

# INSTITUTE OF ACTUARIES OF INDIA

## EXAMINATIONS

31<sup>st</sup> October 2007

### Subject ST2 — Life Insurance

Time allowed: Three hours (14.15\* pm – 17.30 pm)

#### INSTRUCTIONS TO THE CANDIDATE

1. *Enter all the candidate and examination details as requested on the front of your answer sheet/s.*
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. *The answers are not expected to be any country or jurisdiction specific. However, if Examples/illustrations are required for any answer, the country or jurisdiction from which they are drawn should be mentioned.*
4. *You must not start writing your answers in the answer sheet until instructed to do so by the supervisor.*
5. *Mark allocations are shown in brackets.*
6. *Attempt all questions, beginning your answer to each question on a separate sheet.*
7. *Candidates should show calculations where this is appropriate.*
8. *Fasten your answer sheets together in numerical order of questions. This, you may complete immediately after expiry of the examination time.*

#### Professional Conduct:

*It is brought to your notice that in accordance with provisions contained in the Professional Conduct Standards, If any candidate is found copying or involved in any other form of malpractice, during or in connection with the examination, disciplinary action will be taken against the candidate which may include expulsion or suspension from the membership of IAI.*

**Candidates are advised that a reasonable standard of handwriting legibility is expected by the examiners and that candidates may be penalized if undue effort is required by the examiners to interpret scripts.**

#### AT THE END OF THE EXAMINATION

Please return your answersheets and this question paper to the supervisor separately.

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

- Q. 1)** You are the Chief Actuary of an established listed insurance company with a full range of regular and single premium products sold through company agents. A new non executive director has just been appointed. She is not particularly familiar with either listed companies or life insurance companies and has asked for an informal discussion with you to improve her understanding. The first topic you discuss is the pricing of products and you explain how the sale of a new product can be viewed as a form of capital investment proposition by the shareholders. She understands this concept but then asks what considerations do you take into account when developing an appropriate return on shareholder capital that takes into account the risks involved.
- a)** What points would you make to the director? (9)
- You then explain there are other measures used to assess the financial effect of pricing a product and specifically mention net present values. She asks how one might best compare net present values across different product types.
- b)** State with reasons the alternative you would advocate. (2)
- The discussion turns to product types and you explain the risks to the company of various types of product – conventional non profit, with profits and unit linked. But she then asks whether risks to policyholders also vary by product type. They do, you say.
- c)** What general risks to policyholders for the main product types would you identify? (9)
- She tells you that before accepting her new appointment she reviewed a number of sets of financial statements but both the results and the assumptions identified seemed to differ significantly. You explain that there are a number of types of statement and valuations prepared for life insurers and different principles apply to each.
- d)** What types of accounts and valuation would you identify and what are the main drivers of the differences? (11)
- [31]
- Q. 2)** **a)** Describe the principal methods by which life insurers may be taxed and explain how taxation can impact product design and customer behaviour. (5)
- You are a recently appointed actuarial consultant to a life insurer in a country where the Government has recently announced a new retirement incomes policy as a result of which it predicts the market for all types of immediate annuity should expand dramatically. The insurer has traditionally focused on term insurance and knows little about annuities. You have been asked to make a presentation on the features of the different types of immediate annuity products.

- b) What bullet points on immediate annuity product types would you include?  
One of your later slides includes the heading “Risks” and you start to explain that annuity business involves mortality risks. (10)
- c) What specific risks would you mention and why would you say they are important? (2)  
You also include a section on new issues for the company and one of these is how assets should be invested given the particular nature of immediate annuity liabilities.
- d) What investment considerations, issues and potential solutions would you present? (11)  
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- Q. 3)** You are the product development actuary of an established and stable insurer that transacts four lines of business – life insurance and pensions business with both linked and non linked in each category. You are reviewing the standard assumptions made for expenses in product pricing and have a meeting with the newly appointed financial controller. He tells you that he has reviewed management reports over a number of years and the company’s expenses appear stable as a proportion of premium income. He suggests that it would be simpler all round if products were priced assuming that expenses were a constant proportion of premiums expected to be paid.
- a) What points initial points would you make in response to this suggestion? (3)  
The financial controller agrees that an expense investigation is justified and asks how you would like to approach this task.
- b) Describe the main steps you would recommend and which particular points you would emphasize. (10)  
Your next meeting is with the marketing manager. You mention the new investigation and the marketing manager says that when the results are completed it may be possible to address a long standing issue of uncompetitive large policies.
- c) What are the principal options available for amending the allocation of expenses in the setting of premiums for large policies? (3)  
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- Q. 4)** You are the pricing actuary of a life insurance company. Your company launched a conventional without profits critical illness term assurance contract ten years ago which it sells through intermediaries.
- a) State why the company would underwrite these contracts at inception. (3)
- b) Describe the factors the company should take into account when reviewing its medical limits and how it would determine by how much they should be increased. (3)

- c) Outline the principal methods by which special terms might be applied to the contract as a result of the underwriting process. (3)

The volume of new business sold has risen significantly in the last three years. Under the contract no benefit is payable on death or lapse. The company is about to review the profitability of the contract. For this purpose it is decided to carry out an analysis of the claims experience under this critical illness product.

- d) Describe how you might analyse the critical illness claims experience since launch. (9)
- e) Describe how the company might use the results of this analysis to set assumptions for calculating the profitability of the contract. (3)
- f) Describe why the results of this analysis may not be indicative of future experience. (4)

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