 - 1300
Instructions

Answer one question from section 1, two questions from section 2, one question from section 3, and one more question, chosen from any of the remaining questions in section 1 and section 2 (Five questions in all).

The answers to each question must be returned in the examination envelope provided. All examination scripts must be handed in at the end of the examination.

The marks allocated to each question are given.

Unless otherwise stated, references to Statutes in England include the equivalent alternatives for Scotland, Wales and Northern Ireland.

Unless otherwise stated, any reference to Statutes includes the EU regulations that they enforce.

Food law and policy (Section 1)

1. Unhealthy diets and increasing obesity have been implicated in poor health outcomes in recent years. Discuss the role of governments, food composition and labelling legislation, food technological advancements, food manufacturers and consumers in this issue and consider what changes could be made to improve health outcomes.

   20 marks

2. Food Allergens and food intolerances have in recent years become high profile as well as a public health issue.

   Discuss the regulatory framework and the assessment criteria that currently exist for informing consumers of the presence of allergens in food, and give your views on whether you think these are sufficient to provide consumers with the information that they need to make safe food choices.

   20 marks
3. a) Detail the requirements relating to the use and labelling of additives in animal feeds.  
   5 marks

b) Describe the official method of analysis for determining each of the following:
   i. Vitamins A & E in a dry compound feed
   ii. Sodium in a mineral lick
   iii. Selenium in a liquid complementary feed

   (3 x 5 marks)  
   15 marks

4. a) i. Explain what is meant by 'Undesirable Substances' with respect to animal feeding stuffs.  
    2 marks

   ii. Give four examples of undesirable substances and their potential origins.  
    8 marks

b) i. Describe how you would assess the safety of raw pet foods placed on the market.  
    5 marks

   ii. Discuss any particular risks in the sale and use of raw pet foods.  
    5 marks

5. a) What are the legislative definitions of the following feeding stuffs?
   i. Compound feed
   ii. Feed material
   iii. Complementary feed
   iv. Mineral feed

   (4 x 1 Marks)  
   4 marks

b) Describe the official method used to analyse a formal feeding stuff for each of the following:
   i. Protein
   ii. Crude fibre
   iii. Oil
   iv. Salmonella

   (4 x 4 marks)  
   16 marks
6. For each of the following essential nutrients in plants, give their main function, the form of uptake and an example of a sign of deficiency.

i. Phosphorus
ii. Potassium
iii. Manganese
iv. Nitrogen

(4 x 3 marks) 12 marks

b) Regulation (EC) No 2003/2003 implemented by the EC Fertilisers (England & Wales) Regulations 2006 applies to products placed on the market as fertilisers designated ‘EC fertiliser’.

Name one designated type for each of the following inorganic straight primary nutrient fertilisers:

i. Nitrogenous fertiliser
ii. Phosphatic fertiliser
iii. Potassic fertiliser

(3 x 1 marks) 3 marks

c) They also state the compulsory markings that a package/label/accompanying document must bear. What are the requirements for each of the following:

i. Micro-nutrients contained in the fertiliser 1 mark

ii. Micro-nutrients of which all or part are chemically linked with an organic molecule 2 mark

iii. Fertiliser containing only one micro-nutrient 1 mark

iv. Fluid fertiliser 1 mark
Water (Section 3)

7. 
   a) Taints in water are frequently the cause of consumer complaints. Give examples of how these can arise, outline how you would confirm their presence by analysis and describe how these taints could be eliminated. 

   10 marks

   b) What are the possible sources of each of the following in a potable water and what is their concern with human health.

   i. Nitrate
   ii. Arsenic
   iii. Trihalomethanes
   iv. Coliforms
   v. Lead

    (5 x 2 marks)

    10 marks

8. 
   a) Detail the regulatory framework in place to control the quality of public and private drinking water supplies in the UK.

    8 marks

   b) Describe how you would determine each of the following parameters in a sample taken from a public water supply:

   i. Pseudomonas aeruginosa
   ii. Escherichia coli (E. coli)
   iii. Lead
   iv. Nitrate

    (4 x 3 marks)

    12 marks

END OF PAPER