

INSTITUTE AND FACULTY OF ACTUARIES



EXAMINATION

20 April 2016 (pm)

Subject ST2 – Life Insurance Specialist Technical

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 all five questions, beginning your answer to each question on a new page.*
6. *Candidates should show calculations where this is appropriate.*

Graph paper is required for this paper.

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 from the approved list.

- 1** State the principles that should be applied when considering general alterations (excluding making policies paid-up) to conventional without profits policies. [6]
- 2** (i) Explain why a life insurance company would project its solvency position. [7]
(ii) Describe how a life insurance company might determine its future solvency. [10]
[Total 17]
- 3** A unit-linked savings product offers a fixed minimum guaranteed benefit at maturity.
The company wishes to calculate a market consistent liability for this maturity guarantee, using one of the following approaches:
- option pricing
 - stochastic simulation
- (i) Describe how these two approaches would be applied for this purpose. [15]
(ii) Comment on the relative merits of the two approaches. [6]
[Total 21]
- 4** A large life insurance company is considering buying a significant portfolio of in-force immediate annuities from a pension scheme. The arrangement involves the transfer of liabilities and the transfer of assets from the pension scheme. The value of assets to be transferred across will be decided after negotiation between the two parties.
- (i) Describe the risks to the insurance company that would arise from entering into this transaction. [14]
(ii) Suggest ways in which the insurance company might mitigate these risks. [14]
[Total 28]
- 5** (i) Describe how bonus is added for conventional (i.e. not accumulating) with profits business under the “additions to benefits” method. [6]
- A life insurance company has been distributing surplus to conventional with profits policyholders using a simple bonus approach under the additions to benefits method over a 20 year period.
- The company is now considering the alternatives of compound and super-compound bonus approaches for a new conventional with profits product that it is developing.
- When making the decision, the company has considered the previous 20 years and has calculated the regular bonus rates that would have been declared under each method if it had been applied in the past.

Under the simple bonus approach, the company actually declared a bonus of 5% p.a. for the first 5 years, 6% p.a. for the next 10 years and 4% p.a. for the final 5 years.

Under the compound bonus approach, it would have declared a bonus of 4% p.a. for the first 8 years, 5.5% p.a. for the next 8 years and 3% p.a. for the final 4 years.

Under the super-compound bonus approach, it would have declared the sum assured rate as 3% p.a. throughout the period and the attaching bonus rate as 8% p.a. throughout the period.

Consider a regular premium conventional with profits policy with a sum assured of 100 and a 20 year term, which was taken out at the start of the 20 year period being considered.

- (ii) Calculate, showing your workings, the total attaching regular bonus for this policy under the simple and compound bonus approaches described above, at the following times:
 - (a) at each point at which there is a bonus rate change for that particular approach; and
 - (b) at the end of the 20 year period. [6]
 - (iii) Show that the total attaching regular bonus for this policy under the super-compound approach at the end of the 20 year period is 137. [3]
 - (iv) Draw a graph that illustrates how the total guaranteed benefit changes over the 20 year period under each of the three bonus approaches. [It can be assumed that the bonus is added continuously over each year.] [4]
 - (v) Sketch on the same graph a line showing the approximate likely development of the asset share for this policy over the 20 year period, under stable investment conditions. [2]
- The life insurance company is not financially strong and finds it difficult to raise additional capital.
- (vi) Recommend, with reasons, which one of the three regular bonus approaches it should adopt for the new product. [4]
 - (vii) Comment on the potential disadvantages of your recommended approach. [3]
- [Total 28]

END OF PAPER