# THE INSTITUTE OF ACTUARIES OF AUSTRALIA

**LIFE INSURANCE**
**PAPER TWO**

**2002 EXAMINATIONS**

**Answer all 6 questions.**

## QUESTION 1 (13 marks)

You are a consulting actuary and have just received a phone call from an investment banker wanting to engage you to provide actuarial services in relation to a potential acquisition of a life insurance company by their client. She asks you to prepare an overview of the actuarial issues for the bank and their client based on the publicly available information.

(a) Outline the information you would use to prepare your presentation and what you would draw from each. (5 marks)

(b) At the presentation, the bank's client asks you to provide some material after the meeting summarising and contrasting the two different potential views of profit that you have discussed - the MoS profit and the change in Appraisal Value. Draft this document. (8 marks)

**QUESTION 2** **(20 marks)**

You are the Appointed Actuary of a medium-sized life office that has recently been taken over by a broad based financial services organisation. The life office has one statutory fund comprised of the following assets and liabilities:

| **Assets** | **$bn** |
|---|---|
| Fixed Interest | 2.3 |
| Equities | 0.7 |
| Property | 0.1 |
| Cash | 0.3 |
| Total | 3.4 |

| **Liabilities** | **$bn** |
|---|---|
| Investment Account | 1.7 |
| Participating conventional | 0.5 |
| Disability Income | 0.6 |
| Other risk | (0.2) |
| Tax | 0.2 |

The company has capital and retained earnings of $0.6bn. The excess of the Capital Adequacy Requirement over the Policy Liabilities is $0.4bn.

A new Chief Investment Officer (CIO), with a background in stock broking, has been appointed. He has reviewed the investment portfolios and presented a paper to the Board Investment Committee. In the paper, the CIO is highly critical of the conservatism of the previous management, noting that the asset mix of the investment portfolio was highly skewed towards fixed interest securities. In the paper, he recommends moving the portfolio to a more balanced asset mix by reducing the Fixed Interest exposure by $0.7bn and investing those funds in International Equities.

The Chairman of the Board Investment Committee has requested your written advice on the proposal. Draft your response.

(20 marks)

 

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**QUESTION 3** **(15 marks)**

You are the Pricing Actuary for superannuation products for a medium-sized Australian life office. Up until now, the life office has concentrated on individual retail products, but with the trend in superannuation for corporate funds to join Master Trusts, a Product Manager for Corporate Superannuation has been appointed.

(a) Outline the advantages and disadvantages of using marginal expenses in a product pricing basis. (5 marks)

(b) The Product Manager has developed a proposal for a new Corporate Superannuation Product. The proposal requires minimal initial outlay, but shows an ongoing fixed cost of $2m per annum for the infrastructure required to operate the business (general management, technical services, etc).

The Product Manager suggests to you that the product pricing basis should use marginal costing. She would like your written response to this suggestion in order to finalise her business proposal to the senior executive for approval.

Draft your response, including an opinion on the proposal to use marginal costing in the pricing basis. (10 marks)

**QUESTION 4** **(25 marks)**

You are the Product Actuary for a life insurance company that specialises in writing all classes of retail risk products and you have recently received a number of requests regarding specific business ideas.

(a) One of your best Agents has approached you with a business proposition to offer a premium discount and simpler underwriting requirements on Disability Income Insurance to small business owners in his local district.

(i) What underwriting requirements would you normally expect would apply to this group for Disability Income Insurance? (3 marks)

(ii) What concessions would you consider offering, what conditions would you place on the offer, and what process would you follow in determining your offer? (7 marks)

(b) The General Manager of Distribution has called you to a meeting with one of your company's senior financial advisers who recently returned from a trip to the USA, where he attended a seminar run for members of the Million Dollar Round Table. Whilst there, he became aware of a new product opportunity that he believes would provide your company with a unique marketing feature and enable it to gain status as an innovative leading company in risk business.

