External Assessment Report 2009

Subject	Biotechnology
Level	Higher

The statistics used in this report are pre-appeal.

This report provides information on the performance of candidates which 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

Despite the addition of one new centre, candidate numbers were once again down on the previous year.

Candidates performed well, indicating that they are very well prepared in certain areas.

Section C was completed particularly well by many candidates

Areas in which candidates performed well

Questions involving calculations appeared to have been performed better than in past years.

The following questions were handled particularly well by the majority of candidates:

Question 1 (apart from 1 a ii) on yeast;
Question 3 on immunity;
Question 5 on bacterial growth;
Question 9 on batch culture.

Both parts of Question 2 of Section C were very well answered.

Areas which candidates found demanding

Question 1 a ii, the equation for aerobic respiration was poorly answered.

Poor responses were given for Question 7 b i, which asked the factors that should be considered when selecting a plate for inoculation. This is a standard question which was not expected to be demanding, however it is felt that use of the word “factors” acted as a trigger for answers such as pH, temperature etc. which were clearly not appropriate to the question being asked. Candidates therefore should be advised to read and consider the whole question rather than respond automatically to certain words.

Plasmids containing elements of the *lac* operon are a demanding concept and Questions 2b and 2c were designed to challenge the most able candidates.

Generic risk assessments (Question 4 c ii) have not been examined in previous papers. This question was therefore expected to be demanding and it performed as expected.

The data analysis on handwashing procedures was also a deliberately demanding question. Questions 6c (predicting the effect of the procedures) and Question 6f (drawing a conclusion) proved as demanding to candidates as such questions have done in previous years. The fact that answers to these questions cannot be taught but should be drawn by the candidates from the evidence presented seems to be the challenge.

That Question 8b on monoclonal antibodies and anti-cancer drugs proved demanding was unsurprising as this was a “suggest” question in which the candidate has to produce a theory based on evidence presented. Again, this always proves demanding for less able candidates.

Factors to be considered when scaling up to an industrial fermenter (Question 10 d) proved to be a demanding question, suggesting that candidates have an imperfect understanding of the issues involved.

The differences between and purposes of embryo and somatic cell cloning (Question 11 d and e) proved as demanding as expected for this difficult concept.

Question 12d, in which candidates had to apply a method to a given situation also proved to be challenging.

Advice to centres for preparation of future candidates

It is clear that candidates are well prepared in terms of knowledge, with questions demanding straightforward recall on basic concepts always being answered particularly well. As ever, it is questions where candidates are challenged to provide answers from given information that prove difficult. Again the advice must be that candidates should practice extensively examples of such questions found in the past papers.

Teachers must also be aware of teaching all concepts in the Arrangements document so that candidates are prepared for the introduction of areas that have previously not been examined. The subject is still relatively new and some ideas remain that have yet to be examined.

Statistical information: update on Courses

Number of resulted entries in 2008	35

Number of resulted entries in 2009	28

Statistical information: Performance of candidates

Distribution of Course awards including grade boundaries

Distribution of Course awards	%	Cum. %	Number of candidates	Lowest mark
Maximum Mark - 130				
A	28.6%	28.6%	8	91
B	25.0%	53.6%	7	78
C	14.3%	67.9%	4	65
D	7.1%	75.0%	2	58
No award	25.0%	100.0%	7	-

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.