GCE

STATISTICS

SS06 Statistics 6

Report on the Examination

6380

July 2013

Version: 1.1

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General

Most students were well prepared and had a good working knowledge of all the topics. However their ability to express themselves clearly in context when interpreting results was not always as strong.
Students usually knew how to state relevant hypotheses but many lost marks by not mentioning the population parameters.

Individual question comments are as follows:

Question 1

Most students knew that zeros and signs must be considered when carrying out a paired *t*-test. The assumption in part (a)(ii) should always refer to the distribution of the differences in the context of the question.
Part (b) was done extremely well with most students using the correct $\mathrm{B}(20, 0.3)$ model and many students evaluated the correct answer in part (ii). It should be remembered that the expected number of devices should not be stated as an integer.

Question 2

In part (a), students should refer to the blocking and treatment factors as stated in the question
ie (i) furnace run not 'furnace'
(ii) dose of implant material not 'implant'
In (a)(iii) few students remembered to comment that producing the wafers in the same way, from the same batch, would reduce/eliminate bias and also would ensure that any difference detected should be due to dose of implant or furnace run.
Part (b) was well answered with students realising that Harriet's design took into account the furnace run effect but Eric's did not.
In part (c) it was not sufficient to mention ANOVA for both marks. The fully correct solution should include 'two factor/two way'.

Question 3

Students seem very confident in carrying out a one factor ANOVA and degrees of freedom were usually correct. However, hypotheses were frequently incorrectly stated since the alternative hypothesis should refer to 'at least two of the population means differ' or equivalent.
In part (a)(ii), students seemed surprised that they might have to comment that the company should not necessarily be advised to use any one thread treatment since no significant difference had been detected in part (a)(i).
Part (b) was extremely well answered with most students realising that the Kruskal-Wallis test should be used in the case where 3 separate groups were to be compared with no need to assume that there is an underlying normal distribution.

Question 4

This question was generally answered very well with many students scoring full marks in part (a). Some careless slips occurred in the evaluation of the sample standard deviation in part (b)(i) but the most obvious problem with part (b) was the comment in (ii) where students commented 'action should be taken'. In the case of a request for such a comment, students should be encouraged to state where, in terms of LAL,LWL,UWL,UAL the sample mean and standard deviation each lie, and then respond accordingly:

- within warning lines – all fine no need for any action
- between warning and action lines – take another sample immediately
- beyond action line – stop process immediately.

Comments in part (iii) were good but students should realise that 3 distinct comments are required if 3 marks are available.
Part (c) was successfully completed by a pleasing number of students with the most common error being that 0.02 rather than was used.

Question 5

Many students were well prepared for this Latin square analysis but a significant number did not seem to have practised the procedure sufficiently to have the confidence to complete it. Many forgot how to find the SS total and many did not identify that the df for Error was 6.
In part (b)(iii) and part (c) few students gave their answer in the context of the question. It is useful to point out that it is the fuel efficiency measurements that need to be normally distributed and have a common underlying variance and that there should be no interaction between petrol blend, car model and driver.

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 www.aqa.org.uk/umsconversion