Version

General Certificate of Education (A-level)
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Statistics SS03

(Specification 6380)

Statistics 3

Report on the Examination

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General

In general, most candidates attempted all questions, demonstrating a sound knowledge of the topics in the specification, except in the case of question 6. There was still evidence that many candidates found it difficult to use a calculator correctly for the evaluation of the Kruskal–Wallis test statistic, H.

Candidates generally remembered to quote final answers to three significant figures, but marks were still lost unnecessarily by some because only one or two significant figures were quoted. Written evidence of the method used, particularly for the χ^2 test statistic and the Spearman's rank correlation coefficient, was not always supplied and some marks were lost as a consequence.

Candidates often did not explain their conclusions in the context of the question as required.

Question 1

All candidates made a good effort at part (a) and it was encouraging that many candidates did very well on this question. Candidates appeared confident in evaluating Spearman's rank correlation coefficient.

The test in part (b) was carried out well by most candidates, and the hypotheses tended to be stated correctly.

Common errors were to evaluate the PMCC in error for part (a) or to use incorrect critical values from the PMCC table rather than the SRCC table, or to use the wrong significance level in part (b).

Question 2

The Wilcoxon signed-rank test was attempted confidently by most candidates, with only a very few forgetting to find the differences between 1994 and 2004 data first. Hypotheses were frequently inconsistent with the differences used: for example, $\mathrm{H}_1\ \eta > 0$ but with differences evaluated as –4, –8 etc.

The conclusion in part (a) was often not clear in the context of the question. In part (b), the comment needed to refer to the fact that a matched-pairs design would eliminate individual differences between types of burglar/types of burglary and would therefore reduce experimental error and make the test more likely to detect a difference, if one existed.

Question 3

Candidates seemed very comfortable with this topic and many fully correct solutions were seen in part (a)(i). The hypotheses were often stated the wrong way round with H_0 'an association between selection of type of accident and registration of HGV involved.' Some candidates did not compare observed and expected frequencies to identify sources of association, and many simply commented on the observed values in the original table for their solution to part (a)(ii).

Part (b)(i) caused problems for some candidates, who struggled to identify the categories as 'Age of driver' and 'Prosecution or not'. In part (b)(ii), many candidates were unable to apply Yates' correction correctly and often evaluated ($O - E - 0.5$) rather than ($|O - E| - 0.5$) for use in the numerator of the test statistic.

Question 4

This question was tackled extremely well by many candidates, who successfully separated the categories of method and applied ranks as one group for the required test. Careless slips or incorrectly stated hypotheses/conclusions led to loss of marks for some, but a lot of candidates scored full marks.

Question 5

Some excellent attempts were seen in part (a), but many candidates struggled to apply the formula for H, despite correctly totalling the ranks in each category. Several candidates re-ranked the given ranks, which wasted time but, if done correctly, did lead to the correct solution. Another common error was to use $\nu = 24$ instead of $\nu = 4$.

In part (b), candidates correctly selected the highest ranks total as belonging to the lowest acidity beer in most cases, but comments in part (c) were often irrelevant to the suggestion made.

Question 6

Some good attempts were made in part (a) and many candidates identified a sign test as the relevant test to apply. Candidates usually stated the test statistic correctly but there was still uncertainty about which probabilities from the binomial tables were required, and often $n = 10$ and/or $p = 0.1$ were incorrectly used. The binomial probability found was often incorrectly compared to 2.5% rather than the correct 5% for this 1-tailed test.

In part (b), there were a few excellent answers, but candidates often failed to explain fully the method used, and many made no attempt at this part of the question or simply guessed.

Mark Ranges and Award of Grades

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