

Royal Society of Chemistry
Mastership in Chemical Analysis (MChemA)
Assessors Report 2024

Alastair Low (Chief Assessor)

Jane Couper

Rachael New

John Dean

Introduction

This is the annual report of the Assessors for the Mastership in Chemical Analysis for the year 2024. These comments are intended for candidates and their counsellors only, to help them to understand the expectations of the examiners and to aid their preparations for the MChemA.

The MChemA Regulations, Syllabus and Guidance Notes can be found on the RSC website at <http://rsc.li/mchema>.

Part A

Three candidates took the Part A examination on the 17 April 2024.

Previously we had met on-line for a discussion on how to tackle examination questions, mark breakdown (and its importance), and a 'live' session on answering the previous examination paper.

All three students have passed (an average >50%). Questions 1, 3 and 5 were attempted by all 3 candidates, probably reflecting either their job roles or past degree subjects (or combination thereof). For one candidate, part questions were all over the examination paper, requiring a check to ensure that I had Tw T*b*b*t -3 (b*)-numthey appeared on questions attempted where as follows:

Question 1

Attempted by all three candidates. A statistics-based question, around a scenario of glyphosate in an agricultural bean crop, that had mainly numerical answers. Two candidates did particularly well (20/20 and 18/20) on the statistics data interpretation. Full marks for latter candidate were not awarded because of the uncertainty in the answer to the numerical part using the F-test. They had changed their mind on what the answer was, so while getting the number part correct, they then failed to change the wording on the written part.

Question 2

Part B

The two Part B exams were held in person at Burlington House, London on the 24th and 25th April 2024. The chief assessor was present as one of the invigilators on both days. This was the first year of the Part B in the changed format of a partially open

Question 2

All three candidates attempted this question.

The first part (a) was looking for an understanding of the general approach to investigating an unsatisfactory z-score within an accredited laboratory, such as trend analysis, repeating analysis by another trained analyst, comparison of the method used with others participating in the round, etc.

The second part (b) was looking for a candidate to discuss the possible causes or issues surrounding each of the three 'real' encountered scenarios with the stated PT z-scores, in regard to the following

- (i) How is the difficulty in obtaining an in-house reference overcome and is the titrant volume satisfactorily large enough, in which case, does the lab's method allow for an increase in weight of oil to be used, correct storage of the PT sample prior to analysis, etc was expected to be discussed.
- (ii) It was expected for a candidate to discuss whether the enzymes have worked properly (including in-house controls), manual checking of the database being used for interpretation, contamination or mix-up as to whether routine samples were run alongside the PT samples in a batch, etc.
- (iii) It was expected for a candidate to discuss the salt form used for the calibration namely hydrate or anhydrous, possibility of co-elution with other peaks, how did the other participants perform who used HPLC, etc.

In the third part (c), it was expected that a candidate would identify that a z-prime score replaces a z-score when the standard uncertainty (SU) of the assigned value is not

Question 3

Paper 2

Candidates were required to answer three questions from four in Section 1 (Food), and one question from two in Section 2 (Agriculture).

Section 1: Food

Question 1

Both candidates attempted this question.

The first part (a) dealt with the topical issue of 'rare' or 'pink' or 'lightly cooked' beef burgers (i.e. Less Than Thoroughly Cooked) served in catering establishments/restaurants. The question required a detailed discussion on the aspects that a food business operator must consider to ensure 'safe' food is served. This should have included discussion on HACCP, testing requirements and applicable legislation, etc. The topic is discussed on a government website (<https://www.legislation.gov.uk/>) and specific guidance was produced following issues/outbreaks relating to this type of food.

The second part (b) expected a discussion on the use of currently available DNA analysis techniques that could be applied to the microbiological safety of foods including appropriate examples with their advantages and limitations.

Both parts of this question were not attempted well by either of the candidates (although one was better relative to the other) and demonstrated a significant lack of microbiological knowledge in these pertinent areas. One candidate in part (a) persisted with discussing 'pre-packed' food rather than hot cooked food made to order.

Question 2

Both candidates attempted this question.

The first part (a) dealt with the 7 key principles of the internationally recognised food safety management system HACCP to ensure food is safe for consumers to eat. It was expected that each of the principles would be listed and explained including examples of how such a system would be implemented in workplaces.

The second part (b) dealt with the newsworthy topic of shelf life dates and their pivotal role to ensure both food safety and prevent safe food from going to waste. A discussion was expected on the different approaches available for a food business operator to take and it was expected that a candidate would not only discuss microbiology ('use by') but quality ('best before') considerations, including insightfulness with predictive modelling, challenge testing, 'transport packaging', food packaging atmospheres, etc.

Both candidates were undistinguished and lacked depth to the answers. One candidate performed better in part (b) than (a) whilst the other candidate performed the same for parts (a) and (b).

Question 3

Both candidates attempted this question.

The first part (a) dealt with the topic of the food fraud strategies after moving on from the infamous 'Horsegate' scandal. A discussion was expected, to include a candidate's own opinions on what developments there have been over the last ten years, the types of activity that have been identified as manifesting within food crime offences/fraud, what has/hasn't worked, other untried things that may be worthwhile considering, how effective the National Food Crime Unit (NFCU) is, etc.

The second part (b) dealt with the topical subject of UK food recalls surrounding allergens which appear to be constantly in the media. It was expected that a candidate would discuss likely causes, the two approaches (risk management and risk assessment), public expectations, whether precautionary allergen labelling (PAL) system is working (and in a consistent manner), impact of Brexit and imported goods, HACCP, mis-packings, supermarket own brands (sub-contracting factories) and their audit processes, whether consumer/patient organisations are being involved enough, etc.

A very good published article in the Journal of AOAC International by three respected authors prominent in this field in 2018 still very much applies today and for the foreseeable future.

Many possibilities exist in this question for a candidate to freely discuss and obtain marks but both candidates were undistinguished. Neither candidate stated what they regard the term 'food fraud' to even mean and they did not show great knowledge in either of these persistent topical areas and hence lacked depth to their answers.

Question 4

Neither of the candidates attempted this question dealing with water (for human consumption).

The first part (a) required a schematic diagram with explanation of the various steps in a surface/ground water treatment plant.

The second part (b) dealt with the testing of two parameters encountered in legislation.

The third part (c) dealt with two issues commonly known to be the cause of complaints and thus resulting in an investigation.

Portfolio of Evidence

The first-part portfolio of evidence was received on time from the candidate attempting Part B for the first time and feedback/advice was given via an (online) interview along with the provision of a brief written summary afterwards. A further candidate not re-sitting the Part B examination this year also submitted an update to their first part portfolio and again this has been reviewed by all three assessors with written collated feedback provided to that candidate.

Part C

No exam held in 2024.