



Mastership in Chemical Analysis

Part B Examination

Paper 1

Burlington House

Wednesday 24th April 2024

1200 – 1600

Plus 10 minutes reading time

Instructions

Answer **four** questions out of the six questions.

The answers to each question must be returned 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 a partially open book examination. You will be allowed access to legislation only. You will not be allowed to communicate with third parties during the examination or freely search online for information. You can use any resources on the following two websites only, for the UK ([Legislation.gov.uk](http://legislation.gov.uk)) and EU (<https://eur-lex.europa.eu/homepage.html?locale=en>) legislation. You will be required at the end of the examination to show your internet history covering the duration of 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. Where appropriate specify which Statutes you are using.

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

Food Analysis/Composition/Labelling

Question 1

- (a) 200 barrels of “reservoir fluid” have leaked from a pipeline into an area where there were shellfish beds being reared for human consumption. Due to the nature of this leak and the potential impact on the environment, the local authority as well as the Scottish Environment Protection Agency (SEPA) and Food Standards Scotland (FSS) are also involved. Your laboratory has been asked to test 20 samples of cockles and mussels for polycyclic aromatic hydrocarbon (PAHs) Benzo[a]anthracene, Benzo[b]fluoranthene, Chrysene and Benzo[a]pyrene.

Detail your analytical approach and interpretation of your results to determine compliance.

(15 marks)

- (b) A trading standards officer has concerns over the quality and processes that a small local dairy is applying to bottled drinking milk. They have approached you as their public analyst to have the bottled milk tested. Discuss the parameters that you would assess to confirm the standards of the milk are satisfactory and meet the required regulatory requirements.

(10 marks)

Question 2

(a) United Kingdom Accreditation Service (UKAS

Question 4

(a) For EACH of the following, outline the analytical methods that you would use to demonstrate the quality/authenticity of each of the following products including all rationale and subsequent criteria behind your choices.

- (i) Tea (Black)
- (ii) Tomato Puree
- (iii) Mayonnaise
- (iv) Flax Seed Oil
- (v) Fresh raw chicken skewers

(3 marks each = 15 marks)

(b) Explain EACH of the following and how they are applied in food analyses.

- (i) Veith's Ratio
- (ii) Stubbs and More
- (iii) Extraneous water
- (iv) Spirit Obscuration
- (v) Water activity

(2 marks each = 10 marks)

Question 5

An inexperienced Trading Standards Officer (TSO) has been passed the following label designs from local businesses relating to products to be launched in the near future. For EACH of the four labels below, discuss any concerns that you may have with legislative compliance giving full reasoning and rationale to back up your opinions.

[Note: A full label assessment is NOT required]

(Question 5 continues on the next page)

(a)



(4 marks)

(Question 5 continues on the next page)

(b)

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Typical values per 100g

	per 100g
Energy	3700kJ, 880kcal
Total Fat	100g
of which monounsaturates	8.9g
of which polyunsaturates	0.9g
of which sugars	0g
of which polyunsaturates	0g
Omega-3	0.4g
Omega-6	0.4g

daily delivers 2g of Omega-3
daily recommended intake for men

It's divine & sustainable

(6 marks)

(Question 5 continues on the next page)

(c)

[With this product, the FBO is using a patented protease enzyme product Brewers Clarex® at the start of the barley fermentation process and a

(5 marks)

(Question 5 continues on the next page)

- (e) A formal cooked pie sample containing chunks of both steak & kidney sold loose from a family run butcher's shop in a small local authority has failed a meat content analysis when compared to the verbal quantitative ingredient declaration (QUID). Given various production factors can affect such a declaration, explain what advice you would give to an inexperienced qualified Trading Standards Officer on how to obtain a defensible follow-up formal sample for analysis and the rationale behind all your advice?

(6 marks)

Question 6

- (a) Your local Council is concerned about the nutritional value of meals served at its secondary schools and have asked you to design a practical protocol to be used to assess their nutritional value against relevant national standards.

Outline the protocol that you have recommended. Discuss the parameters and the different approaches to sampling and analysis that you have considered when designing the protocol, giving the reasoning behind your decisions.

(10 marks)

- (b) Fat is a mandatory declared nutrient on the nutrition panel on pre-packed foods.

Using examples of different types of foods, describe the most appropriate technique that should be used for that food type to obtain the most accurate result.

(15 marks)

END OF PAPER