



General Certificate of Education (A-level)
June 2012

Human Biology

HBI3T

(Specification 2405)

Unit 3T: Investigative and Practical Skills

Report on the Examination

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General Comments

The marking standard continued to improve compared with the previous year. Most markers had clearly read the Marking Guidelines carefully, and thoughtfully considered them in the light of the responses given by their students. Some centres were inclined to read longer responses superficially, resulting in awards of marks lower than the total they deserved. The term 'valid' appeared very rarely, and only a few centres used it to allow credit for answers not on the Marking Guidelines. This approach remains unacceptable; points not in the Marking Guidelines should not be given.

Most of the marking was in red, as requested. It is helpful to choose a different colour for internal moderation. It should be clear which set of marks should be used for external moderation when there are differences. Approximately half of those markers whose work was moderated numbered their ticks with the marking point awarded; this aids the process of moderation enormously. Such a technique is requested in the Marking Guidelines and using it could help to inform those markers who fail to award marks that have been earned. Annotations added by markers are always much appreciated.

In a few centres there were no totals written in the margin. Ringed mark allocations and subsection results alone are not so reliably checked.

Most centres followed the administrative procedures perfectly. Parcels arrived on time, were well organised, and accompanied by all the correct paperwork. A small number failed to check that the Candidate Number appeared on each sheet. Centre Declaration Sheets were almost always included. A few centres like to pack the work of an individual in a separate, close fitting wallet. The use of such packages is inconvenient, as it is time-consuming to extract and return the work; treasury tags are preferred.

There were two options available and a number of centres appear to have given their students the chance to attempt both; they then submitted the best mark. A small number of centres left their trials until the last minute and found they had to phone for advice and an extension of the deadline; this is not good practice.

ISA P The effect of different concentrations of sodium chloride solution on osmosis through an artificial membrane.

Stage 1

Most students gave full titles at the top of the raw data table. Likewise, almost all students knew to put the independent variable in the first column. Those who did not used the letters for the tubes, followed by the concentration: this was accepted by both the markers and the moderators. Units were usually perfect, being transcribed from the task sheet, and they were not found in the body of the columns. The overall standard of table construction was very good in almost all centres.

Stage 2

Assessment of data processing and the graph

Most students were able to process their data by calculating a mean volume. A small minority did not recognise that it was inappropriate to include vast numbers of decimal points. An occasional centre incorrectly penalised imperfect units again at this point; this was unnecessarily severe.

No graphs were seen during moderation with the axes reversed. The scales chosen varied and, although they could be plotted accurately and read easily, all the plots were near the top of the graph paper. This was not penalised but it would have been better to use a smaller part of the scale. Units were almost always perfect and the unit 'ml' was rarely seen in place of cm^3 . Plotting was mostly very accurately carried out and well checked by the markers. A few students used crosses which were too big and pencils which were not sharp. Although this was not desirable, there were no penalties. A lot of students ruled lines between the points. Where lines of best fit were attempted, some were deemed to have been drawn in an inappropriate place. Extrapolation beyond the plotted points was rare.

Written test: Section A

Question 1

Most students recognised that mass flow by leakage should be avoided but few made reference to the movement of substances only through the membrane.

Question 2

- (a) Few used the term 'standardises' but most gave the idea of 'the same length of time'. Diffusion and osmosis were rarely mentioned.
- (b) This was expressed in a number of ways and was well answered, though often somewhat wordily.

Question 3

Some markers were too lenient, and credited answers which did not appear on the Marking Guidelines. Most students were able to think back to the task they had completed and answer this question well.

Question 4

Some markers accepted 'to act as a control', even though this was not allowed without qualification. The idea of comparison is a part of methodology which is well understood but

some students failed to earn the remaining mark because they failed to apply their answers to the specific task they had carried out.

Question 5

- (a) This was a more challenging question, and many suggested 'no movement'.
- (b) This was heavily reliant on the practical work that had been carried out and was generally well answered. Unfortunately, some centres gave credit for answers not appearing on the Marking Guidelines and, thus, risked moving their centre out of tolerance.
- (c) Osmosis is well understood and was generally competently applied to this situation. A small number of poorer answers made reference to 'water concentration' which was not creditworthy.

Question 6

In parts (a) and (b), the answers showed significant confusion. Good answers involved explanations using specialist terminology, such as 'water potential'. Reference was made to 'osmosis' by most students.

Written Test: Section B

Question 7

Many could calculate this competently but some obviously wrong answers suggested that weaker students had no idea whether a calculated answer was realistic or not.

Question 8

Students answered extensively. They had a good idea of practicalities. Marking point 6 was rarely seen during moderation.

Question 9

Again, students wrote a great deal. They told a good story, and explained the consequences of eating a salty meal. Few linked increasing blood volume to higher blood pressure.

