BIO6T

Administration

Schools and colleges are reminded to refer to the Instructions for the Administration of the ISA, published on the AQA website in Teaching and learning resources http://www.aqa.org.uk/subjects/science/a-level/biology-2410/teaching-and-learning-resources for guidance on how to conduct and also to maintain the confidentiality and integrity of the ISA assessments.

Most schools and colleges had worked extremely hard to ensure that the required sample of work and the accompanying documentation arrived with the moderator in good time. This was much appreciated.

It remains the case that moderators found significant errors involving the addition and transfer of marks. Since moderation is only based on a sample of work, errors involving the work of other students could go unnoticed. If not already in place, schools and colleges are strongly advised to establish a system of checks to prevent individual students from being seriously disadvantaged by errors of this nature. These checks should also include ensuring that a student’s name and candidate number appear on each part of the ISA and on any additional sheets. Component parts or sheets can easily be separated during the moderating procedure and, without a means of identification, are extremely difficult to relocate.

The mechanics of marking

Moderators try to support the marking of a school or college. Marks are only changed when what is rewarded fails to meet the requirements of the Marking Guidelines. It is much easier to support marking when the instructions in the Guidelines for Teachers marking Biology ISAs have been followed as required. Assessors are reminded that this section should be read before any work is marked. The following points should be noted.

- Work should only be marked in red ink. Many scripts were seen in which blue, black and green ink, as well as pencil, had been used.

- For each mark awarded, a tick should be placed on the work as near as possible to the point awarded. In all cases, a tick should represent a single mark. The total number of marks for each part answer should be written in the right hand margin. The practice of ringing the mark allocation number leads to difficulties in interpretation.

- Schools and colleges are requested to show the marking point number alongside the tick. This proves helpful both to the assessor - ensuring that the same marking point is not awarded more than once - and for the moderator who is then able to understand which marking point is being awarded and better appreciate a school’s or college’s application of the Marking Guidelines.

- The work submitted by many schools and colleges showed evidence of internal standardisation. This process is essential but it must be clear where dual marking has taken place which set of marks has been accepted as final. In all cases, the agreed marks should be shown in red ink.
Applying the Marking Guidelines

Where marking fell outside AQA’s tolerance limits, differences between the marks awarded by the school or college and those given by the moderator often resulted from a failure to apply the general principles of marking outlined in the initial Guidelines for Teachers marking Biology ISAs or a failure to apply the Marking Guidelines with sufficient rigour. Schools and colleges should note the following points in particular.

- The guidelines are presented in two columns. The first is headed Marking Guidance and the other is headed Comments. Both must be considered in determining whether a mark should be awarded or withheld. Many moderators reported that mandatory points made in the Comments column were not always considered in marking the work.

- The points made in the Marking Guidance represent the minimum acceptable answer. More detailed answers should clearly gain credit but those in which the detail is less than that stipulated should not be given credit. For example, in ISA Q, question 13 (a), the marking point requires the idea that both variables are continuous or the recognition that there are two dependent variables. The response, “Results are continuous”, should not gain credit as it is not expressed in the required detail.

- Some marking points need more than one feature to be identified before the mark can be awarded. Thus the Marking Guidance for ISA Q required students in question 12 (a) to identify that both ‘Sugar and fibre content are low’. Credit should not be given where only one of these is identified.

ISA P - An investigation of human variation

Stage 1

Question 1 and 2

Almost all students completed the tables appropriately ensuring the number of people in each case added up to 10. A minority of schools and colleges did not follow the requirement in the Teachers’ Notes to allocate their students different pairings of characteristics.

Stage 2

Question 3

Most students were able to formulate an appropriate null hypothesis. Moderators reported that it remains the case that some assessors are less than clear of what constitutes a suitable null hypothesis from what was deemed acceptable in the case of weaker answers.

Question 4

The correct statistical test was selected by almost all students and the choice appropriately supported by a reference to a comparison of frequencies (or numbers in this case) of people in the two categories.
Question 5

Calculations were generally accurate and presented methodically. There were a few instances where the final step of determining the degrees of freedom had not been taken or had been calculated wrongly.

