



External Assessment Report 2013

Subject(s)	Human Biology
Level(s)	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

Candidates continue to be well prepared for this exam. This year the standard of response was slightly better than in recent years.

Section A: Objective test

The average mark for this section was 20.4 out of 30. This is an improvement on previous years.

Section B: Restricted Responses

Candidate responses in this section were also generally better than last year. Candidates were good at answering 'C' type questions where they had to name biological terms or select information. Candidates were less comfortable answering 'A' type questions which involved applying their knowledge in unfamiliar contexts; however this is not surprising as these questions are designed to challenge candidates and allow them to demonstrate A grade knowledge and skills.

Section C: Extended Responses

Candidate performance in this section showed an encouraging improvement compared to last year; however this section still remains the most demanding for candidates in general. Option 1A on transport across cell membranes proved more popular (68%) than option 1B on meiosis (32%). Candidates choosing the membrane question scored on average 5.3 out of 10, while candidates choosing the meiosis question scored on average 6.9 out of 10. Option 2A on the liver was chosen by 38% of candidates with 62% choosing option 2B on the kidney. Both of these questions were less well done than those in option 1A with the mean score for the liver question being 3.6 out of 10, while for the kidney question it was 4.5 out of 10.

Areas in which candidates performed well

Candidates showed good knowledge of:

- Question 2(b): Glycolysis
- Question 2(d): When the body uses protein
- Question 3(b): Immunity
- Question 3(a)(ii): Genotypes
- Question 5(a), (b): The male reproductive system
- Question 6(a)(i): Colostrum
- Question 7(a),(b): Blood vessels and their contents
- Question 7(d): The lymphatic system
- Question 9(a)(iii): Surface area to volume ratio
- Question 9(b)(i): The hypothalamus
- Question 10(a): Impulse direction along a nerve
- Question 10(c): Mitochondria and vesicle function
- Question 10(d): Myelination
- Question 11(a): The corpus callosum
- Question 12(c)(i): Generalisation
- Question 12(d): Deindividuation
- Question 13(a)(i): Changing land use
- Question 13(c): Demography
- Question 14(g): The effects of nitrates on a loch

Candidates performed well in the following problem solving tasks:

- Question 1(a)(i); 6(b): Selecting information from graphs
- Question 4(a)(i): Labelling diagrams
- Question 11(b)(ii): Making predictions
- Question 14(a): Constructing a bar graph
- Question 14(b): Drawing conclusions
- Question 14(e): Evaluating procedures

Areas which candidates found demanding

Candidates found the following questions particularly demanding:

Section A: Question 13: Deciding whether the umbilical cord blood vessel was an artery or a vein. Most candidates thought blood vessel X was a vein, clearly assuming that the blood vessel was part of the mother's circulatory system and not the embryo's.

Section A: Question 29: Identifying that the conversion of nitrates into plant protein does not involve micro-organisms. The majority of candidates did not appear to realise that stage was essentially protein synthesis.

Question 1(b)(ii): Explaining why trypsinogen is produced in the pancreas instead of trypsin. Most candidates did not realise that trypsin would digest the pancreas cells that produced it.

Question 2(c): Describing what happens to acetyl CoA in the Krebs Cycle. Many candidates did not mention that it combines with a 4 carbon / intermediate compound in order to form citric acid.

Question 3(c): Suggesting why different vaccines are required to combat different strains of influenza virus. Many candidates were unaware that different strains carried different antigens.

Question 3(d): Describing how T-lymphocytes combat infection. Most candidates talked about destroying the virus and not attaching to the infected cell and destroying it.

Question 6(c)(i): Explaining why the concentration of IgA decreased despite the mass being constant. The majority of candidates ignored the constant mass and talked about her producing less antibodies after two days, rather than spotting the milk volume increase in Figure 1.

Question 7(c): Explaining the increase in lactic acid in the athlete's blood. Many candidates mentioned anaerobic respiration but did not indicate this was happening in muscle cells.

Question 8(b)(ii): Calculating the volume of blood leaving the left ventricle each minute. Many candidates found reading the graph correctly and then making the calculation too difficult.

Question 8(c): Describing how the nervous system and hormones can increase the blood volume leaving the heart. A large number of candidates did not realise heart rate increases and so the sympathetic nervous system and adrenaline will be involved.

Question 99b)(ii): Explaining how increased sweating and vasodilation decreases body temperature. Too many candidates did not realise that sweat evaporates while vasodilation increases blood flow to the skin surface.

Question 10(b): Suggesting a possible role for the nucleus in transferring information across the synapse. This challenging question required candidates to understand that neurotransmitters transfer information and that the nucleus may code for their production or the production of an enzyme to break them down in the synaptic cleft.

Question 11(b)(i): Explaining why the split brain patient picked up the key and not the spoon. This challenging problem solving question required candidates to provide an explanation for picking up the key and one for not picking up the spoon. Most candidates only explained why he picked up the key.

Question 12(b): Suggesting how shaping could be used by a teacher to improve a student's guitar playing. Most candidates discussed the rewarding of good playing but failed to go on and explain that over time only improvements in playing would be rewarded.

Question 12(c)(ii): Explaining how a teenager's opinion on a band's music could be altered by internalisation. A large number of candidates failed to indicate the role of persuasion in the process.

Question 14(d): Improving the reliability of an investigation's results. Many candidates mentioned taking more samples but did not specify that the procedure should be repeated by taking more samples from each river.

Advice to centres for preparation of future candidates

General

The majority of candidates appeared to have been well prepared for the Human Biology exam.

It was encouraging to observe fewer candidates missing out the questions where information has to be added to diagrams, Questions 4(a) and 10(a). Similarly, fewer candidates this year forgot to insert units into the answer that required them, Question 6(b).

As highlighted in External Assessment Reports, an area of concern is vasodilation. A high number of candidates still talk about blood vessels rising to the skin surface rather than arterioles dilating and diverting blood to the skin surface. Another area of concern is the roles of insulin and glucagon. Too many candidates talk about these hormones converting glucose to glycogen or vice-versa. The hormones, of course, actually stimulate enzymes to bring about the conversion. This area of concern has also been highlighted in previous reports.

Centres should ensure that candidates are correctly aware of 'shaping of behaviour'. Most candidates realised that shaping is the rewarding of desired behaviour but did not appear to realise that over time only improvements in the behaviour are rewarded so that the same behaviour is not simply repeated.

Centres should emphasise to candidates that they must say more than simply 'repeat the investigation' when asked how to improve the reliability of results in an investigation.

Centres should also make candidates aware that if diagrams are drawn, to support extended response answers in Section C, they must be properly labelled. For example, there were many diagrams of endocytosis but often the resulting vesicle was unlabelled.

Statistical information: update on Courses

Number of resulted entries in 2012	4356
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Number of resulted entries in 2013	4124
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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 130				
A	21.1%	21.1%	869	93
B	22.8%	43.9%	942	78
C	26.5%	70.4%	1094	63
D	11.7%	82.2%	484	55
No award	17.8%	100.0%	735	-

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.