People in the medical profession are regularly exposed to infectious diseases, not all of which can be cured or immunised against. If a medical practitioner becomes infected with one of these diseases then they would have to cease practising and sell their business, as they would otherwise risk exposing patients to the disease. It is pointed out that Hepatitis C and HIV are reportable infectious diseases and that any occupational incident where there is a risk of infection is required to be documented under the Universal Precautions Guidelines.

The issue is that when medical practitioners become infectious, cease practise and sell their business, they often do so quickly, thus resulting in a lower price for the business than they would normally achieve. The provision of a lump sum benefit would enable the practitioner to cover the costs of the business and sell it in a more orderly fashion.

The Financial Adviser is proposing that in addition to the normal income protection benefit provided in the company's product, for an additional premium, the company offers the payment of a lump sum on the diagnosis of Hepatitis C or HIV.

The General Manager believes that this is an excellent opportunity and has asked you to draft a product specification for this rider benefit.

(i) In your product specification, outline what you believe to be an appropriate benefit design including eligibility criteria, underwriting requirements, exclusions, claim criteria, and any limitations to the benefit. (10 marks)

(ii) Outline the factors you would consider in determining a price for the optional benefit and outline the key steps in performing the pricing analysis. (5 marks)

## QUESTION 5 (11 marks)

You are the Capital Management Actuary for a medium-sized life office writing risk insurance business in Australia that has been recently purchased by a bank. The bank's management is very risk averse and desires a stable flow of reported profits from year to year. Following the purchase, the bank has limited capital available and is keen to free up capital employed in the business so that it can be used to fund further expansion.

The new CFO, who transferred over from the banking business, has read in the media about the reinsurance arrangements employed by HIH, and wants to ensure that appropriate reinsurance arrangements are in place for the life business. He has no prior knowledge of reinsurance and is, therefore, reliant on you for advice on the potential opportunities to use reinsurance to smooth profits and/or reduce capital requirements.

He has asked you to consider potential reinsurance strategies that may reduce the capital requirements of the business and to draft a paper outlining the alternatives available. For each of the proposals in your paper, make sure you consider the impact of the proposal on the bank's key measures, reported profits and capital position.

(11 marks)

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**QUESTION 6** **(16 marks)**

You are an actuary responsible for the Appraisal Value calculations in a large financial services organisation. Historically Appraisal Values have only been determined for the life insurance entities in the group. Recently, you have been asked to investigate preparing valuations for the funds management entities within the company on a consistent basis with those for the life entities.

Your first step is to meet with the Financial Controller (an accountant) for the funds management entities to discuss the concept, including what could be done and the information required. As preparation for your meeting, you decide to plan the process and identify issues that you expect to emerge, as well as potential differences to the work you have done on the life insurance valuations.

(a) Outline your initial plan, documenting at each step what issues you expect may emerge. Make sure that you consider each of the components of the Appraisal Value. (5 marks)

(b) Identify, with reasons, the assumptions you expect to be most important to consider in the derivation of each of the components of value in the environment described. (4 marks)

(c) You have been given some initial information on the businesses to help with your preparation for the meeting. Given the information below, estimate the appraisal value of the business and outline the reasoning behind your approach as well as the results.

| | |
|---|---|
| Net Assets | $10m |
| Present Value of Future Profits - Existing Business | $50m |
| Present Value of Future Profits - Next Year's Sales | $10m |
| Average New Business Growth Rate (1996 - 2001) | 5% |
| Planned NB Growth Rate (2002 +) | 10% |
| Capitalisation Factor @5% sales growth rate | 12 |
| Capitalisation Factor @10% sales growth rate | 9 |
| Current Year Earnings | $20m |
| Funds Under Management | $5 billion |

(5 marks)

(d) The Financial Controller is sceptical about the approach. Describe for her how appraisal values of life companies have been used. (2 marks)

**END OF PAPER TWO**