

**Royal Society of Chemistry
Mastership in Chemical Analysis (MChemA)
Examiners' Report 2010**

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Introduction

This is the annual report of the Examiners for the Mastership in Chemical Analysis for the year ending 31 December 2010. These comments are intended for candidates and their counsellors, to help them 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 www.rsc.org/mchema.

WARNING

Previous Examiners Reports have been used to support the arguments of outsiders to the process in attempting to modify the nature of the qualification. Such action has caused consternation to the Examiners as it misrepresents the purpose and function of the report and the opinions of the Examiners.

Consequently, this Report may not be used out of the context given above by other individuals or organisations.

This is likely to result in the drawing of false or misleading conclusions.

Part A

No candidates presented themselves for Part A this year.

Part B (27-28 October 2010, Burlington House)

2 candidates sat Paper B1 and 3 candidates sat Paper B2.

Paper B1

Paper 1 addresses, in general, food science, technology, law, analysis and examination with the syllabus representing the core work on food of the public analyst.

NOT ALL CANDIDATES ANSWERED ALL QUESTIONS TO WHICH COMMENTS ARE APPENDED.

Question 1 asked about alcohol and its determination in different drinks and asked for a calculation of theoretical maximum alcoholic strength attainable in a brewing process.

Neither candidate attempted this question.

Question 2 asked for a discussion of the main provisions of the Plastic Materials in Contact with Food (England) Regulations 2009 and their devolved equivalents including the key provisions of European legislation referred to.

While the basics of the Regulations were understood, the responses were not developed beyond those basics.

Question 3 gave a selection of food additives and asked about their function. Examples of use were also sought.

The overall response to this question was disappointing and showed a insufficient familiarity with food additives.

Question 4 sought to test the candidates' knowledge of authentication of foods. While some realistic methods were given, some ideas appeared more hypothetical than practical.

Question 5 dealt with allergenic ingredients. The Examiners were disappointed with the scope of allergenic ingredients known to the candidates and were therefore unsurprised that knowledge of methods of analysis and problems with interpretation were also limited.

Question 6 was asked about statutory methods compared with method performance criteria and method performance characteristics.

The Examiners felt the question was highly specific to method performance criteria specified in European Regulations and that the answers received failed to address the specifics of the question, wandering into unrelated areas for which no credit could be given.

Question 7 simply asked the candidates to write an essay on the preservation of food.

One candidate gave a reasonably good and detailed answer, although some significant areas such as canning, modified atmosphere packaging, freezing, dehydration and ambient pouches were omitted.

Question 8 was a 'practical' question regarding the analysis of unlabelled, non-prepacked fish cakes and asked about the standard that would be applied for the fish content. Incidentally, the subject of the standard was discussed at APA Council earlier this year and recommendations appear in the minutes of the meeting on the APA website, it was therefore disappointing the aspects of this were not better appreciated.

Overall, with an occasional exception, the responses of the candidates to the questions were below the standard expected in the areas of the syllabus addressed. It is important candidates familiarise themselves with such basics as additives used in the food industry, be aware of options for food authentication and be able to recognise and determine allergenic ingredients in food. Knowledge of compositional standards and their origins is also essential.

It is stressed that the examination is a competency based qualification and that the examiners expect the question that has been asked to be answered.

No candidates passed Paper B1 this year.

Paper B2

This Paper includes questions on food policy and law, agriculture, and water. It has in the past been perceived as being more difficult, perhaps because, due to the way the paper is divided into three sections, there is less choice, and not all laboratories conduct agricultural and water analysis. To alleviate this situation, this is the first year a new system has been presented to the Candidates, with one question from the policy and law section, one from the water section and two from the agriculture section being mandatory but with the Candidate having the freedom of choice of the fifth question from all sections of the paper. It is hoped that by this change, while still ensuring the Candidate is subjected to examination in all areas, there is opportunity to particularly impress the Examiners by the breadth and depth of knowledge in one.

NOT ALL CANDIDATES ANSWERED ALL QUESTIONS TO WHICH COMMENTS ARE APPENDED.

Food Policy

Question 1 examined the candidates' knowledge of Food Additives legislation in a European context and was answered adequately.

Question 2 looked at the Official Feed and Food Controls (England) Regulations 2009 and their devolved equivalents providing for the execution and enforcement of Regulation (EC) 882/2004.

The nature and purpose of the measures put in place with respect to the procurement and analysis of official samples was poorly understood. Candidates are advised that, during their career, they are likely to operate in an environment where some degree of comprehension of the wider structure of legislation is desirable and time spent understanding that legislation is time well spent.

