

Mastership in Chemical Analysis

Part B Examination

Paper 2

Online

Thursday 27th April 2023

1000 - 1400

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Instructions

You must answer **two** out of the four questions from section 1 and answer **both** questions from section 2. **Four** questions in total.

The answers to each question must be returned in the examination envelope provided at the end of the examination. Please also provide any question notes you have prepared which could demonstrate your thinking.

Please read through the questions carefully. You are advised to take approximately equal time on each question.

This is an open book examination, and you are allowed access to any resources you feel are appropriate. This includes the use of the internet; however, you are not allowed to communicate with any third parties during the examination.

Where appropriate, please reference the relevant resources used for each question.

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 (Section 1)

1.

(a) Outline the changes in Food Controls in the United Kingdom as a result of our departure from the European Union (EU) and also discuss with examples what impact this is likely to have on the safety standards of our imports in the future.

12.5 marks

(b) Detail the procedures that a food business operator producing fudge confectionery products would have in place to ensure the safety and quality of their products. The manufacturer currently has four different product lines which include Chocolate Coated Fudge, Coconut Fudge, Hazelnut Fudge and Whisky Fudge.

The products are distributed throughout the United Kingdom as well as exported to the United States of America and various EU countries.

12.5 marks

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2. It is the 10th year anniversary of 'Horsegate' food scandal which you might assume would have resulted in improved public confidence in the safety/quality/authenticity of the food being sold in the UK.

(a) Discuss, giving your opinion, as to whether you think the publicity from this has changed food safety/quality/authenticity for the better as well as discussing any current factors (2023) which may have an impact on food manufacturing. Illustrate your view with reasoning and examples.

15 marks

(b) Outline the food "recall" system in the United Kingdom and present a case as to whether it is fit for purpose in your opinion?

10 marks

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3. (a) A new Sushi/Sashimi Bar has just opened in your local authority area and a trainee Environmental Health Officer (EHO) who has responsibility for it has approached you for advice.

Using all the example menu below, detail the advice that you would give to the Food Business Operator to ensure they are serving safe products on a take-away basis.

CALIFORNIA ROLLS

(8 pcs) 2 fillings each roll
(Salmon avocado, tuna avocado, spicy tuna cucumber, crab avocado)

MAKI

(8 pcs) 1 filling each roll
(Cucumber, avocado, salmon, tuna, tamago, prawn, spicy tuna, crab)

NIGIRI

(pair) 2 pcs
(Tuna, salmon, sea bass, tamago, inari)

TEMPURA

prawns tempura
vegetable tempura,

TOFU

deep fried tofu with dashi sauce/chilli sauce, edamame, rice, gyoza, inari,
green herbs salad

10 marks in total

(Question 3 continues on the next page)

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(b) There has been a suspected food poisoning outbreak in your area and raw Venison products from a local supplier have been implicated.

Your laboratory has received three of their products for microbiological examination - Venison Sausages, Venison Burgers and Venison Steaks. They have all given similar results as follows:

Escherichia coli 0157 - Not Detected in 25g

Presumptive Shiga Toxin-Producing E.coli - Detected in 25g (using Polymerase Chain Reaction (PCR))

Discuss what your next steps would be in dealing with these samples and how you would advise the Local Authority food enforcement officer who is involved in the Incident Management Team.

5 marks

(c) A Food Business Operator (FBO) has submitted a smoked salmon sample for microbiological examination immediately post-production. The proposed shelf-life is 10 days. The results of examination are as follows:

Colony Count @30C	< 4.0 x 10 ³
Enterobacteriaceae	<10 cfu per g
Escherichia coli	<10 cfu per g
Listeria Species	Detected in 25g
Listeria monocytogenes	90 cfu per g

Discuss the advice you would give to the FBO.

5 marks

(Question 3 continues on the next page)

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(d) You have received a complaint regarding a spring water producer. The complainant alleges that the water is not from a spring water source. The labelling of the spring water bore the claim "sodium 12 mg/l" and the source of the spring was alleged to be in the New Forest, Hampshire. A sample of the bottled spring water and a sample of water taken at source were analysed and gave the following results:

Determinand	Raw Water	Bottled Water
pH	5.0	7.4
Chloride mg/l	19	19
Sulphate mg/l	36.7	35.7
Nitrate as NO ₃ mg/l	<1	<1
Calcium mg/l	8.7	8.6
Iron µg/l	1370	65
Magnesium mg/l	2.2	2.2
Manganese µg/l	54.1	32
Potassium mg/l	1.1	1.1
Sodium mg/l	11.6	52.6

By assessing these analytical findings, discuss what possible conclusions can be made about the alleged bottled spring water in your opinion.

