
A-LEVEL STATISTICS

SS06 – Statistics 6
Report on the Examination

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General

In general, students found this paper to be challenging due to the mix of harder topics that appeared on this year's paper. Most students displayed a sound knowledge of the topics in the specification but found the demands of the question on experimental design particularly difficult and were also challenged by the problem set on acceptance sampling by variable. Students seemed to manage the time well and most made a good effort to interpret their results in the contexts of the questions. Use of graphics calculators was efficient and appropriate.

Question 1

In part (a), students often did not put the assumptions required into context and did not express that it is the **differences** in yellowness index that must be normally distributed and that it is the **birds** that are a random sample. In part (b), there were many students who scored full marks in the paired t -test requested. A small number of students did not evaluate differences initially and therefore lost most of the marks. As expected, there were many minor numerical mistakes but these did not lead to significant mark penalisation.

Question 2

Part (a)(i) was answered correctly by most students and most of these went on to score both marks in part (a)(ii). In part (a)(iii), students tended to make vague comments such as “good at accepting good batches”, but in order to gain full marks students should include numerical evidence to support their comments. Very few students appreciated that the context was the production of 20 kg bags and therefore it would be unwise to accept batches containing a high proportion of underweight bags. Part (b) was challenging, but many students scored full marks and others gained some marks as they attempted to use an equality or inequality, or trial and improvement, in order to find the required values of w and/or n .

Question 3

Many students found the correct value of n in part (a) and most also found the correct value of p . In part (b), most students stated the formulae for the upper warning and upper action limits correctly, using 1.96 and 3.09, but a significant number of students made mistakes in their calculations. Students should realise that, in a question such as part (c), it is always necessary to find the proportions of non-conforming components in each of the 10 samples and compare them with the upper warning limit found in part (b). Many students found the correct proportions of non-conforming items in part (d) but were frequently too vague in their conclusions and did not refer to their upper action and/or warning limits. In part (d)(ii), some students stated “take action” and most stated, correctly, “stop production”.

Question 4

Students found this question challenging and many failed to produce the required table as well as an explanation for the three different experimental designs in part (a). Few students stated that volunteers should be allocated randomly into the groups. In part (a)(iii), a minority of students realised that the pairs should be matched by **both** age and gender in order to reduce experimental error due to differences between individuals. In part (b), most students identified that completely randomised experimental design reduces bias. Very few students expressed an appreciation that randomised block design takes into consideration the effect of another factor — age or gender — on the experimental outcome. Few students had a full understanding that a matched pairs design reduces experimental error due to differences between individuals, that it is therefore more likely to detect any difference in treatment and that hence it would be the preferred design in part (c).

Question 5

There were many students who made a good attempt at part (a)(i), although many solutions contained the usual numerical errors. Many students efficiently found correct test statistics and critical values but frequently the degrees of freedom were incorrect. In part (a)(ii), very few students correctly identified the two brands which were most different (C and A) or the greatest difference between the ranks for the making orders (first and third). In part (b)(i), many students identified that there should be no interaction between the tea brand and the making order, but very few students were able to say that this means that one brand of tea should not be better/worse at a particular making. In part (b)(ii), few students included the context of **ratings** in their assumptions. A high proportion of students stated that the sample of customers must be random, when the question had stated clearly that these were the ratings awarded by only one customer. Part (c) was a straightforward Wilcoxon signed-rank test, but a minority of students incorrectly attempted a sign test or made no attempt at the question. Many students gave the correct rankings, but a minority still assigned rank 1 to zero. Students who correctly found both the test statistic and the critical value usually stated a correct conclusion in context.

Mark Ranges and Award of Grades

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

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

UMS conversion calculator www.aqa.org.uk/umsconversion