External Assessment Report 2015

Subject(s)	Human Biology
Level(s)	Higher

The statistics used in this report are prior to the outcome of any Post Results Services requests.

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

Section A (Objective Test): this section was well done with the average score being 20 out of 30. There were a few applying knowledge questions where candidates did not use all the information provided and so failed to work out the correct answer.

Section B (Short Answers): candidate performance was slightly poorer in this section this year. Candidates remain good at demonstrating knowledge, but find the application of knowledge much more challenging. It was encouraging that many candidates showed good data-handling and numeracy skills.

Section C (Extended Response): candidate performance in this section varied between the two questions. Question 1 was well done, but Question 2 was done relatively poorly with many of the candidates failing to gain the five marks necessary to trigger the relevance and coherence marks.

Areas in which candidates performed well

Section A

♦ Questions 4, 5, 9, 10, 13, 14, 18, 20, 23, 24, 25, and 27 – most candidates demonstrated that they had the required knowledge about these topics.
♦ Questions 6, 11, 12, 16, 19, and 26 – the majority of candidates could apply their knowledge and so answered these questions correctly.
♦ Questions 8, 17, 21, 28, 29 and 30 – most candidates had the skills required to solve these problems.

Section B/C

Candidates showed good knowledge of:

♦ Question 1(a) – DNA replication
♦ Question 2(a) – inborn errors of metabolism
♦ Question 3(c) – differences between osmosis and active transport
♦ Question 4(b) – preparation of vaccines
♦ Question 6(a)(i) – seminiferous tubules
♦ Question 6(b) – meiosis
♦ Question 9(a) – the hypothalamus
♦ Question 9(e) – hypothermia
♦ Question 10(a) – dendrites and their function
♦ Question 11(c) – the visual area of the cerebrum
♦ Question 12(b) – displacement in short-term memory
♦ Question 13(e) – community health programmes
♦ Question 1A (Section C) – hormonal control of the menstrual cycle

♦ Question 1B (Section C) – the cardiac cycle.

Candidates performed well in the following skill areas:

♦ Processing information: Questions 8(c), 13(c) and 14(b) – candidates were relatively good at performing calculations.
♦ Selecting information: Questions 6(d)(i), 8(a), 8(b), 8(d(i),13(a) and 13(b) – candidates generally were good at selecting data from tables and graphs.
♦ Presenting information: Question 5(b)(i) – the majority of candidates could correctly draw a line graph.
♦ Making predictions: Question 8(d)(ii) – most candidates could make this prediction.
♦ Designing practical investigations: Questions 5(a) and 3(b) – the majority of candidates could identify variables that needed to be kept constant during an investigation. They could also explain why cells needed to be left in solutions for four hours prior to examination.

Areas which candidates found demanding

Candidates found the following questions particularly demanding:

Section A

1   Many candidates did not read the question carefully and missed that it was a synthesis reaction. Instead they assumed it was a breakdown reaction.

2   Many candidates thought that the reaction rate was increasing not decreasing.

3   A large majority of candidates had difficulty with this applying knowledge question. They had the knowledge that the mRNA strand contained seven triplet codes, but were unable to use the diagram to identify that these translated into only five different amino acids.

22   Many candidates seemed unaware that proteins are not filtered out of the bloodstream at the glomerulus, while water is, so raising their concentration.

Section B

1(a)(iii) Many candidates did not know that ATP and enzymes are required for DNA replication.

2(b)   Many candidates did not realise that the order of bases or nucleotides is altered with the result that the enzyme has an altered order of amino acids.

2(c)   This was a challenging question. Most candidates realised that individuals with the disease had no glycogen stores to replace glucose used, but they were expected to also indicate that during exercise glucose is used for respiration or to provide

2(d)   Many candidates were unable to describe the patterns of inheritance shown by recessive and sex-linked conditions.

3(a)   A large number of candidates got the direction of the line wrong or did not have it crossing the X-axis at 0·85%.

3(d)   Many candidates did not realise that increased reabsorption of water would decrease the salt concentration in the blood.

4(a)   The majority of candidates were unaware that it is the ability to reproduce which allows viruses to be classified as living organisms.

4(c)   Most candidates knew the roles of ribosomes to produce proteins and mitochondria to produce ATP, but they did not apply this knowledge to viral reproduction.

5(b)(ii) Most candidates described the pattern of the graph, but the conclusion must relate to the aim which was to find out about the 'damaging' effects of UV radiation.

5(c)(ii) Most candidates did not realise that almost as many yeast colonies survive at SPF 15 as at higher SPF values so SPF 15 is sufficient for 30 minutes.

6(c)   This was a challenging calculation. Candidates had to work out that the sperm count had fallen from 45 million/cm^3 before calculating the yearly fall.

6(d)(ii) Many candidates discussed IVF instead of artificial insemination.

7(c)   Many candidates were unable to explain about diffusion of carbon dioxide in the lungs and head or that carbon dioxide is produced during respiration.

9(b)   A large number of candidates did not realise that blood vessel X would have to constrict and so reduce blood flow to the skin.

9(c)   Many candidates did not know that the hairs standing up trap an insulating layer of air.

9(d)   Many candidates were unaware that sweat evaporates in order to cool the body.

10(b)   A large number of candidates did not appear to realise that from point Y impulses would have to cross the synapse. Consequently, few candidates described neurotransmitters being released and diffusing to receptors on the muscle.

10(c)   Candidates knew that actin and myosin filaments were present, but few were able to say that it is the overlapping of these filaments that create the striped appearance.

11(a)   A large number of candidates did not know that the light-absorbing cells were rods.

11(b)   Many candidates did not realise that the rods were arranged in a convergent pattern so increasing the amount of neurotransmitter released.

12(a)   Many candidates managed to name organisation and elaboration. However, most candidates failed to correctly apply this knowledge to the diagram.

14(d)   A large number of candidates did not understand the direction of the arrows in this food web and thought copepods ate cod and pouting.

Section C

2   Many candidates did not have sufficient knowledge of either the carbon or nitrogen cycle and so could not describe how the activities of man can disrupt these cycles.

Advice to centres for preparation of future candidates

This is the last year of this Human Biology Course.

Centres requiring advice on the preparation of future Human Biology candidates should look at the 2015 course report for the new Higher Human Biology Course.

Statistical information: update on Courses

Number of resulted entries in 2014	3943

Number of resulted entries in 2015	2840

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	19.3%	19.3%	548	85
B	23.9%	43.2%	678	68
C	26.1%	69.3%	741	52
D	11.3%	80.6%	322	44
No award	19.4%	-	551	-

For this Course, the intention was to set an assessment with grade boundaries close to the notional values of 50% for a Grade C and 70% for a Grade A. Overall the course assessment proved to be more difficult than intended due to a number of items. The grade boundaries were decreased by 4 marks for Upper A, 5 marks for Grade A and 10 marks for Grade C to reflect this.

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.