Question 10

- (a) A well answered question by most, although some markers credited alternatives which were not offered for credit.
- (b) A challenging question and many failed to realise the need to take many measurements, or to take them regularly. Hardly any students earned credit by subtracting the result from one year from that of the previous year.

Question 11

Students were able to answer this well. They were able to apply their answers to this specific question rather than answering in generalities.

Question 12

More described the effect than named it as a positive correlation; both approaches were acceptable.

Question 13

- (a) This was answered in various ways, but most involved comparisons to the rest of the data.
- (b) Wordy answers indicated that students knew what they wanted to say but struggled to express themselves succinctly.

Question 14

A surprisingly small number chose to quote data but when they did, it was generally successful.

Question 15

Despite having a wide list of options to choose from, some markers added a few of their own; this is not acceptable. Weaker students were inclined to offer answers which they had learned rather than giving responses which reflected their understanding of this specific question.

ISA Q The effect of surface area and volume of cells on the absorption of substances

Stage 1

Raw data tables were generally well presented. Students who did not supply full details in a title for one column, did not usually supply full titles in any of the table and so failed to gain a mark. The calculation was carried out correctly by most students. Mixed units were very rarely found, indicating progress from previous years. Some students named the blocks in the first column; this was accepted by markers and moderators. No units were found within the columns of the tables among the scripts which were moderated.

Stage 2

Most students processed their data and were able to calculate a mean. A few weaker students were unable to do so, and very few chose to calculate a rate of reaction.

Graph axes were around the right way on all moderated scripts. Scales were generally linear, but some students chose to start from zero, and place all their plots at the top of the page. This was not penalised, as they were accurately plotted and easy to read. However, they did not make the most appropriate use of the paper.

Units were well used. Plotting was accurate almost without exception. Some students risk this mark by making inappropriate choices regarding their line of best fit. Some should consider the width of their lines and a small number need to guard against unintentional extrapolation beyond the measured values. Graphs and tables were generally well marked.

Written Test: Section A

Question 1

Most students successfully answered this point, and scored by giving the first response.

Question 2

This question was frequently marked too leniently and answers were sometimes credited which did not include the specialist terms expected, especially in the second marking point.

Question 3

Weaker answers involved vague ideas on the reasons for colour change.

Question 4

This was a successful mark-earning question for most students. Despite this, some markers felt the need to credit responses which were not on the Marking Guidelines.

Question 5

Students are still too blasé about the effect of different size samples and, particularly, their effect on various aspects of anomalies. Some students assume that an increased sample size reduces the number of anomalies, when the reverse may well be true. Many suggested the calculation of a mean.

Question 6

- (a) Many coped with this question by quoting units provide; this was acceptable as it showed understanding.

- (b) A pleasing number were able to suggest that plotting a graph was a suitable response. Credit was given to some very wordy responses which described how to read off the required value.

Question 7

Most knew that the standard deviation would be needed. There was some confusion with 'variance' which was allowed credit.

Question 8

Students tended to respond at length. Where centres marked their ticks with the number of the response, this was much appreciated at moderation. Many students did not think sufficiently about the differences and tended to rely on making two points with their converses, rather than offering four separate ideas.

Written Test: Section B

Question 9

- (a) A number of students repeated their first answer, offering it as their second response. A number of markers did not recognise this, and were too generous in their mark allocation.
- (b) Weaker answers did not relate to the answers given to part 9(a). Few appreciated the fact that no more nicotine is delivered once a cigarette has gone out.

Question 10

Students were able to read the times off the graph. Answers were offered in minutes and seconds when the graph was plotted using minutes. These answers were acceptable but it is preferable to stick to one unit.

Question 11

- (a) Percentages were calculated with varying degrees of success.
- (b) Students of all ability recognised that this would allow comparison.

Question 12

- (a) Some students are very sound in their thinking regarding the effect of sample size. Others ignore its effect on the reliability of the mean. References to the number of anomalies remain confused in some areas.
- (b) Students were inclined to give, and markers allow, a wide range of answers, only some of which were acceptable.

Question 13

Some centres contain students who are very confident in the issuing of instructions for carrying out an investigation. Others are vague and imprecise. Weaker answers did not show appreciation of the need to establish a baseline of the numbers of cigarettes smoked, before using the spray or gum. Comparisons were not as frequently suggested as might have been expected. Students who answered in bullet points tended to show a clearer idea of some of the steps.

Question 14

- (a) As this was a question on methodology, there were many responses which offered 'learned' answers from past papers. While some of these were appropriate, others seemed to be more of a stab in the dark. Suggestions like 'other factors' were vague and not specifically related to the scenario under consideration.
- (b) 'Peer review' appeared to be a novel concept to a number of students, so responses were often creative. More appreciated that experiments can be reproduced, rather than that other checks can be carried out.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the [Results statistics](#) page of the AQA Website.