Agriculture

Question 3 addressed the main provisions of the the control of organic food production, supply and labelling within the United Kingdom. No candidate attempted the question.

Question 4 addressed undesirable substances and their control limits in feeding stuffs. While answers were adequate in respect of those chosen by candidates for wider discussion, it is not undesirable for a comprehensive listing of the substances to be readily available in the candidates' minds.

Question 5 required straightforward knowledge of official methods of analysis of feeding stuffs.

The quality of the answers was highly variable between candidates. Once again, it is vital that candidates have a ready familiarity of the requirements of these methods and the Examiners where appropriately pleased when that familiarity was clearly demonstrated.

Question 6 probed understanding crop nutrition and, when answered, showed a high degree of comprehension.

Water

Question 7 was a simple question regarding the main requirements of the Natural Mineral Waters, Spring Waters and Bottled Waters (England) 2009 and their devolved alternatives with a subsidiary question regarding microbiological criteria.

The Examiners, while not wholly disappointed with the responses, thought there was more that could have been given and would therefore have expected fuller and more detailed responses.

Question 8 asked about a selection of parameters and their significance. The answers received were of a reasonable standard.

Generally, and again with an occasional exceptional question, the Examiners were satisfied with the performance of the candidates. As in previous years, it is stressed that candidates should spend sufficient preparation time as is necessary to familiarise themselves with the contents of legislation, and in particular as it applies to statutory methods.

Three candidates passed Paper B2 this year.

Portfolios for Part C (May 2010)

One candidate was making a further attempt at Part C and had already submitted a portfolio so only updates were required.

One candidate was attempting Part C for the first time but had submitted a portfolio in 2009 and only updates were required.

One candidate was attempting Part C for the first time and submitted a full portfolio.

The Examiners would remind Candidates that the portfolio is intended to provide evidence of the level of capability and training of the Candidate. It is also an opportunity for the Candidate to showcase their work. The Examiners expect to see a high standard for the work, especially for the Certificates they have prepared. While the Examiners recognise style and opinion may differ, these Certificates should be free of errors that would prove fatal in Court. Several requests were made for amendments to be made to Certificates. Similarly, interpretation of food labelling law may be subjective. Some issues, however, are incontrovertible and it is disappointing for the Examiners to have to refer back to the Candidate.

Candidates are advised that the Examiners are impressed more by substance than by style.

Part C Practical Examination

Three candidates presented themselves for the examination, one resitting from the previous year and two presenting themselves for the first time.

The examination was held on Wednesday 1 September 2010 at the Food Biosciences building at Reading University.

The examination covers certificate writing, microscopy and investigative skills in interactive exercises. Candidates are expected to demonstrate competency in all areas of the examination. Good time management is required to maximise the marks

available and this includes making efficient information requests in the interactive exercises. Communication with the examiners is the responsibility of the candidate in these exercises, it being essential that the candidates make sound requests of the examiners for information and analysis. It is of great import in the process that the candidate reflect back to the examiners their thought processes, reasoning and deductions in a clear and concise manner as it is only by these means that the examiner are able to allocate and award marks.

The overall pass mark for the practical part of the Part C Examination is 50%.

However, the candidate must achieve the following minimum percentage marks in each section of the examination:

Communication in the form of formal certificates	50
Microscopy	40
Communication and problem solving	40

Communication in the Form of Formal Certificates

The writing of certificates under the conditions of the examination is always difficult for candidates. It is recognised by the examiners that there is no single correct way of constructing a good certificate, but also that there are many ways of constructing a poor one.

The examination packs include certificates as they are prescribed in the relevant legislation. Candidates need to be able to select the appropriate form of certificate and complete it in every detail. The improvement noted in previous years of candidates distinguishing between different wordings required for a certificate of analysis and one of examination continued with the detail of certificates being properly attended to.

Three certificates were required,

A mouldy cheese – a photograph was provided showing excessive mould growth and a label. Analytical / examination results raised issues regarding *Listeria monocytogenes*, use of unpasteurised milk in the production of the cheese, fat and moisture values and the protected status of Stilton cheese. No candidate dealt with all the issues presented and the Examiners were disappointed that occasion was found to object to high aerobic colony count, to be expected in cheese of this type.

A sample of animal feed with Vitamin A / E declarations in incorrect units and with overage and deficiency issues. The problem of deciding if these were to the prejudice of the purchaser was dealt with properly by most Candidates.

