EXAMINATION

1 November 2016 (am)

Subject F104 — *Pension and Other Benefits* Fellowship Principles

Time allowed: Three hours

INSTRUCTIONS TO THE CANDIDATE

1. *Use the instructions and password provided at the examination center to log in.*

2. *Submit your answers in Word format only using the template provided. You MAY NOT use any other computer program (e.g. Excel) during the examination.*

3. *Save your work regularly throughout the examination on the supplied computer's hard drive.*

4. *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.

5. *You must not start typing your answers until instructed to do so by the supervisor.*

6. *Mark allocations are shown in brackets on examination papers.*

7. *Attempt all seven (7) questions, beginning your answer to each question <u>on a new page</u>.*

8. *You should show calculations where this is appropriate.*

Note: The Actuarial Society of South Africa will not be held responsible for loss of data where candidates have not followed instructions as set out above.

AT THE END OF THE EXAMINATION

Save your answers on the hard drive AND hand in 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.

QUESTION 1

The sponsor of a medium-sized Defined Contribution fund has decided that the fund contributions are no longer affordable and the scheme should be discontinued. The employer decides to wind up the scheme.

i. What two alternative actions could have been taken that would have allowed all employer contributions to cease? For each give a reason why winding up could be preferred.

[2]

ii. At the most recent valuation date, the fund showed a surplus. The fund's only liabilities are the member liabilities. Outline the factors that the trustees should consider in any distribution of surplus.

[5]

[Total 7]

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QUESTION 2

A large employer in a certain country has operated a Defined Contribution fund for many years where the total contribution rate towards retirement funding is 10% of salary. The contribution rate was determined many years ago in a very different economic climate.

i. Describe the process that you would use to carry out an experience analysis on salary inflation for this fund.

[5]

ii. Determine the percentage of income replacement that a new member who enters the fund at age 25 and retires at age 65 can expect, applying the following basis:

Investment return net of expenses:16.48% p.a.
Salary increases:12% p.a.
Annuity factor at age 65:20

You can assume that contributions are paid on average midway through the year and that your hypothetical member will get their first salary increase in a year's time.

[5]

iii. Records from the time when the contribution rate was set have been destroyed. However, there are emails suggesting that a salary increase rate of 14% p.a. was used to determine the contribution rate. Salary inflation over the period has been close to 12% p.a. The benefits manager is perplexed that the actual salary inflation rate has been lower than expected, as have the achieved replacement ratios. He expected that salary inflation and achieved replacement ratios would have been negatively correlated. Explain why the relationship appears to have been positive in this case.

[4]

[Total 14]

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QUESTION 3

An employer sponsors a well-established, mature, large Defined Benefit fund. Contributions have always been calculated using the Projected Unit Method (PUM).

The employer is in some financial difficulties and is trying to cut costs. The financial officer of the employer, a former actuary, says that he seems to remember that the contribution rate under the Current Unit Method (CUM) is generally lower than that under the PUM.

i. Define the Current Unit Funding Method.

[3]

ii. Discuss the relative standard contribution rates under the PUM and the CUM, with reference to a mature fund.

[5]

iii. Discuss the likely modified contribution rate if the funding method were to be changed to CUM and hence comment on the financial officer's assertion.

[3]

iv. Comment on the relative merits of the CUM and PUM for this fund.

[4]

[Total 15]

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QUESTION 4

The government of Scotia, a developed country, pays a universal pension to all individuals aged 60 or more if they are not working. This benefit, which is set at a level designed to cover the basic necessities, is the same monthly amount for all retirees, and is financed from general income tax on working individuals.

i. Discuss the advantages and disadvantages of this design of retirement system for the government of Scotia

[4]

The government of Hibernia, which is also a developed country, offers an identical pension to that of Scotia but with two differences: the benefit is means-tested and the benefit is set at the median earnings level of workers in Hibernia. Fertility has been declining and longevity increasing and the government is concerned about the impact that the changing demographics of the country will have on the scheme. They switched from a pure Pay-As-You-Go financing system to a Scaled Premium financing system a few years previously.

ii. Describe how the Scaled Premium contribution rate is calculated over time.

[3]

iii. Demographic risk is just one risk that the government scheme of Hibernia faces. Describe some of the other risks the government faces.

[6]

iv. The switch to Scaled Premium financing was politically unpopular and a politician from Hibernia was recently quoted in the press stating that the change in financing method "has fixed the problem once and for all and has other positive effects, such as stimulating investment." Discuss this statement.

[5]

[Total 18]

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QUESTION 5

Two employers, A and B, operating in the same industry sponsor retirement funds for their employees. In both funds each member has their own separate account to which net contributions and investment returns are allocated and fund expenses are deducted. Fund A (of employer A) allocates the actual investment returns earned on the underlying assets to members' individual accounts. Fund B (of employer B) allocates a fixed return of x% per annum to members' individual accounts, regardless of the actual investment return earned on fund assets.

Both funds are funded in advance by the payment of regular contributions.

i. Fund A and B are very distinct fund types. Name the fund types and outline the implications of the differences between these two funds from the points of view of the employer and members respectively.

[7]

ii. Fund A and Fund B both offer death benefits through group life insurance policies equal to the maximum of four times salary and the individual member account at the date of death. The premium rates payable by Fund A are lower than those payable by Fund B. Explain possible causes of the difference in premium.

[5]

iii. In Fund A contributions of younger members are invested in higher-risk assets, such as equities, and older members' contributions in more stable assets, such as bonds and cash. The switch from higher-risk to growth assets occurs at a predetermined age such that both funds are expected to deliver returns of x% p.a. over the long-term. Members that retire from Funds A and B must use all of their individual account to purchase a life annuity from a life office. Detailing the investments that would normally back different types of annuity, outline the implications of the different investment structures for members at retirement.

[4]

[Total 16]

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QUESTION 6

A large Defined Contribution pension fund invests in a balanced mix of equities, bonds and cash. The member trustees of the fund have approached the sponsor to request that the fund introduces a minimum benefit on withdrawal equal to a return of the member and employer contributions, increased with inflation.

i. Describe how you would value the cost of the guarantee.

[7]

An employer trustee has stated that "We are invested in the market, which goes up and down. We will be paying out these minimum benefits all the time!"

ii. Comment on the trustee's assertion regarding the frequency with which the minimum benefits will be paid out.

[3]

iii. Briefly outline how the sponsor could finance the cost of these minimum benefits, assuming the investment strategy is not altered and that regulations allow for full flexibility in terms of financing.

[3]

The employer has stated that they will not finance any additional cost of the minimum benefit. However, if the trustees can find a way to provide for the benefit by altering the investment strategy of the fund, the employer would probably accept the proposal.

iv. Describe how the Trustees could achieve this, and comment on the effect this will have on fund benefits.

[3]

[Total 16]

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QUESTION 7

In a certain country, the state operates a pension scheme that it is compulsory for all workers to join. The benefit is an inflation-linked monthly benefit that is received tax-free at retirement. The benefit is the same for everyone. The scheme is funded by contributions which are a fixed percentage of salary; however the salary on which the contributions are based is capped.

In addition, workers earning above the cap may opt to join voluntary employer-based Defined Contribution schemes. Contributions and investment growth are taxed, however benefits are received tax-free at retirement.

i. The government wants to encourage private savings for retirement by making changes to the design of the state-operated pension and changes to the tax-incentives on the employer-based schemes. Outline various options available to them, explaining the rationale for each suggestion and highlighting possible shortcomings of each option.

[10]

ii. Apart from tax incentives, what other alternatives does the State have for encouraging provision?

[4]

[Total 14]

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END OF PAPER

