

EXAMINATION

2 November 2018 (am)

Subject F104 — *Pension and Other Benefits* Fellowship Principles

Time allowed: Three hours

INSTRUCTIONS TO THE CANDIDATE

1. Follow log in and saving instructions issued to you at the exam venue.
2. Save your work throughout the exam.
3. You are required to 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.
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 exam papers.
7. Attempt all eight (8) questions, beginning your answer to each question on a new page.
8. Candidates should show calculations where this is appropriate.
9. If answer booklets are used for any question(s) start each question IN A SEPARATE ANSWER BOOKLET, entering all candidate and examination details on **EACH**.

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

**Check that you have saved your work as per instructions given to you.
Hand in your question paper with any answer booklets firmly attached.**

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

A large well-developed country has a welfare system that provides an old age pension. The pension is a fixed amount per individual and is subject to means-testing. The benefit is funded from general income tax collected each year.

The country has historically had a Gini coefficient of 0.4. Over the last five years this measure has increased to 0.5. The income tax collected has remained relatively constant in real terms.

- i. Define the Gini coefficient and explain what an increase in the coefficient implies. [3]
- ii. Outline how the increase in the Gini coefficient may affect the provision of the old age pension in this country. [4]

[Total 7]

QUESTION 2

- i. Compare and contrast mutuality and solidarity. [2]

All employees at a particular company must join that employer's defined contribution retirement fund. In addition to retirement benefits, the fund also provides a death benefit of a return of the accumulated fund credit plus a lump sum benefit. For the lump sum benefit, each member contributes 1% of their annual fund salary towards the death benefit and in return receives death cover (expressed as a multiple of fund salary) based on their age category. The age categories are based on 5 year age bands, for example, under 25, 25-29, 30-34, 35-39 etc. The level of death benefit (expressed as a multiple of fund salary) in each age band is such that the expected benefit cost is 1% of annual fund salary in each age band.

- ii. Explain with reasons whether this death benefit design reflects mutuality or solidarity. [3]
- iii. Outline ways that the fund manage its mortality risk without changing the benefit design, highlighting the shortcomings for each. [4]

[Total 9]

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QUESTION 3

A particular country has a well-developed retirement and medical insurance industry. Employers typically subsidise participation in a medical insurance scheme prior to retirement and offer comprehensive retirement benefits. At retirement, members are compelled to convert their retirement savings to a regular pension. There are no state benefits for retirement or healthcare and all medical scheme members pay the same level of contribution regardless of their risk status.

- i. Recent research indicates that the retired population have the lowest representation in the universe of medical scheme members. Suggest reasons why this might be the case. [3]
- ii. The state has suggested that medical schemes should consider introducing reduced rates for members of society who are over the country's normal retirement age. The state has agreed to subsidise the balance of the cost experienced by the schemes. Discuss the potential impact on contributors, retirees and the retirement fund industry if this plan is implemented. [10]

[Total 13]

QUESTION 4

A growing employer decides to sponsor a defined benefit retirement fund for all employees in service. One of the company directors suggests the use of the Current Unit Method in determining the contribution rate to keep contribution rates low in the early years and a switch to the Projected Unit method later on.

- i. Describe the current unit method of determining contribution rates. [3]
- ii. Comment on the suggestion made by the company director, describing how you would expect the contribution rate to move in the future. [10]
- iii. The tax authority grants preferential tax treatment up to a specified limit. The Current Unit Method is not approved for tax purposes. Suggest a reason why. [1]

[Total 14]

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QUESTION 5

A defined contribution retirement fund has the following design:

Members select a contribution rate between 8% and 14% of salaries, and the employer matches member contributions. The total contribution is applied as follows:

0.85% of salaries for Group Life Assurance cover

1.2% of salaries for expenses

0.25% of salaries for reserves

The remainder is invested for retirement. The fund's investment portfolio is assumed to return 4% p.a. in excess of inflation. The normal retirement age in the fund is 67.

The fund has approached you to perform some calculations to give members reasonable recommendations of the most appropriate contribution rate. You may assume that salaries will grow at 2% p.a. and that relevant inflation linked life annuities can be purchased for the following prices:

Male aged 67 17.065

Female aged 67 19.553

- i. Using the assumptions above (which are deemed to be realistic), show that the recommended contribution rate for a man entering the fund at the age of 30 is just under 14%. The contribution rate should be such that, if maintained over the working life of the member, it results in a Replacement Ratio of 80% of salary. [5]
- ii. Define sensitivity testing and perform a sensitivity test on the investment return assumption. [4]
- iii. Briefly outline the points you would make to the ABC trustees in your report of the results of this investigation. [3]

[Total 12]

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QUESTION 6

The government of a particular country have historically had a retirement fund in place for all government employees. The government fund has been administered by a single administrator since inception. The trustees of the fund decide that in the interest of good governance the administrator should be changed.

- i. Describe how the data transfer might be implemented. [3]
- ii. Discuss the factors specifically with respect to data transfer that the trustees should consider before changing the administrator. [7]

[Total 10]

QUESTION 7

A Defined Contribution Retirement Fund has 100 members of various backgrounds and salary levels, most of who are in their 30s. The fund currently has a single investment portfolio, which is a medium risk balanced fund managed by an asset manager. Members and the employer contribute into the fund, and at retirement members are paid out the fund proceeds which are used to buy an annuity in the market.

- i. Outline how the members of this fund are affected by investment risk. [5]

The fund is considering making individual investment choice available in the fund. It plans to offer five (5) portfolios graded from low risk to high risk.

- ii. Discuss why members' choices might create additional risks to their benefit levels and suggest how they could be mitigated. [7]

Individual investment choice is implemented in the fund by contracting 5 asset managers to manage the suggested 5 portfolios. One year later, the financial statements of the fund are published, extracts of which are shown below.

Balance sheet

Fund A (Low risk cash fund)	R1.5m
Fund B (Low/Medium risk bond fund)	R50.0m
Fund C (Low risk balanced fund)	R12.0m
Fund D (Medium risk balanced fund)	R2.0m
Fund E (High risk balanced fund)	R30.0m
Bank account	R0.8m
Total assets	R86.3m

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Income statement

Contributions paid	R9.0m
Investment income	R5.0m
Benefits paid	R20.0m

Inflation was 4% over the reporting period.

- iii. You have just been appointed as actuary to the fund. Comment on the above results. [5]

[Total 17]

QUESTION 8

In the country of Albion, occupational retirement funds are well-established. Although there are some final salary defined benefit funds, most of these are closed to new members, and most of the occupational funds are defined contribution in nature.

- i. Outline how the role of the actuary might be defined in terms of retirement fund regulation in Albion. [3]
- ii. You are an actuary working in Albion with a broad portfolio of clients. One of your defined benefit occupational fund clients has requested that you perform a salary inflation investigation to ascertain the appropriateness of their salary increase assumptions. Briefly describe the data required and process you would follow. [5]
- iii. The Albion government has previously not involved itself in retirement benefit provision. It now intends to provide a basic flat-rate benefit to all citizens over the age of 65, regardless of income or wealth. This pay-as-you-go benefit will be funded from general tax revenue. Discuss the possible impact on the members of the occupational retirement funds of Albion, the funds themselves and their sponsoring employers. [10]

[Total 18]

END OF PAPER