INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

4 October 2011 (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 before 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 eight 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 (i) Define the net replacement ratio. [1]

(ii) Discuss the limitations of using the net replacement ratio as a measure for individuals' need for post-retirement income. [5]
[Total 6]

2 A company runs a non-contributory defined benefit pension scheme for its employees. The benefits provided are one sixtieth of gross earnings in the year before retirement for each year of service. On death before or after retirement, there is an attaching spouse's pension on the death of a member of two-thirds of the member's pension accrued at the date of death. Pension increases before and after retirement are in line with price inflation.

The company wishes to keep the scheme open to both new entrants and future accrual of benefits, but has expressed concerns over the ongoing cost of benefits. The company has asked the actuary advising the scheme to suggest ways to reduce the expected cost of future accrual to the company.

(i) List the possible changes to benefits that could be made. [5]

The actuary has also been asked to highlight which of the above changes would be both simple to implement and would result in a significant reduction in the cost of future benefit accrual.

(ii) Suggest three distinct changes and illustrate the approximate effect of each of the changes on the cost of future accrual. [3]
[Total 8]

3 A 45 year old man living in a developed country has been receiving a £1,000 per month ill-health benefit under an insurance policy for the last five years. The health condition that led to the insurance claim prevented him from continuing in employment but is not thought to be life-threatening. The policy pays this level of benefit until he dies, reaches age 65, or his health recovers sufficiently to be able to return to his previous employment, whichever is the earlier.

The insurance company has made a one-off lump sum offer to the man of £100,000 in exchange for all future benefit payments under the policy. Long-term and short-term interest rates, as indicated by government bond yields in that country, are currently 4% per annum.

Discuss the considerations and risks that should influence the individual's decision whether or not to accept the offer. Tax and regulation can be ignored. [10]

4 The trustees of a defined benefit pension scheme are about to undertake a formal actuarial funding valuation and have been discussing the possible methods available to set the discount rate used to value the assets and liabilities.

The liabilities of the scheme are approximately 40% for pensions in payment and 60% for non-pensioners. The scheme is currently invested 80% in equities and 20% in government bonds. The following current market information and historic data is available:

Gross redemption yield on over 15-year government bonds: 4.80% per annum
Gross redemption yield on under 15-year government bonds: 3.30% per annum

Period of measurement	*Annual average return, in excess of inflation on equities*	*on bonds*
1946 to 2010	6.0% per annum	0.9% per annum
1970 to 2010	5.7% per annum	3.5% per annum

For each of the three approaches to setting the discount rate listed below:

- an asset-based discount rate
- mark to market
- bond yield plus risk premium

(a) explain the key features of the approach, and
(b) suggest an appropriate discount rate, based on the information provided

[12]

5 The sponsor of a large defined contribution pension scheme has carried out an employee satisfaction survey. This indicated poor awareness of the details of the scheme, and that employees ranked the scheme much lower than other benefits that cost less for the sponsor to provide. The sponsor is, therefore, carrying out a general review of the scheme.

Outline the objectives of the review that should be considered under the following headings:

- Investments
- Administration
- Communication
- Company considerations
- Member considerations

[13]

 PLEASE TURN OVER

6 A company operates a long service award scheme which pays cash lump sums to employees completing specified periods of service with the employer. The scale of awards is currently as follows:

Service completed	*Lump sum paid*
5 years	$500
10 years	$1,000
20 years	$5,000
40 years	$10,000

No lump sum is paid if an individual leaves service or retires for any reason before completion of the required service for the next payment. There is no formal requirement to increase the level of awards, but they have been reviewed from time to time by the board of the company, and have been increased broadly in line with price inflation.

The finance director of the company has expressed concern that whilst this benefit appeared relatively cheap to provide initially, it may become a problem at some point in the future, particularly as the amounts are currently met on a pay as you go basis.

(i) Describe how the actuarial control cycle could be used as a framework for providing advice to the finance director on this scheme. [6]

The finance director has asked for actuarial advice on establishing a funded reserve to meet payments under the scheme.

(ii) Discuss how to establish an actuarial value for the liabilities of this scheme. [8]

[Total 14]

7 A company with a large overseas parent operates a defined benefit pension scheme. The company is experiencing trading difficulties and has approached the scheme's trustees to suggest closing the scheme to future accrual.

(i) Outline the immediate and longer term employer covenant assessment issues that the trustees might consider in reaction to the above suggestion. [4]

A recent valuation of the scheme has revealed a significant deficit on the agreed funding basis.

(ii) Discuss the security that the trustee might seek from the company as an alternative to extra cash payments into the scheme. [6]

As part of a refinancing package to ensure the company continues in existence, the parent company has offered to make a final one-off payment into the pension scheme to permanently remove the company's obligation as scheme's sponsoring employer.

(iii) Discuss the issues that the trustees would need to consider before accepting the company's offer. [7]

[Total 17]

8 A large mature defined benefit pension scheme is about to undergo a full funding valuation. The actuary has received all the membership data and has asked an actuarial student to obtain all the other data needed to complete the valuation.

(i) Outline the other information the student should obtain, explaining, for each item, why it is needed in order to complete the valuation. [10]

(ii) Outline the principal checks that should be performed on the membership data. [6]

(iii) Explain why the membership data the actuary needs to calculate a cash equivalent transfer value for an active member might differ from that used for the same individual for the funding valuation. [4]

[Total 20]

END OF PAPER