EXAMINATIONS

15 April 2002 (am)

Subject 304 — Pensions and Other Benefits

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.*

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 Actuarial Tables and your own electronic calculator.

1 Discuss the factors to be considered in deciding whether or not members should be required to contribute to the pension scheme offered by their employer. [5]

2 A government wants to ensure that employees are adequately provided for if they become unable to work on health grounds. It has proposed legislation requiring employers to provide an income equal to salary when last at work. The payments will increase in line with the company's own pay increases and will be made for as long as the employee is unable to work. Employers have objected that this would be too expensive to provide because the benefits are too high and costly to administer. In particular it will be expensive to check continued inability to work, and the benefit may continue to be payable long after the individual would normally have retired.

List four changes that could be made to the proposed legislation to reduce the potential costs to employers. Explain how these will still enable an adequate income to be provided for such employees and how each will help to control employers' costs. [8]

3 You are the actuary to a defined benefit pension plan for which membership is voluntary. The plan has a $1/80^{th}$ accrual rate and provides benefits based on prospective service to age 65 for members who retire on ill-health grounds.

(i) Discuss the advantages and disadvantages for the employer of the following options in connection with the benefits on ill-health retirement to be provided to employees who do not join the plan when they start employment:

- offer membership at any time with no regard to medical evidence
- only permit membership on receipt of satisfactory medical evidence
- offer membership but with some adjustment to ill-health benefits [4]

The employer has proposed using the third option set out in (i). It has been suggested that the element based on future potential service should be pro-rated in line with the proportion that completed pensionable service bears to completed company service.

(ii) Calculate and compare the benefits arising from this proposal with those that would arise if no adjustment was made to future potential service, taking as your example an employee who commenced employment on their 25^{th} birthday but joined the plan on their 40^{th} birthday.

Compare the benefit arising if ill-health retirement occurs at ages 40, 50, 60 and just prior to their 65^{th} birthday with the pension that would have been granted if the first option in (i) were adopted. [5]

(iii) Comment on the employer's proposal. [4]

[Total 13]

4 An employer which operates a defined benefit (DB) pension scheme with an accrual rate of $1/60^{th}$ and normal retirement age of 65 has decided to close the scheme to new entrants and set up a money purchase (MP) pension scheme. Member contributions to the DB scheme are 3% of salary, this rate will also be paid to the MP scheme.

(i) The employer has asked for your advice in determining a contribution scale for the MP scheme. Three options are being considered for the employer's contribution rate:

- a single rate for all employees
- an age related scale
- a service related scale

Draft a report on the advantages and disadvantages of each option which should include an explanation of how you would determine a reasonable contribution arrangement under each option (formulae and calculations are not required).

[Two marks are available for drafting.] [10]

(ii) Based on your report the employer has opted for the following age related scale:

Age last birthday	*Employer contribution (% of basic salary)*
under 30	5
30 to 39	7
40 to 49	9
50 and over	12

Ignoring pre-retirement decrements and using the following assumptions:

Salary increases	= price inflation + 1¾% per annum
Interest	= price inflation + 5% per annum
Annuity cost at age 65	= 15 for each unit of pension

Calculate the pension as a percentage of the DB benefit available previously to a member who joins the MP scheme on their 25^{th} birthday and who retires at age 65. [7]

(iii) Repeat the calculations in (ii) for the same member if they leave service on their 42^{nd} birthday and comment on your results. You should assume that during deferment the deferred pension from the DB scheme increases in line with price inflation. [5]

(iv) Annual joint contributions of 15% of members' basic salary are currently being paid to the DB arrangement. The finance director has asked you to confirm that his pension costs will be reduced. Outline the points you would make in your reply. [10]

[Total 32]

Questions 5 and 6 relate to the following scheme:

Membership: 8 retired members in receipt of pension
25 deferred pensioners
70 current members accruing benefits

The company's managing director is one of the current members and will reach retirement age in just over 3 years time after 35 years' pensionable service. When he retires he is looking forward to spending more time with his young wife.

The scheme's benefit structure is as follows:

Pension accrual	1/40th Scheme Salary for each year of pensionable service.
Spouses pension	Death after retirement: 75% of member's pension.
	Death before retirement: 75% of member's prospective pension but for the first year after death the pension payable is equal to the member's full prospective pension.
Pension increases	In line with consumer price inflation.
Lump sum benefit	Retirement: 2 × pension (in addition to pension).
	Death in service: 5 × Scheme Salary.
Scheme Salary	Gross salary received in the previous 12 months.
Leaving service benefits	Full accrued benefit revalued to retirement age in line with consumer price inflation.

The scheme's assets are 50% company shares, 50% fixed interest government bonds. The shares and bonds are readily marketable on the stock exchange.

When the scheme was last valued, 2 years ago, there was a small surplus. At that time the value of the liabilities was split:

5% pensioners;
10% deferred pensioners;
25% managing director;
60% other members.

The scheme membership has not changed over the two years. Salaries were boosted last year by bonus payments amounting to 33% of salary for the managing director and 20% for all other members.

You have recently been appointed to provide actuarial advice in connection with the scheme.

5 The scheme has always insured the death in service lump sum but has paid pensions and retirement lump sums from its contributions and investments.

Taking account only of the benefits payable in respect of the managing director, whose Scheme Salary is signficiantly higher than that of any other member of the scheme, describe how the scheme would be affected by a decision to insure or not insure for the whole scheme:

(i) death benefits [6]

and

(ii) benefits at retirement age [4]
[Total 10]

6 (i) List the items for which you will need to make assumptions in order to value the scheme's liabilities. [3]

(ii) Describe the investigations you would carry out into the asset and liability experience of the scheme over the last two years. [13]

(iii) Explain the extent to which you will take account of the recent experience of the scheme when choosing your valuation assumptions, list the other information you would seek and state the possible sources of this information. [10]

(iv) You have valued the managing director's benefits separately. For the remainder of the membership you are taking the assets at market value and are going to use a market related discount rate to value the liabilities.

Describe three methods you could use to set the discount rate for valuing the liabilities. [6]
[Total 32]