5 marks

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4. (a) Discuss with examples the challenges that you think “Fashionable foods” (which can also be often portrayed as being healthy/healthier) can present to law enforcement.

15 marks

(b) A sample from a private water supply from a holiday cottage that is rented in the summer months has been tested and gave the following results of analysis:

Total Coliforms	2 per 100ml
Escherichia coli (MPN)	< 1 per 100ml
Enterococci	1 per 100ml
pH	6.2
Iron	232 ug/l
Copper	30mg/l
Manganese	45 ug/l
Lead	12ug/l
Nitrite	55mg/l
Nitrate	0.6mg/l

Discuss the above results and detail the advice with rationale that you might give to the cottage owner.

10 marks

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Agriculture (Section 2)

5. (a) Describe how you would advise a raw pet food manufacturer on how to assess the safety of their products prior to them being placed on the market and also discuss any particular risks in the sale and use of raw pet foods.

6 marks

(b) Discuss the significance of the following results of analysis of a dog food labelled as 'Beef Tripe':

Salmonella Spp	not detected in 25g
Enterobacteriaceae Spp	5100 cfu per g
Listeria Species	Detected
Listeria innocua	Present in 25g

3 marks

(c)

(i) What advice would you give to a sampling officer in relation to sampling a batch of compound feed produced by a local farmer by mixing 60 kg of copper sulphate into 2 tons of feed for copper analysis?

4 marks

(ii) Discuss your approach to the analysis of the copper content of the feed and explain how you would assess the significance of the result.

6 marks

(d) Discuss the effect of the following feed constituents on animal species:

- (i)** Vitamin C
- (ii)** Selenium

6 marks

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6. (a) An inspector at a fertiliser handling facility has contacted you asking for advice regarding 20 tonnes of loose solid fertiliser. The fertiliser is lying in a storage shed in a single heap.

The material was accompanied with the following statutory statement:

Compound Fertiliser 5:5:10 with iron
Nitrogen (N): 5%
Phosphorus Pentoxide (P₂O₅): 5% (2.2% P)
 of which: soluble in water 0% (0% P)
Potassium Oxide (K₂O) 10% (8.3% K)
 of which: soluble in water 9.5% (6.9% K)
Iron (Fe) 0.6%

- (i) Detail how the fertiliser should be sampled and suitably transferred to the laboratory.

3 marks

- (ii) Detail how the sample should be suitably prepared for analysis in the laboratory.

2 marks

- (iii) Assess whether the correct declarations have been made on the statutory statement, summarise the methods of analysis that you would direct to be used to check the values on the statutory statement and explain how you would assess whether the declarations were correct and compliant with the relevant regulations.

8 marks

(b) An inexperienced Trading Standards Officer (TSO) has been passed the following dog food label design from a local business who is intending to launch the product in the near future. Assess the label and comment on legislative compliance with full reasoning and rationale behind your decisions and opinions, so that the TSO can feedback to the business.

12 marks

(Question 6 continues on the next page)

Bedtime Biscuits

CALMING, DELICIOUS AND NUTRITIOUS BEDTIME BISCUITS FOR ANXIOUS DOGS

We have designed our food range from a recipe crafted by Michel Roux focusing on improving behaviour and strengthening the special relationship between owners and dogs.

Made using only the highest quality natural ingredients.

Added pro-biotic to aid in the establishment, maintenance and restoration of a balanced gut flora in dogs.

Helps your dog to wind down and relax.

Use before a car journey trip to the vet & other potentially stressful situations.

Composition

Sweet Potato, Potato, Peas, Seaweed, Pumpkin Seeds, Dried Egg, Lucerne, Flaxseed, Brewers Yeast, Duck Gravy, Duck Fat, Spinach, Lecithin (0.1%), Camomile (0.1%), Green Tea Extract, Cranberries, Parsley, Garlic Extract, Ginger, Mixed Tocopherols, Vitamins

Nutritional Additives per kg

Vitamins: Vitamin B1 (Thiamine) 40mg

Technological Additives; Pro-biotic: Contains E1705 Enterococcus faeciun cemelle 68 (SF68: NCIMB 10415) 1,000,000,000 cfu as an aid in the establishment, maintenance and restoration of a balanced gut flora in dogs.

Analytical Constituents – Unit Value

Crude Protein% 12	Metabolisable Energy Kcal/100g 318
Crude Oil and Fats % 6	Omega 6 % 0.98
Crude Fibre % 4	Omega 3 % 0.47
Crude Ash % 5.5	Calcium % 0.30
Moisture % 8	Phosphorus % 0.17

Complimentary Pet Food

Keep dry and cool

Dog Specialists Ltd, Unit 2, Kavannagh Farm, PT34 6TT

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