



External Assessment Report 2010

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

Candidate numbers were once again down on the previous year.

Candidates performed well, with a good proportion of passes, though fewer 'A' grades were awarded than in previous years.

Section C was completed particularly well by many candidates.

Candidates showed good knowledge of basic bacteriology and microbiology techniques (Questions 1, 6 and 7, although calculations were not well done in Questions 6 and 7). It is worth noting that the lac operon (Question 7 (d)) is well understood by candidates.

Candidates showed good knowledge on codons and protein synthesis in Question 2 (b) and Question 2 (d).

Question 8 (a)(i) and (ii) on the laboratory model were well answered by candidates. Question 8 (b)(ii) on the design features of a room containing an industrial fermenter, (which has not been asked in previous question papers), has obviously been well taught as candidates performed well. Immobilisation of enzymes (Question 8 (d)) was also well done.

Question 9 was well done, apart from part (c). In part (d), where candidates were asked to compare data, this was especially well handled considering the complexity of the data.

Candidates showed good knowledge of all four subjects in Section C.

Areas which candidates found demanding

In general, candidates find the following areas to be demanding:

- ◆ Carrying out calculations (eg Question 2 (a)(i), Question 3 (c), Question 4 (b), Question 4 (d), Question 6 (a), Question 7 (b)(ii), and Question 7 (b)(iv))
- ◆ Giving detailed descriptions (eg Question 2 (b), Question 3 (e))
- ◆ Commenting on experimental procedure, for example in Question 3 (b), Question 9 (c), and especially in Question 10. In Question 10 (c), many candidates answered confidently, but discussed antibiotic resistance in terms of the bacterium, when in fact the plasmid containing resistance had been passed on to the plant.
- ◆ There were unexpectedly poor responses to Question 1 (b) (catalase test), Question 5 (b) (removal of protein from DNA) and Question 8 (b)(i) (lab fermenters — see note below).

Advice to centres for preparation of future candidates

As ever, candidates have good knowledge of facts but lack flexibility in application of that knowledge in experimental situations. Candidates should be encouraged to work through experimental problems and look for general principles to apply when the situation is unfamiliar. In particular, questions asking for a suitable control will inevitably elicit many answers involving distilled water whether this is appropriate or not.

For questions such as Question 10 (d)(ii) on the need for a control, generalised responses such as 'to make sure everything is fair' are not acceptable. The answer must always include some application in or reference to the experiment being described.

On the advantages of stainless steel for industrial fermenters, 'easy to clean' is too general a response. Instead, reference to the ability to steam sterilise makes for a stronger answer.

Statistical information: update on Courses

Number of resulted entries in 2009	28
Number of resulted entries in 2010	27

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	11.1%	11.1%	3	91
B	33.3%	44.4%	9	78
C	25.9%	70.4%	7	65
D	11.1%	81.5%	3	58
No award	18.5%	100.0%	5	—

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, therefore, SQA 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 Head of Service 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.