Faculty of Actuaries **Institute of Actuaries**

EXAMINATION

31 March 2006 (pm)

Subject ST4 — Pensions and other Benefits 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 8 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 You are the actuary to a large mature defined benefit pension scheme. The active membership is employed by a company in a heavy engineering industry. In addition to retirement benefits the pension scheme provides a lump sum and a spouse's pension if a member dies in service.

Outline the factors that should be considered when deciding whether or not to insure some or all of the death in service benefits. [8]

2 A medium sized company in a developed country has for many years sponsored a defined benefit pension scheme for its employees, written under a Trust Deed.

At the recent valuation, completed as at 31 December 2005, the scheme was only 70% funded on a minimum funding assessment, and the results showed that the liability profile is mature.

At present 17% of the total value of the pension scheme's assets are held in the ordinary share capital issued by the sponsoring employer. In the last 5 years there have been no sales or purchases of those shares.

The performance of the company's shares, measured in terms of total performance from capital growth and income, compared to the country's main share market index over the last five calendar years is as follows:

	2005	*2004*	*2003*	*2002*	*2001*
Company	+9.3%	+8.2%	–12.6%	–2.1%	+17.4%
Index	+4.1%	+1.9%	–7.0%	–1.9%	+7.9%

(i) Discuss the appropriateness of holding the company shares in the pension scheme's investment portfolio, from the viewpoint of the scheme's trustees. [6]

(ii) Outline ways in which the investment risks associated with the current holding of the sponsoring company's shares could be reduced. [3]
[Total 9]

3 You are the actuary to a large defined benefit pension scheme. The trustees of the scheme are reviewing the current investment strategy which will include the use of an asset liability model.

(i) Outline the general issues that should be considered in the investment strategy review. [4]

(ii) Describe the objectives and the characteristics of, and the outputs from, an asset liability model. [6]
[Total 10]

4 A new defined benefit scheme is being set up. The employer is considering providing the following options for the members:

- Payment of a retirement benefit at a date earlier than normal retirement age.
- Payment of a transfer value if a member leaves employment before normal retirement age.
- Allowing conversion of pension to cash at retirement.

(i) Set out the general issues to be considered before a decision is made to offer any of the above options. [6]

(ii) State a simple equation of value for the early retirement option. [2]

(iii) Outline the practical issues that should be considered when determining the terms to offer for each of the three options. [4]

[Total 12]

5 Discuss the reasons for undertaking actuarial valuations of defined benefit pension schemes from the perspective of:

(a) Scheme sponsors
(b) Scheme members
(c) Shareholders
(d) Regulators

[12]

6 You are the actuary to a long established defined benefit pension scheme that was closed to new entrants after the previous valuation. The next actuarial valuation is due.

(i) Discuss the characteristics of the Projected Unit and Attained Age funding methods. [5]

(ii) Set out simple formulae (ignoring any pre-retirement decrements) that could be used to calculate the Standard Contribution Rates for the Projected Unit and Attained Age funding methods respectively. [4]

(iii) Explain how you could estimate the Standard Contribution Rate for the Attained Age funding method from the calculated Standard Contribution Rate for the Projected Unit funding method. [2]

(iv) Set out the different ways company contributions could be structured to eliminate a funding deficit and outline the characteristics of each method. [4]

[Total 15]

7 A government has established a new framework for protecting benefits offered by employers to members of approved defined benefit pension schemes. Very generous tax breaks will be awarded to employers who establish such schemes. However, under the new framework, a failure to meet any of the liabilities of the scheme will result in the directors of the company being personally responsible for making good any shortfall in benefits to the members.

Stating any additional assumptions you make about the new framework, describe the:

(a) funding implications
(b) investment implications
(c) benefit design issues; and
(d) security issues

that might arise under such a regime. [16]

8 You are the actuary to a large defined benefit pension scheme which has 100,000 pensioners, 50,000 deferred pensioners and 100,000 active members.

Explain how you would establish a best estimate valuation basis for this scheme. Your reply should cover the components of the basis where you would expect to use standard assumptions and those which would need to be scheme specific in order to meet the best estimate objective. [18]

END OF PAPER