INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

May 2015 examinations

Subject CA2
Model Documentation, Analysis and Reporting

Paper One and Two

Introduction

The attached subject report has been written by the Principal Examiner with the aim of helping candidates. The specimen solutions are based on one possible approach to modelling the assignment set but the examiners gave credit for any alternative approach or interpretation which they considered to be reasonable.

Possible models with an audit trail or summary are posted on the website. It should be noted that these include more detail than would ordinarily be possible within the time allowed for the examination.

F Layton
Chairman of the Board of Examiners

June 2015

GENERAL

The aim of this subject is to ensure that the successful candidate can model data, document the work (including maintaining an audit trail for a fellow student and senior actuary), analyse the methods used and outputs generated and communicate to a senior actuary the approach, results and conclusions.

At this diet of CA2 there was not a large difference in the performance of candidates between Paper One and Paper Two.

PAPER ONE

Modelling

There were 31 marks available for accurate completion of the modelling steps and appropriate data checks. Most candidates produced a reasonable model for checking data and determining the position in which each competitor is expected to finish in the Minister's triathlon. The better prepared candidates were able to calculate the overall profit from the event and determine a new swim parameter that gave a profit close to 0.

The weakest candidates tended to hard code values or copy and paste data. Some candidates also failed to keep the provided data in its unchanged form – something which reduces transparency.

The quality of the graphs produced was high and most candidates scored well for these questions. Some candidates lost marks for failing to include appropriate axes on charts.

Most candidates demonstrated good modelling techniques and scored well in this area (up to 7 marks available).

As with previous exams very few candidates managed to score well for the 'other (non data) checks' where 7 marks were available. A large number of candidates are failing to score anything or only achieve a single mark here. Candidates should be asking themselves whether the results they are seeing appear reasonable and what makes them reach that conclusion. For example, it would be reasonable for the total time for competitors to complete the Minister's triathlon to be longer than the charity triathlon, given the longer distances involved. Similarly, then, in determining the speed which competitors achieve in each stage, one would expect that they will cycle faster than they run and run faster than they swim.

It is not sufficient to say that the results are 'as expected' – candidates are expected to explain why the results are as expected to show understanding.

Audit Trail

Most candidates prepared audit trails that followed the order of their model, starting with an overview of the model and stating assumptions that were required for the calculations.

The stronger candidates provided sufficient detail explaining their calculations with the very strongest also explaining why steps were being performed.

Some candidates struggled to determine the value of λ that resulted in zero profit, but as the remainder of their audit trail included sufficient detail, they were still able to score well.

Almost all candidates were able to signpost which sheet the calculations could be found, but the better prepared candidates were able to provide more signposting by saying where in the sheet specific calculations could be found, either by reference to tables or a combination of columns and rows, for example "in column F the speed is calculated by …".

PAPER TWO

Modelling

There were 15 marks available for accurate completion of the additional modelling steps and production of the required charts. The quality of the graphs produced was very good and most candidates scored well for these questions. Additional modelling steps were generally done well, although some candidates did struggle to include accurately the post-retirement withdrawals. A common error was to fail to allow for continuing investment return post-retirement.

Summary

The examination question effectively provides an outline for the summary and the points to be included. The vast majority of candidates prepared a summary that followed the same order of the items they had been requested to include in the summary.

While it is pleasing to see candidates using their initiative, it was disappointing that most candidates only stated the assumptions that were listed in the audit trail provided, and did not add any further assumptions of their own.

The successful candidates were able to explain the projection methodology used. This included the allocation of the premium to different asset classes and how the return on each asset class was determined.

A number of candidates tended to reproduce portions of the audit trail in the methodology section of the summary. Whilst selective re-use of parts of the audit trail is acceptable, candidates are reminded that the audit trail and summary have different purposes so differences in style and depth are expected.

Most candidates included all the results in the summary that had been requested. Candidates tended to clearly answer the question concerning the level of annual income that could be supported.

However, the comments and conclusions included in the summaries were poor and did not suggest that the candidates understood the results that the model had produced.

Many candidates are failing to record basic observations and explain them. For example, it can be observed from the results that the contributions are increasing. The reason for this is that salary increases and contributions are a percentage of salary.

Many straightforward marks were lost here. As a reminder, candidates are expected to show that they understand the results produced by the model by explaining them.

For the list of next steps, this was also not answered well. Too many candidates relied on short bullet points that were too generic. For example simply stating "use stochastic modelling" is too brief and generic. A successful candidate would, for example, include "the investment returns could be modelled stochastically so that a range of possible outcomes could be presented to the individual."

There were plenty of variables used and assumptions stated for a good list of next steps to be produced.

END OF EXAMINERS' REPORT