Question 6

Many students interpreted the results of their calculations appropriately and expressed their answers clearly. To gain maximum credit there should have been a statement referring to the probability of the result being due to chance supported with a reference to the results of the calculation. There should have been a second statement explaining the consequences of this on acceptance or rejection of the null hypothesis. Answers that did not gain full credit usually confused probability and chance. Given the requirement that both of these terms be used in the answer, moderators could not support the few assessors who had awarded both marks when this was not the case.

Written test: Section A

Question 7

For the opening question to the Written Test, the Marking Guidelines for this question were quite lenient. Clearly, students who appreciated the role of both genotype and environment in determining phenotype met the requirement, in this case, more than adequately. Students should be aware though that such a level of understanding could be expected.

Question 8

Many struggled with this question largely due to trying to answer it on face value – “why are subjects matched” - rather than in the context of the investigation they had undertaken. Successful responses usually made reference to the sex of individuals having no influence on the outcome.

Question 9

This question evoked some excellent responses reflecting a sound awareness of the Hardy-Weinberg principle.

Question 10

Most students identified age and sex as features for matching but the added explanation did not always have the required clarity. It was not sufficient to offer that people of different ages would have different hand spans or that the hand sizes of males and females are not the same. Assessment differences between the moderator and centre often arose where the assessor gave credit for features other than those given in the Marking Guidelines.

Question 11

Most students identified the correct values in this question. Weaker answers suggested a value for the median that was not a whole number. Unfortunately, some assessors credited these weaker answers.
Question 12

Most students struggled to get more than one mark in this question. Those who approached the question from the viewpoint of how the effect of a single gene could be recognised, and then considered why this was not the case for wrist circumference, did better. Given many weak responses, in some instances answers were credited that did not match the Marking Guidelines. Where this was the case, moderators had difficulty supporting the marking.

Question 13

(a) Students might be familiar with when to use a particular type of graph, but they struggle to offer an explanation for their choice. Explaining the use of a scatter diagram remains difficult for most.

(b) Students were better able to explain the ‘positive’ aspect of correlation than the ‘strong’ feature of the positive correlation. Many students offered the stock answer “correlation does not mean causation”, which was not appropriate in this case.

(c) The use of Spearman’s rank correlation coefficient was widely appreciated.

(d) Students who were able to interpret a test statistic correctly in Stage 2 had difficulty when presented with questions related to statistical values in the Written Test. Better answers identified that “P” should be expressed as probability and the ‘<’ sign meant that the probability was less than 0.05. There is a tendency for some to believe that 0.05 is the same as 0.05%, an error that was not always spotted by assessors.

Written Test: Section B

Question 14

The question required the calculation of a ratio and not the statement of the ratio as 142:50. A few did not follow the wording of the question and incorrectly gave the ratio as 1:2.84.

Question 15

Most students were able to score both marks with basically the same idea – not being able to tell one form from another - suggested in each case. Some assessors gave credit to references to amputation or deformities, which were not included in the Marking Guidelines and were inappropriate here.

Question 16

Many students were prepared to accept the percentage given without considering how it might have been derived. As a consequence, few were able to achieve both marks. Where credit was given, it usually related to a small sample size or the location not being representative of the UK as a whole. It was rare to see a student offer both of these ideas.

Question 17

(a) A large number of students had difficulty translating the relevant Figure into a description of results. There was a tendency to quote figures without identifying what was shown such as the lack of an overall pattern, or that there was little difference between certain islands.
(b) Only the higher scoring students were able to gain more than one mark. The nature of the question was “Suggest” but few could use prior knowledge or understanding in the context of island populations beyond the idea of less, or no, immigration or emigration.

**Question 18**

This question, testing the ability to interpret given evidence, proved to be challenging for students. Few achieved better than a single mark and this was often the result of a lenient interpretation of the Marking Guidelines by the assessor.

**Question 19**

The majority of students could suggest the evidence that would support the conclusion, which was a complete contrast to the limited ability to interpret evidence shown in the previous question.

**Question 20**

Students frequently struggle with calculations using the Hardy-Weinberg equation. This question allowed those less confident with calculations to describe how the calculation would be carried out. Many students were able to do this, usually achieving full credit.

**Question 21**

Weaker responses simply restated the question. To suggest that knowing the frequency of harmful alleles would help Health Authorities estimate the frequency of harmful alleles was not worthy of credit. What was required was a translation of the idea to realise that the frequency of those affected by the disease could be estimated. Some assessors did not appreciate this logical step and inappropriately gave credit for restating the question.

