External Assessment Report 2015

Subject(s)	Human Biology (Revised)
Level(s)	Higher

Comments on candidate performance

General comments

The number of centres attempting the revised exam this year increased from eight to twelve. In total, 179 candidates were presented for the exam, which is a slight decrease on last year. This relatively low number of candidates makes it very difficult to make reliable generalisations.

Section A (Objective Test): this section was quite well done, with the average score being 19 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 significantly better in this section this year. Candidates remain good at demonstrating knowledge however 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 also improved this year. Question 1 was generally well done. The vast majority of candidates chose question 2B which was also well done. Question 2B was done poorly with many of the candidates who chose this question failing to gain the five marks necessary to trigger the relevance and coherence marks.

Areas in which candidates performed well

Section A

♦ Questions 1, 2, 3, 5, 7, 10, 13, 16, 18, 21, 22, 23, 25, 27 and 30: most candidates demonstrated that they had the required knowledge about these topics.
♦ Questions 6, 8, 11, 15, 19, 20 and 28: the majority of candidates could apply their knowledge and so answered these questions correctly.
♦ Questions 9, 12, 14 and 17: most candidates had the skills required to solve these problems.

Section B

Most candidates demonstrated good knowledge of the following topics:

Question 1(a) — DNA replication
Question 2(a) — anabolic pathways
Question 3(a) — viscosity of seminal fluid
Question 3(b)(ii) — development of secondary tumours
Question 3(c) — false positive tests
Question 5(a) — energy investment in glycolysis
Question 6(a)(i) — seminiferous tubules

Question 6(b)(i) — meiosis
Question 7(a) — structural differences between arteries and veins
Question 8(a) — formation of an atheroma
Question 8(b) — reasons why an atheroma can increase blood pressure
Question 8(c)(ii) — clotting substances
Question 10(a) — dendrites and their function
Question 10(b)(i) — Glial cells
Question 11(c) — storage of facts in the cerebrum
Question 12(a)(i) — mast cells produce histamine
Question 14(b) — the role of adjuvants in vaccines
Question 14(c) — pandemic spread of disease

Section C

Question 1A — hormonal control of the menstrual cycle
Question 1B — the cardiac cycle
Question 2B — the transmission and control of infectious diseases

Candidates performed well in the following skill areas:

♦ Processing information: Questions 9(c), 9(d)(iii),13(c) and 14(a)(ii) — candidates were relatively good at performing these calculations.
♦ Selecting information: Questions 6(d)(i), 9(a), 9(b), 9(d)(i),13(a), 13(b) and 14(a)(iii) — candidates generally were good at selecting data from tables and graphs.
♦ Presenting information: Question 4(b)(i) — the majority of candidates could correctly draw a line graph.
♦ Making predictions: Question 9(d)(ii) — most candidates could make this prediction.
♦ Designing practical investigations: Questions 4(a) — the majority of candidates could identify variables that needed to be kept constant during an investigation.

Areas which candidates found demanding

Section A

4   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.

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

13   Many candidates thought that dehydrogenase enzymes were located in the electron transport chain and not the citric acid cycle.

24   Many candidates misread this choosing an effect of endorphins rather than a cause for their release.

26 A majority of candidates appeared to not fully read the question and predicted 15 hours instead of 10 hours. They did not use the information that it would be legally okay to drive with a blood alcohol concentration of 80 mg/100cm.

29 Many candidates did not demonstrate sufficient knowledge on the cells of the immune system.

Section B

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 however they were expected to also indicate that during exercise glucose is used for respiration or to provide energy or ATP.

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

4(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.

4(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.

5(b) This was a challenging question. Candidates had to apply their knowledge and suggest that the shape of the active site would be changed by the binding of magnesium ions and so enzyme activity would be increased.

5(d) Most candidates were unaware that in a reversible reaction a build-up of product, in this case fructose-6-phosphate, causes the reaction to change direction.

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 into the blood or that carbon dioxide is produced during respiration in brain cells.

8(d)(ii) Many candidates did not know that during a heart attack the coronary artery is blocked by a clot, depriving the heart muscle of oxygen.

10(b)(ii) Many candidates could not state an additional function of glial cells.

10(c)   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.

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

12(b)   Many candidates lost this mark because they did not mention that it was self-destructive enzymes which cause apoptosis.

Section C

2A   Candidates who attempted this did not have sufficient knowledge about how perception allows the brain to analyse information.

Advice to centres for preparation of future candidates

This is the last year of the revised 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	213

Number of resulted entries in 2015	176

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	26.1%	26.1%	46	85
B	26.1%	52.3%	46	71
C	19.9%	72.2%	35	58
D	6.3%	78.4%	11	51
No award	21.6%	-	38	-

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 4 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.