# EXAMINATION

7 April 2008 (am)

## Subject CA1 — Core Applications Concepts

## Paper One

*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 6 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 from the approved list.*

**1** A life insurance company is considering offering an immediate annuity product. Rather than paying cash to purchase the annuity, the policyholder would give the company an interest in a residential property belonging to the policyholder.

The terms are that the policyholder would continue to live rent free in the property until his or her death, and meanwhile receive an annuity. On death, the property would belong to the life insurance company.

The annuity would be payable throughout life and could be either level or linked to an inflation index. It could be written on a single or joint life last survivor basis.

An elderly homeowner with no current mortgage wishes to release the equity in their home.

(i) Describe the cashflows involved if the homeowner were to:

(a) sell their home and move to a smaller, cheaper residence;
(b) take out this policy in respect of their existing home. [5]

(ii) Discuss the disadvantages to the homeowner of taking out this policy, compared to selling their home and moving to a smaller, cheaper residence. [5]
[Total 10]

**2** (i) List the items that an insurance company would consider when determining the assumption for future expense inflation in its financial modelling. [2]

A life insurance company has estimated the unit costs for the following year based on its expense and new business volume budgets for the following year. Unit costs are:

- the per policy cost of maintaining each in force policy
- the expected cost per claim processed
- the cost per unit of new business written
- the cost of investment management as a proportion of funds under management

The unit costs vary with the type of contract, depending on the complexity and level of activity involved in various aspects of administration. Unit costs include allowances for overheads and other indirect costs.

(ii) Describe how the company would use these expected unit costs to allow for future expenses in:

(a) the valuation of liabilities at the coming year end;
(b) re-pricing its major product lines.

You do not need to describe how the unit costs are derived. [10]
[Total 12]

**3** A large developed economy has a domestic equity market which is commonly divided into 20 sectors. Each sector contains at least 20 stocks.

A university in that country has a substantial portfolio of investments. Various committees made up of members of the academic staff determine the investment strategy.

The committee responsible for investment in domestic equities holds an annual strategy meeting. Prior to the meeting the return on each stock in the whole market over the previous year is obtained. At each meeting the committee decide to invest in 16 stocks. These stocks are selected from the whole market as follows:

The fourth, fifth, sixth and seventh best performing stocks in the fourth, fifth, sixth and seventh worst performing sectors are identified. The whole fund is then divided equally between these stocks. No changes are made to these investments until the next strategy meeting. No specialist investment managers are used and the committee wishes to make as few active investment decisions as possible.

(i) Outline why the committee might use a passive investment approach. [3]

(ii) Explain the rationale behind the approach to stock selection described above. [4]

(iii) Describe situations or events where decisions may need to be taken by the committee between strategy meetings. [6]

(iv) Discuss the types of indices the committee should use to assess the performance of this domestic equity fund. [4]
[Total 17]

**4** (i) Outline the main factors to be considered by an individual in developing a personal investment strategy. [10]

(ii) State the additional factors a financial institution will need to consider when developing an investment strategy for the funds it offers to individual customers. [3]

Three members of a family have each inherited a sum of money.

- A single 23 year old in full time employment (but not in a pension scheme) living in rented accommodation. His inheritance is five times his annual income.
- A married 50 year old in full time employment (in a pension scheme), with two children in full time education, living in his own home, which is mortgaged. His inheritance is twice his annual income.
- A widowed 75 year old living in her own home. Her inheritance is ten times her annual income.

(iii) Outline how each family member could use their inheritance. [9]
[Total 22]

**5** The regulatory regime in a certain country requires each life insurance company to appoint a Pricing Actuary. The Pricing Actuary may be an employee of the company. The function of the Pricing Actuary is to certify that the company's premium rates are sufficient to provide for the risks that the company expects to take on in the next twelve months. A new certificate has to be given whenever there is a change in premium rates, or annually if no rates have changed. The certification is based on the whole portfolio of business. The regulations do not preclude particular product lines being written as loss leaders, provided that the certificate can be given for the whole expected portfolio of business. A Pricing Actuary who is unable to give a certificate must make a report to the Regulator.

A life insurance company has a Pricing Actuary who is an employee. The company writes a wide range of products, but 50% of its new business arises from annuities written on retirement of members of pension schemes. This market is becoming increasingly competitive, and in order to maintain market share the profitability of the annuity rates has been steadily reducing.

Fixed interest yields have recently reduced significantly, but the company has decided to leave annuity rates unchanged in the hope of increasing new business. The Pricing Actuary has some concerns about whether he can give the necessary certificate. The Chief Executive points out that as there is no change in premium rates, a new certificate is not required, and in any event the regulations permit products to be sold as loss leaders.

Outline the technical and professional issues that the Pricing Actuary should raise in his discussions with the company before deciding whether or not to give the certificate. [16]

**6** A government is following a policy of transferring some of its operations and employees to the private sector. As part of the transfer agreements, the new employers are required to make a commitment to provide pension benefits for future service that, overall, are at least as good as those that would have accrued under the government's defined benefit scheme. The government scheme currently links increases to pensions in payment to an inflation index and provides relatively generous benefits on early or ill health retirement.

(i) Describe the various ways of interpreting and assessing the pensions commitment. [7]

(ii) State any significant problems that a new employer could encounter in trying to meet its commitment. [3]

(iii) Outline the actions a new employer could take to make up the shortfall in benefits if they are unable to satisfy the pensions commitment fully. [5]

(iv) Discuss how any benefits accrued in the government scheme prior to the transfer of employment could be accommodated under the new arrangements. [8]

[Total 23]

## END OF PAPER