Scholarship

2010 Assessment Report

Statistics and Modelling

COMMENTARY

Successful candidates were able to correctly interpret the questions. They used statistics correctly in their explanations, observations and conclusions. They displayed strong algebra and graphing skills and were totally familiar with the techniques required to answer the questions. All their answers were logically presented. They were able to explain their written answers with simple clear and well reasoned arguments taking into account all the evidence available.

Unsuccessful candidates were unable to apply adequate skills. Their descriptions of statistical graphs lacked depth and they did not ensure that the graphs in Q1 (a) were in percentage terms in order to enable comparative analysis. There was a lack of skill shown towards obtaining integer values for the optimal points in the linear programming problem. Many unsuccessful candidates were still writing far too much in their observations and explanations. As a consequence, in many cases they started to contradict themselves and became vague both in their observations and explanations.

SCHOLARSHIP WITH OUTSTANDING PERFORMANCE

Candidates who were awarded Scholarship with Outstanding Performance typically:
- linked statistical concepts successfully using the appropriate context by using clear and effective communication
- solved unfamiliar types of problems by successfully using a range of statistical techniques
- set out all their working clearly using variables that they had defined
- displayed a high level of mathematical and statistical thinking which was evidenced by their answers to Q1 (b) (iii) and Q2 (a)
- calculated correctly the percentage increase in sample size required for a "difference of two means" to have a reduced margin of error in Q1(c)
- successfully found all three optimal solutions in Q2 (b) by considering the validity of whole number solutions and knowing when $a > 1$, $a = 1$ or $a < 1$ in the construction of the cost function; $C = ax + y$
- found successfully the answer required in Q3 (a) by recognising the conditional probability and using appropriate techniques
- used elegant logic with correct calculations and algebraic processes with their answers especially in Q3 (a)
- derived further information from that given in graph form, for instance in Q4 (a) with the observation that price decreased on average by $1470 for each additional year
- were able to answer successfully the question involving identifying factors in Q4(c) along with their influence on the price
- used index numbers or percentages successfully in the comparison of the changes in two sets of data in Q5(c).

SCHOLARSHIP

Candidates who were awarded Scholarship but not Scholarship with Outstanding Performance typically:
- carried out the calculations correctly as required by the question but in many cases were unable to fully interpret their answers using the evidence provided
- described obvious features of a graph but were unable to derive any further information
- fully explained the stratified sampling technique in Q1 (b)

- displayed their ability to construct and interpret confidence intervals in Q1 (b)
- calculated correctly two out of three optimal integer points accurately in Q2 (b)
- provided correctly a full sketch of the graph in Q3 (b) beyond the four given points
- found correctly an average of several values for a and b that were calculated simultaneously in Q3 (b)
- correctly solved the model in Q3 (b) for constants a and b then found the minimum cost successfully
- demonstrated an advanced level of thinking statistically when describing the relationships between the variable pairs in Q4 (a)
- chose the correct model for the prediction calculation in Q4 (b)
- averaged the two values found from the two models in Q5 (b) and observed with justification that this gave the best forecast in Q5 (b)
- justified their choice of model to make a prediction and successfully discussed the validity of their predictions both in Q4 (b) and Q5 (b).

OTHER CANDIDATES

Candidates who were not awarded Scholarship or Scholarship with Outstanding Performance typically:
- used both formulae and graphics calculators incorrectly
- lacked the skills necessary to understand and interpret questions
- lacked clarity in writing which was shown by their vague and irrelevant comments
- did not relate their answers to the context of the question
- did not use any technical language in their explanations
- tended to write long and complicated explanations with no statistical evidence to back up their statements
- gave vague descriptions of the graph in answering Q1 (a)
- could not calculate summary statistics from a grouped frequency table like central measures, spreads and modal classes as part of answering Q1 (a)
- did not give enough detail in their descriptions of the sampling method in answering Q1 (b)
- did not recognise the existence of the conditional probability in answering Q3 (a)
- were unable to describe the validity for the predictions calculated in Q4 (b) by not referring completely to correlation and data variability
- did not differentiate between their choices of model to use in order to make a prediction in answering Q4 (b)
- substituted incorrectly into all the models and then averaged their answers to get a prediction in Q4 (b)
- explained individual changes in Q5 (a), one at a time, without looking at, and commenting on, the overall trend
- introduced seasonal effects into Q5 where they were not part of the question
- used correlation when it was not appropriate for explanations especially in answering Q5(c).