

# EXAMINATION

3 April 2006 (am)

## Subject SA2 — Life Insurance Specialist Applications

*Time allowed: Three 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 three 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. *Mark allocations are shown in brackets.*
5. *Attempt both questions, beginning your answer to each question on a separate sheet.*
6. *Candidates should show calculations where this is appropriate.*

### **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 A UK life insurance company has three funds: the Shareholder Fund, Long-Term Insurance Business Fund 1 (“Fund 1”) and Long-Term Insurance Business Fund 2 (“Fund 2”). It sells a wide range of conventional with profits products, conventional without profits products and unit-linked products.

The unit-linked products are written into “Fund 1”, which is 100% shareholder owned.

“Fund 2” is a with profits fund, within which profits are shared between policyholders and shareholders in the ratio 90:10. The conventional with profits and conventional without profits products are all written into “Fund 2”.

The company calculates its embedded value annually, using a traditional deterministic calculation approach.

- (i) Describe the methodology that the company would use to calculate its embedded value. (Details of the basis and modelling techniques are not required.) [13]
- (ii) Describe how the company could allow within its embedded value calculation for credit risk on corporate bonds. [5]
- (iii) Outline the main elements that the company would include in an analysis of change in embedded value. [7]

An investment analyst has explained that he uses a simple model to assess whether or not shares appear to be currently under or over priced. The model estimates the theoretical market value of each proprietary company by multiplying reported earnings over the year by a factor that depends only on the industry within which the company operates and on the current economic environment. For life insurance companies, the reported earnings used in this model are the change in embedded value over the year.

- (iv) Discuss this approach as applied to life insurance companies. [9]

The company is required to publish its embedded value results before completion of its regulatory solvency returns. One year, the reporting actuary decides to change the statutory valuation basis for conventional without profits immediate annuities after the embedded value has been published. Although actual investment yields are unchanged, he decides to strengthen both the valuation rate of interest and the mortality assumption.

- (v) Describe how each of these changes might affect the embedded value. [8]

Another investment analyst has said that the traditional deterministic embedded value calculations that the company uses will soon become a thing of the past because they do not allow appropriately for risk.

- (vi) Discuss this comment, including how the embedded value calculation might better allow for risk. [13]  
[Total 55]

- 2 A UK mutual life insurance company writes a wide variety of conventional and unitised with profits business. The value of the with profits liabilities as at 31 December 2005 was £750m. Over the last few years the company's free assets have gradually fallen, although the company is still comfortably solvent. The company has one with profits fund that has the following investment guidelines:
- 70–80% of the assets to be invested in equities or property
  - 15–25% of the assets to be invested in fixed interest securities, including gilts and UK company debt
  - 0–5% of the assets to be invested in cash and short-term deposits

The with profits business is primarily regular premium endowment business and regular premium personal pension business, both of which have been suffering from declining sales in recent years. The company declares annual reversionary bonuses and terminal bonuses.

The Actuarial Function Holder has recently carried out some investigations into the future financial position of the company and has suggested that a more suitable investment strategy for the with profits fund would be as follows:

- 55–65% of the assets to be invested in equities or property
- 25–35% of the assets to be invested in fixed interest securities, including gilts and UK company debt
- 0–10% of the assets to be invested in cash and short-term deposits

- (i) Describe how the Actuarial Function Holder may have used cashflow projections in order to reach this recommendation. [17]

The Board of Directors has decided to accept the Actuarial Function Holder's recommendation.

- (ii) Discuss the considerations the company would need to take into account before implementing the new investment strategy. [8]

- (iii) Discuss the possible impact of the change in the investment guidelines on the company's bonus distribution strategy. [10]

A Director has commented that, despite the suggested change in investment strategy, the company's realistic working capital, as reported in the FSA Returns, remains sensitive to changes in market conditions. He has asked whether this sensitivity can be removed.

- (iv) Discuss the points that you would make in your reply. [10]

[Total 45]

**END OF PAPER**