A-LEVEL
STATISTICS

SS06 Statistics 6
Report on the Examination

6380
June 17

Version: 1.0

Further copies of this Report are available from aqa.org.uk

General

Students generally made a good attempt at all questions. In hypothesis testing many students seemed unable to state appropriate hypotheses that demonstrate knowledge of the difference between 'matched pairs' and 'independent samples' testing.

Students demonstrated good understanding that the given context should be used when stating conclusions and assumptions.

Question 1

In part (a), when stating the hypotheses, many students failed to appreciate that they were dealing with matched pairs and stated hypotheses for testing for a difference between the means based on two independent samples.

Most students found the differences between the matched-pairs values and usually went on to find the correct test statistic and critical value. Students followed advice and stated the test statistic they had selected to compare with the critical value.

Often, students failed to state a completely correct conclusion, in context, with many students omitting to state that there was **significant** evidence to suggest Robusta produces a higher **average** yield or that the scientist's belief is supported.

In part (b)(i), many students again failed to appreciate that they were dealing with matched pairs and stated incorrect hypotheses. A minority of students made the mistake of ranking the data as one group before finding the differences between the ranks but most students were very secure on this topic. Again, many students failed to state a completely correct conclusion, in context, and did not mention that there was insufficient evidence to suggest that there is a difference in the **average taste score** assigned by the two tasters.

In part (b)(ii), there were many correct solutions. A common mistake was to omit the potential score in the circumstances that a pairing did not give a zero difference or simply quoted $23½$.

Question 2

In part (a) most students found the correct mean range, but a very common error was to proceed believing that the sample size was 10 (the number of samples), rather than 5.

In part (b)(i) many students subsequently failed to find the correct warning and action limits since they did not base their standard error on a sample size of 5.

A significant number of students who incorrectly used a sample size of 10 in part (a) and (b)(i), went on to use the correct values from the tables to find the action and warning limits for the sample standard deviation in part (b)(ii).

Part (c) led to many correct responses that, since the means are all within the warning limits, the production appears to be performing satisfactorily. This mark was not available for students who had used a sample size of 10.

In part (d), a common error was to state the range for each sample, rather than the sample standard deviation, or to discuss the individual values in each sample. Students should be made aware that it is the measure of average and spread for each sample that is considered.

Question 3

In part (a)(i), many correct solutions were seen. A common mistake was to state the meaning of a double-blind trial in the context of a medical trial or to state that Heather, the Lead Engineer, did not know what lubricant was being used.

Many students correctly stated in context, for part (a)(ii), that the cyclists' performance would not be affected by the knowledge of which lubricant was being used and neither was Pete influenced in how he prepared the bikes.

In part (b)(i), many students failed to state that Pete's design is a **completely randomised design**.

In part (b)(ii), the correct solution was to state that a Latin-square design should be used as there are two blocking factors (cyclist and ride order). A mark was awarded for students who stated 'Randomised Block' as the design and referred to cyclists as the sole blocking factor.

In part (b)(iii), many students frequently labelled incorrectly the blocking factors as cyclists and lubricants in their Latin-square design.

In part (c) ANOVA was usually correctly identified as the analysis required.

Question 4

In part (a), many students found the correct probability of acceptance or rejection but fewer then continued to make the correct comparison of these probabilities with the necessary probabilities to demonstrate that the requirements are not met.

In part (b)(i), many students found the correct probabilities of acceptance or rejection of a batch but, again, far fewer of these went on to make the correct comparison of these probabilities with the necessary probabilities to demonstrate that the requirements are met.

Part (c), proved to be a challenge and only a minority of students managed to achieve a correct probability, with many students making no attempt.

In part (d), many students correctly plotted the points given in Table 4 and Table 5 correctly. Common mistakes were to forget that both curves pass through the point (0, 1) or to omit the labels for the curves (Plan B and Plan C not Table 4 and Table 5).

In part (e), many students correctly identified that Scheme C has a higher chance of accepting good batches that have a low proportion of non-conforming baseballs but far fewer students went on to state another good reason such as that Scheme C offers an opportunity for a second sample if quality is unclear or that Scheme C would lead, on average, to fewer items being sampled.

Question 5

Many students did not state appropriate hypotheses for this test.

Most students successfully separated the values in Table 6 into three correct groups and proceeded to find their totals and the total of the squares of all the values and also the value of SS_T. Many students went on to find the correct test statistic and critical value.

Fewer students went on to state a correct conclusion in context identifying that there is evidence of a significant difference between the **mean** level of immune cells for **at least two** of the treatments. Some students correctly stated that treatment TR_2 slows the progress of the disease more than treatment TR_1.

A common mistake was failing to find the correct degrees of freedom, which led to incorrect mean square values and hence an incorrect test statistic. This mistake also led to finding an incorrect critical value.

Use of statistics

Statistics used in this report may be taken from incomplete processing data. However, this data still gives a true account on how students have performed for each question.

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