

EXAMINATION

14 April 2005 (pm)

Subject CA3 — Communications

Time allowed: Two and a half hours

INSTRUCTIONS TO THE CANDIDATE

1. *Enter all the candidate and examination details as requested on the front of your answer booklet.*
2. *You have 15 minutes at the start of the examination in which to read the questions. You are strongly encouraged to use this time for reading only, but notes may be made. You then have two and a half hours to complete the paper.*
3. *You must not start writing your answers in the booklet until instructed to do so by the supervisor.*
4. *Attempt Question 1 AND Question 2.*

AT THE END OF THE EXAMINATION

Hand in BOTH your answer booklet, with any additional sheets firmly attached, and this question paper.

In addition to this paper you should have available the 2002 edition of the Formulae and Tables and your own electronic calculator.

1 You are an actuary in a life office. A customer services employee has passed on the following note of a telephone conversation between him and a customer.

“Mr T Thomas, a non-smoker, applied for our “Select 15 year Term Assurance” policy 10 years ago with a sum assured of £100,000. He was charged an annual premium of £1,000. At the same time, his twin brother (P Thomas), a smoker, applied for an identical policy (i.e. same term and sum assured) and paid an annual premium of £1,500.

Recently, T Thomas applied for one of our annuity products, the “Select Annuity Contract”. We quoted a lump sum of £30,000 for level annual payments of £1,500 p.a. (nil escalation in payment) The Select Annuity Contract provides regular payments for life to the annuitant with no benefits payable to dependents on death.

P Thomas also applied for the “Select Annuity Contract” and has been quoted a lump sum of £25,500. The terms of both policies are identical i.e. both quotes were for level annual payments £1,500.

T Thomas has a copy of a letter sent to his brother 10 years ago stating that as a smoker he posed a greater risk and therefore his premium for life insurance was higher than his brother’s. T Thomas believes that by the same token, his brother should be charged a higher amount for the annuity. He cannot understand why this is not the case; he has questioned the possibility of his quote being mixed up with his brother’s. He has asked for a response to his query.

T Thomas also mentioned that his brother now smokes even more cigarettes and this is an additional reason why he believes that the quotes are mixed up.

My initial thought was that the difference in the lump sum for the Annuity Contract was due to different levels of commission payable to financial advisers through whom the applications for both products were made. Having reviewed the files, I noticed that the applications were made via the same financial adviser who is on the same remuneration terms.

Therefore, I think that the difference in the lump sums charged for the Annuity Contract were due to either:

- *the lump sum of £25,500 we quoted Mr P Thomas did not include an expense loading; or*
- *the two individuals live in different geographical locations*

In order to acquire this business, I would suggest that we either reduce the lump sum that T Thomas has been charged or increase the level of his annuity.”

Draft a reply to Mr T Thomas in approximately 350–450 words.

[40]

Notes

1. Both the life insurance policies are for identical sums assured, were quoted at the same time and on the same premium rating structure.
2. Both annuity contracts provide identical benefits.
3. All the terms and conditions of the two products are the same.
4. You can assume that the only difference between the two applicants is that one is a smoker whereas the other is not.
5. The insurance company distinguishes between smokers and non-smokers to estimate the life expectancy used in determining the terms offered for both life insurance and annuity contracts.
6. The main rating factors for life insurance include age, gender, smoker status and lifestyle. For annuities, rates are based on long-term interest rates and mortality rates (which in turn depend on age, gender and smoker status).
7. You may assume that there are no restrictions imposed by the Data Protection Act.

- 2 You are a product development actuary for an insurance company. Your company is planning to launch a new savings product, and is considering two options for developing the administration. Option A is highly automated and so more expensive to develop than Option B. However, option B will involve more manual intervention and so will be more expensive to administer. You have been asked to prepare a short presentation for the Marketing Director outlining the relative profitability of the two options.

The Marketing Director has asked you to include in your presentation:

- A summary of key financials for each option, including an estimate of how likely it is to produce a profit after all costs are taken into account.
- An illustration of profits (after development costs) for a variety of sales levels.
- An indication of how likely option A is to produce the higher profit.
- A summary of other considerations that could affect the decision.

Draft your presentation to the Marketing Director using 5 to 8 slides and incorporating relevant information from the profitability summary below.

[60]

Further Information

1. Your team has calculated the profiles of the two options as follows:

| | <i>Option A</i> | <i>Option B</i> |
|-----------------------|-----------------|-----------------|
| Development cost | £2.1 million | £1.5. million |
| Profit per £1000 sold | £30 | £25 |

2. Policy charges will be the same under either option, and the volume sold is expected to be the same in either case. Your team has estimated the volume of sales as £100 million, but with a standard deviation of £30 million. The sales volume can be assumed to be normally distributed.
3. Your team has also informed you that:
- The profit is calculated by discounting future cashflows, and allows for all sales and administration costs but ignores development costs.
 - There are no fixed costs apart from the development costs.
 - They investigated the effects of running a major advertising campaign to support the product, but this would cost £3 million and would probably only increase sales by £100 million, so was not recommended.

- Sales of more than £140 million would put administration of the product under severe strain if option B is chosen, but there would be no problems with option A.
 - If there were administration problems with option B, it would take 2 months to recruit and train additional staff; and
 - If option A is chosen the technology developed would be reusable, reducing the cost of developing similar products in the future.
4. For the normal distribution with mean value 0 and standard deviation 1, the probability $\phi(x)$ of the actual value being lower than x is shown below for various values of x :

| x | $\phi(x)$ |
|------|-----------|
| 0 | 0.50000 |
| 0.33 | 0.62930 |
| 0.67 | 0.74857 |
| 1 | 0.84135 |
| 1.33 | 0.90824 |
| 1.67 | 0.95254 |
| 2 | 0.97725 |

END OF PAPER