EXAMINATION

30 May 2017 (am)

Subject F104 — *Retirement and Related 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 exam papers.*

7. *Attempt all six (6) questions, beginning your answer to each question on a new page.*

8. *Candidates 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

In a certain developing country, the government would like to start a state scheme for all workers which provides death benefits to the worker's family if the worker dies.

i. Briefly outline the forms that such death benefits could take. [3]

This fund will be run on a pay-as-you-go basis funded from general tax revenue and will be compulsory for all formally-employed workers earning above the minimum wage. There are no choices for members of this scheme.

ii. Outline the risks to the state. [9]

iii. Explain the options that the government has to manage these risks, giving specific examples of actions that could be taken for each type of risk management strategy and a drawback for each action. [6]

[Total 18]

QUESTION 2

A large developing country has a retirement system where employers can choose to provide Defined Contribution retirement funds for their workers. If an employer offers a fund, workers are required to join it and contribute from their salaries.

In addition, the state operates a State Retirement Scheme (SRS) which provides a small pension to all citizens, whether they have worked or not. This pension is equal to $100 per month (called the Base Pension) plus 0.5% of career average salary for every year that a citizen has contributed to the scheme (called the Workers' Reward Pension). All workers are required to contribute 5% of their earnings to the SRS, which is sufficient to pay out that year's Workers' Reward Pensions. The Base Pension is funded from general tax revenue.

i. Describe the five pillars of the World Bank Multi-Pillar model and briefly outline how this country's retirement system fits into this model. [12]

The state is considering a change in the retirement system, so that all employers are required to provide a fund to their employees.

ii. State how this will change how the retirement system fits into the World Bank Multi-Pillar Model. [1]

iii. Briefly outline the advantages and disadvantages of this proposal to the individuals in this country. [5]

[Total 18]

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QUESTION 3

A large agricultural organisation operates a Defined Benefit retirement fund which offers a pension related to salary and service, plus death benefits related to salary. Pensions are paid from the fund and increase with inflation.

The fund provides for the organisation's permanent workers, most of whom are farmers and office employees. Agricultural labourers are currently not eligible to join.

i. Outline the arguments for and against a fund having eligibility criteria which exclude manual labourers. [3]

However, due to union pressure, the fund is considering changing the eligibility criteria to admit such labourers. This would double the fund membership. The same formulae would be used to calculate benefits for all members. All members would pay the same contribution rate, and the new members would begin accruing their benefit when they join the fund.

ii. Comment on the potential effects of this change on the total fund contribution rate. [7]

[Total 10]

QUESTION 4

A large industrial employer has run a defined contribution fund for many years on the basis that all members are invested in the same lifestage investment strategy. The strategy involves the asset allocation being predominantly equity-based until a certain age, termed the switch age. From the switch age, the assets are gradually switched towards an investment portfolio matched to a level life annuity. All of the member's accumulated credit is invested in this matching portfolio by normal retirement age.

i. Describe the assets which would be suitable for the investment portfolio matched to a level annuity. [3]

ii. What are the advantages and disadvantages of this lifestage strategy to members? [3]

The trustees of the retirement fund are considering introducing member investment choice with customised defaults.

iii. Define customised defaults. [2]

One trustee is worried that with this new strategy, members may choose poorly.

iv. List eight cognitive biases that members may experience when choosing their investment strategy giving an example of how this bias may affect their behaviour. [8]

[Total 16]

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QUESTION 5

You are the actuary to a large defined benefit scheme, XYZ Scheme. The sponsoring employer of XYZ Scheme has recently acquired another smaller company in the same industry that also provides retirement benefits via a defined benefit scheme. The smaller company was absorbed into the acquiring company the day before the current valuation date of XYZ Scheme.

i. You are currently carrying out the valuation for the XYZ Scheme post acquisition. List the data items and additional information, specifically with respect to the acquisition, that you will need in order to complete the valuation. [4]

You have determined some summarized data **for the original XYZ Scheme members only,** at the current and previous valuation dates, as follows:

	Current Valuation	Previous Valuation
Salary weighted average age	47 years	45 years
Salary weighted average past service	17 years	15 years
Total salaries p.a.	R25 million	R22 million
Total liability		R44 581 756
Total assets	R57 million	R50 million

In addition, the value transferred into the XYZ Scheme in respect of the new member liability amounted to R28 million (as calculated at the date of transfer) and the salary weighted average age of the members transferred was 38 years. The transfer value was calculated using the following assumptions:

Discount rate : 11% per annum
Salary inflation : 8.5% per annum
a_{65} : 12.26

The normal retirement age in both funds is 65. You have determined the following assumptions to be used at the current valuation date as follows, the assumptions used at the previous valuation date are also provided.

Assumption	Current Valuation	Previous Valuation
Discount rate	12%	10%
Salary inflation	8%	7%
a_{65}	10.569	10.569

Notes:

- The previous valuation was carried out two years ago.
- Total contributions over the period amounted to R6.479 million and no benefits were paid.
- The current valuation assumptions will be applied across the entire liability i.e. both original and new member liabilities will be determined on this basis.
- The method used to value the liabilities is the Projected Unit Method.
- You may assume that the benefit structures are fully aligned and no changes to benefit structure were made to either the original or new members of the fund.
- The accrual rate is 1/45 for both funds.
- The normal retirement age is 65 years for both funds.

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ii. The expected pension increase and mortality experience of the new members is similar to that of the original members. Suggest reasons why the annuity factor used in the determination of the transfer value may be higher than that used at the current valuation date. [2]

iii. Calculate the total liability and surplus level at the current valuation date. [7]

iv. Complete the analysis of surplus in respect of the valuation period. [8]

[Total 21]

QUESTION 6

In a certain country, a number of large established employers with large defined benefit funds have recently declared bankruptcy. Currently, funds that are open to new members must value their liabilities using the Projected Unit Credit Method and funds that are closed to new members must use the Attained Age method. The funds must submit valuations to the regulator ever second year. The regulator now wants to introduce a requirement that all funds perform a discontinuance valuation at the same time using the Current Unit Method. The results of this valuation must be disclosed to the regulator and monitored by the trustees.

i. Explain the relative actuarial liability value in the discontinuance valuation relative to the regular valuation. [3]

ii. Some CEOs have been very vocal in expressing their opinion that simply disclosing the discontinuance valuation results is a waste of time. Comment on this view. [5]

In addition to the above, the government is considering requiring that all companies offer a lump sum benefit, over and above any retirement fund payout, to workers who lose their jobs when a company becomes bankrupt. The benefit would be set as *n x monthly salary* where *n* is the number of years of service at the company, rounded down to the nearest full year.

iii. Discuss this proposal from the point of view of workers, employers, the government as well as for the economy in general. [6]

iv. Suggest, with examples, other ways the government could ensure that individuals who lose their jobs due to bankruptcies receive a benefit. [3]

[Total 17]

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END OF PAPER