Coated wholemeal scampi – a label was provided together with weights, a description involving multiple tails and analytical data enabling a scampi content to be calculated.

Candidates should be aware that a high standard is required of Certificates in this Paper and as such need to be comprehensive, accurate and comprehensible to a lay reader.

Ultimately, the Certificate is the end product of the laboratory and is predominantly what sampling officers and industry are likely to see of the public analyst. A poor Certificate reflects not just upon the originator, but on the profession as a whole.

Microscopy

Three samples were presented for microscopical examination, mace blades, powder ginger contaminated with grit and a fruit yogurt, nominally with raspberry but in fact containing strawberry together with undeclared modified starch.

The examiners consider proper use of all the senses useful in the analysis of foodstuffs. The examiners regard health and safety to be of great importance, but consider that, at this post-graduate level, candidates should have developed an advanced awareness of health and safety issues in a laboratory environment and that they will almost certainly have or will acquire advanced responsibilities to themselves and others.

The examiners were not displeased with the standard of the drawings and descriptions presented by the candidates subsequent to the improvement noted previously. However, we would urge future candidates to pay heed to the quality of drawings, the use of scale and appending of clear labels and not allow standards to decline.

Correct identification of the mace blades was accompanied by satisfactory drawings of the salient microscopical features, as was the correct identification of the ginger. Candidates seemed reluctant to commit themselves to the identification of the presence of grit, despite the sample having been deliberately spiked to the level of approximately 20%, the reporting of its presence remaining somewhat tentative even when the residue must have been clearly evident following incineration over a Bunsen. A little more confidence in reporting correct observations would be welcome.

While the presence of the modified starch was universally missed, vanilla seeds that had been sprinkled on the surface were noted despite the presence of these being undeclared on the label. The Examiners were particularly pleased with the resolution of the strawberry / raspberry substitution issue, microscopical features being correctly identified to distinguish. Of particular interest was one candidate noted that two different sizes of seed were present. The observation was correct as the sample had been prepared with two different varieties of strawberry. This exercise was, of course, based upon a real incident.

Communication and Problem Solving

This part of the examination consists of two interactive exercises which are ongoing throughout the day. The exercises consist of scenarios that unfold during the day, the manner in which they unfold being dependent on the information and analysis requested by the candidate and on the personal observation and reasoning exhibited. "Fishing" requests will not generally be of great assistance to the candidates in these exercises, although well structured and reasoned requests will, even if they ultimately lead down a blind alley. Credit is given for eliminating lines of enquiry as well as pursuing a successful one.

The interactive exercises consisted of:

- a) an adverse smell and taste reported in a sample of biscuits, and
- b) a sample from a Port Health Authority of a White Drinking Chocolate imported from China accompanied by a general request for analysis of the sample. A sample was presented at the outset of the examination

Biscuits

Investigation of this sample was assisted by good interaction with the sampling officer. The sample could ultimately be found to contain Diclofuanid, a fungicide, originating from a yard adjacent to the vendor in which wood treatment agents were being applied to fencing. It is important during interactive exercises to identify not just the causative agent of this type of taint issue, but also to identify the means of ingress into the sample. Further, an assessment of the significance of the presence of the agent in terms of the risk to human health is required and an appropriate report generated if requested – a request for a report may not appear in the question, but it is emphasised one of the purposes of the interactive exercises is to assess communication and the form of the output to the original question is liable to morph depending upon that communication.

White Drinking Chocolate

An obvious route into this sample was to analyse for the presence of melamine, an illegal nitrogen builder substituted into milk powder. While melamine was found to be present, and in its own right constituted a serious failure of the sample, further investigation of the sample would have revealed further problems with the substitution of declared fats and sugars, the presence of aspartame and numerous labelling issues including non-permitted health claims. Again, an appropriate report was requested from the candidates and the Examiners hoped this would be comprehensive with respect to the sample.

Award of MChemA

Susanne Brookes and Rachael New successfully completed Part C and were awarded the Mastership in Chemical Analysis. Their certificates were presented by Dr Duncan Campbell, President of the Association of Public Analysts at the Association's Annual Conference in Leeds.

Acknowledgments

As always, the examiners would like to thank Dr Jane McLauchlin and her colleagues at the Royal Society of Chemistry for their support and competent administration of the examination process. Mr Chris Humphreys at the Food Biosciences Department in Reading as always helped to make the Part C Interactive run smoothly.

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Chief Examiner 2010