**ISA Q - An investigation of the energy content of foods rich in carbohydrates**

**Stage 1**

**Question 1**

Few students had difficulty calculating the energy contents accurately.

**Stage 2**

**Question 2**

Most students were able to formulate an appropriate null hypothesis. Moderators reported that it remains the case that some assessors are less than clear of what constitutes a suitable null hypothesis from what was deemed acceptable in the case of weaker answers. Thus, “there is no difference between cream crackers and marshmallows” should not have received credit because it makes no reference to energy content, part of the context of the investigation.

**Question 3**

The correct statistical test was selected by almost all students and the choice appropriately supported by a reference to looking for differences between mean values.
Question 4

Calculations were generally accurate and presented methodically. There were, however, instances where the final step in determining 95% confidence limits had not been taken or the confidence limits had not been calculated correctly.

Question 5

Many students interpreted the results of their calculations appropriately and presented their answers clearly. To gain maximum credit there should have been a statement referring to the probability of the result being due to chance supported with a reference to the results of the calculation. There should have been a second statement explaining the consequences of this on acceptance or rejection of the null hypothesis. Answers that did not gain full credit usually confused probability and chance.

Written test: Section A

Question 6

Few students had difficulty offering a suitable reason.

Question 7

Calculations were generally accurate, with most students recognising the need to convert their data into kilojoules and per 100 g.

Question 8

Moderators commented on the number of schools and colleges that gave credit to answers without the necessary qualification of ‘different foods’ in place, as stipulated in the Comments column. Few students considered the benefit of knowing the composition of foods to be able to control the intake of a particular substance.

Question 9

To gain both marks, the identification of proteins or fats as another source of (heat) energy was required. Many students did not think beyond the presence of carbohydrates as mentioned in the question.

Question 10

Students were largely successful with the two reasons they offered. The common weakness was to consider surroundings or environment without qualification, such as the surrounding air, as sufficiently accurate. ‘Surroundings’ and ‘environment’ can mean a whole host of things and were specifically excluded as acceptable.

Question 11

(a) Almost all students appreciated that there were other unidentified substances in the cream crackers but there was no credit for the suggestion that air would contribute to mass.
(b) There were various suggestions, including the addition of further substances. Few drew attention to fibre or cellulose as carbohydrate but successful students did recognise the double counting of the sugar content.

Question 12

(a) In this question, point 1 needed the identification of all three listed carbohydrates before credit could be given. Point 2 needed reference to the low level of both sugar and fibre to gain credit.

(b) This question required a description of how to show the presence of starch. “Do the iodine test” alone was not sufficient as a description of what substance should be added but, otherwise, students generally achieved both marks.

Question 13

A minority of assessors considered a line graph to be valid also. As with ISA P, explaining the use of scatter diagrams proved to be difficult for students.

Written test: Section B

Question 14

Most were able to identify the correct substances but it was an error of assessment not to cancel a mark when an additional substance, such as hydrogen peroxide, was also included in the list.

Question 15

This question proved to be demanding for many students despite the possible reasons exceeding the maximum mark possible.

Question 16

Almost all students appreciated what was meant by ‘insulin-dependent’.

Question 17

Although the wording used by many students did not entirely match that of the Marking Guidelines, there was often a good understanding of the scientific principles demonstrated to support the assessments made.

Question 18

It was appropriate to consider exercise as equivalent to movement. The majority of students appreciated that such was based on respiration and that respiration uses glucose.

Question 19

In written papers, students often struggle with calculations. However, in this case, the majority produced an answer that fell within the stipulated range.
Question 20

It was pleasing to see that most students gave both sides of the story to give differences between the two methods. It was not appropriate to give credit where this was not the case. Many students were able to make full use of the resource material and obtain full marks for this question.

Question 21

This question proved to be more challenging for many students although some excellent accounts were seen. A synthesis of ideas from the resource material was the key in this question as opposed to lifting relevant aspects for comparison with the previous question, a skill that was more demanding and reflected by the mark range seen.

Question 22

Following a varied performance on question 21, many students produced sound responses to the final question using information from the resources appropriately.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results Statistics page of the AQA Website.

Converting Marks into UMS marks

Convert raw marks into Uniform Mark Scale (UMS) marks by using the link below.

UMS conversion calculator