



External Assessment Report 2013

Subject(s)	Biotechnology
Level(s)	Intermediate 2

The statistics used in this report are pre-appeal.

This report provides information on the performance of candidates that it is hoped will be useful to teachers/lecturers in their preparation of candidates for future examinations. It is intended to be constructive and informative and to promote better understanding. It would be helpful to read this report in conjunction with the published question papers and marking instructions for the examination.

Comments on candidate performance

General comments

Overall, there was a high level of candidate performance this year. All questions in the paper functioned as expected. There was an increase in the number of centres from last year, with one new centre. As in previous years, it is evident that the staff delivering Intermediate 2 Biotechnology have a clear understanding about the course arrangements and the application of assessment standards.

Areas in which candidates performed well

Section A

Candidate performance was very much as expected in this area.

Section B

Candidate performance in this section was strong in a number of areas including:

Question 1(c):	replication of viruses
Question 2(b)(i):	factors involved in photosynthesis
Question 3(a)(i):	preparation of space and person for practical work
Question 3(a)(ii):	explanation of errors in preparation for practical work
Question 3(b):	setting up a microscope
Question 3(c):	requirement for staining for microscopy
Question 4(d):	labelling an agar plate

In PS/PA, candidates were strong in:

Question 2(a):	drawing a bar graph
Question 6(a)(ii):	commenting on improving the reliability of results
Question 6(b)(i)&(ii):	drawing a conclusion from experimental results
Question 6(d)(i):	making a prediction
Question 9(a)(i):	completing a pie chart
Question 9(a)(ii):	calculating a simple whole number ratio

Section C

Most candidates attempted one of the choices in questions 1 and 2. Candidates responded very well in questions 1A and 1B, with many scoring full marks. Questions 1A and 1B were chosen equally, and their average marks were very similar. Question 2 was less well done than question 1. Questions 2A and 2B were chosen equally, and their average marks were similar. There were fewer 'blanks' in question 2 than in previous years.

Areas which candidates found demanding

Section A

Candidates found the following areas of KU challenging in this section:

Question 9: limiting factors in photosynthesis

Question 10: asexual reproduction in *Mucor*

Question 14: silage production

In the PS/PA area candidates were challenged by questions in the following areas:

Question 25: identifying a control in an experiment in an unfamiliar context

Section B

Performance was weakest in KU areas that asked candidates to give an explanation or a reason as part of their response, but also on some recall areas.

Candidates found the following areas of KU challenging in this section:

Question 1(b)(ii): exchange of genetic material by bacteria

Question 1(b)(iii): exchange of genetic material by bacteria

Question 4(c): errors when pouring agar plates

Question 6(d)(ii): explaining the effect of temperature on fruit ripening

Question 7(a)(ii): importance of nitrogen in synthesis reactions

Question 8(a)(i): plant breeding techniques

Question 8(b): plant breeding techniques

Question 9(b): inhibition of the breakdown of organic wastes

In the PS/PA area candidates were challenged by questions in the following areas:

Question 6(a)(i): controlling variables in apple ripening experiment (unfamiliar context)

Question 7(c)(ii): interpreting data on antibiotic production

Question 7(c)(iii): calculation of a percentage increase

Section C

Most candidates performed well in questions 1 A/B.

In question 2A/B, candidates often failed to name, or did not know of, the micro-organism involved. As a result, only a few candidates were awarded full marks in this question.

Advice to centres for preparation of future candidates

- ◆ Centres should continue to stress to candidates the importance of learning, retaining, recalling and (especially) understanding the knowledge content of all Units.
- ◆ Centres should give candidates practice problems at a suitable level. These should involve calculating averages, ratios and percentage changes through experimental work, unfamiliar problem solving situations and homework.
- ◆ Centres should make sure that the practical work undertaken on culturing micro-organisms includes a variety of different transfer methods, utilises different types of micro-organisms, and emphasises that the reasons for the various stages should be understood.
- ◆ Centres should continue to give candidates practice in writing extended response answers, with an emphasis on section C question 2 in the context of Units 1 and 3. The bank of questions and marking instructions from past papers could be used in a formative way to help candidates improve the quality and relevance of their response.
- ◆ It is important that centres refer to the updated Intermediate 2 Biotechnology arrangements document (Fourth edition, June 2002) for clarification on depth of treatment to content, especially in areas of KU.

Statistical information: update on Courses

Intermediate 2

Number of resulted entries in 2012	87
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Number of resulted entries in 2013	88
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Statistical information: Performance of candidates

Distribution of Course awards including grade boundaries

Distribution of Course awards	%	Cum. %	Number of candidates	Lowest mark
Maximum Mark 100				
A	38.6%	38.6%	34	70
B	26.1%	64.8%	23	60
C	21.6%	86.4%	19	50
D	4.5%	90.9%	4	45
No award	9.1%	100.0%	8	-

General commentary on grade boundaries

- ◆ While SQA aims to set examinations and create marking instructions which will allow a competent candidate to score a minimum of 50% of the available marks (the notional C boundary) and a well prepared, very competent candidate to score at least 70% of the available marks (the notional A boundary), it is very challenging to get the standard on target every year, in every subject at every level.
- ◆ Each year, SQA therefore holds a grade boundary meeting for each subject at each level where it brings together all the information available (statistical and judgemental). The Principal Assessor and SQA Qualifications Manager meet with the relevant SQA Business Manager and Statistician to discuss the evidence and make decisions. The meetings are chaired by members of the management team at SQA.
- ◆ The grade boundaries can be adjusted downwards if there is evidence that the exam is more challenging than usual, allowing the pass rate to be unaffected by this circumstance.
- ◆ The grade boundaries can be adjusted upwards if there is evidence that the exam is less challenging than usual, allowing the pass rate to be unaffected by this circumstance.
- ◆ Where standards are comparable to previous years, similar grade boundaries are maintained.
- ◆ An exam paper at a particular level in a subject in one year tends to have a marginally different set of grade boundaries from exam papers in that subject at that level in other years. This is because the particular questions, and the mix of questions, are different. This is also the case for exams set in centres. If SQA has already altered a boundary in a particular year in, say, Higher Chemistry, this does not mean that centres should necessarily alter boundaries in their prelim exam in Higher Chemistry. The two are not that closely related, as they do not contain identical questions.
- ◆ SQA's main aim is to be fair to candidates across all subjects and all levels and maintain comparable standards across the years, even as arrangements evolve and change.