

# EXAMINATION

15 November 2021 (am)

## Subject F104 — *Pension and Employee Benefit* Fellowship Principles

*Time allowed:* Three hours and fifteen minutes, plus an additional five minutes to allow for scrolling in the ASSA Exam Platform

*Total marks:* 100

### INSTRUCTIONS TO THE CANDIDATE

1. Ensure that you are logged in and authenticated through Examity before you attempt the examination.
2. Questions are only available in the ASSA Exam Platform and may not be printed.
3. Submit all of your answers in the ASSA Exam Platform only. No uploads of answers (handwritten or otherwise) to the ASSA Exam Platform will be accepted.
4. You may not use any other computer program (e.g. Email, MS Word or Excel) or files, nor open any other browser during the examination.
5. You may not make use of a Formulae and Tables book during the examination. Any such information that may be required will be provided to you within the examination.
6. You are strongly encouraged to use the first 15 minutes as reading time only, however, you may commence answering the paper whenever you are ready.
7. Mark allocations are shown in brackets.
8. Attempt all eight (8) questions.
9. Show calculations where this is appropriate. You may use blank paper to carry out rough work calculations. You may use a calculator from the approved list only.
10. You may return to your answers to review and amend during the allotted examination time. Once you are happy with your answers you need to **Finish all and Submit** your work. Once you have submitted you will not be able to make any more changes to your answers.
11. You must submit all work **BEFORE** the end of the allotted examination time. Take this into account when planning your review and submission. There will be no time announcements.
12. An option to opt out of the exam will become available 1 hour after the official exam start time. If you select the Opt-Out option, you agree and understand that your entire script/answers will be deleted and cannot be retrieved at a later stage and that your script or part thereof will not be put forward for marking.

**Note: Answers will be saved automatically during the examination if you are connected to the ASSA Exam Platform. However, 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.**

**END OF INSTRUCTIONS**

## QUESTION 1

- i. Outline the 4 (four) criteria for evaluating an existing or proposed benefit system. [5]
- ii. The following retirement benefits are provided in a certain country.
- a. Pension insurance: A mandatory, contributory defined benefit provided by the state to all those who have contributed to this arrangement for 15 years or longer and have reached the retirement age. The benefit is a function of the years of contribution to the pension insurance scheme and the average wage.
  - b. Pension saving: A mandatory, government-administered defined contribution system
  - c. Voluntary pension saving: defined contribution provided by financial services companies

Explain, with reasons how each of these pillars fits into the World-Bank multi-pillar model.

[3]

[Total 8]

## QUESTION 2

The state of a developing country is considering introducing an unemployment benefit that can be accessed by all currently working citizens in the event of unemployment. The benefit will be paid at a regular flat rate for a limited period of time.

The state is proposing that the benefit will be financed from income tax, using a Terminal Funding approach instead of pay-as-you-go.

Define Terminal Funding and comment on the financing approach being proposed by the state for this benefit relative to using pay-as-you-go.

[Total 8]

**PLEASE TURN OVER**

### QUESTION 3

You are the actuary to a medium-sized defined benefit retirement fund with no pensioner members and are performing the triennial statutory valuation.

- i. After noting a strain arising due to salary inflation on the analysis of surplus, you decide an experience investigation into salary inflation is necessary. Describe how this investigation would be carried out.  
[5]
- ii. When you present the results to the board, one trustee comments that the valuation results are completely different from the ones he has seen presented to the company for use on their financial statements. Explain why such differences may occur.  
[5]

[Total 10]

### QUESTION 4

In a certain country, all the formally employed are enrolled in a state run “notional defined contribution” fund which has been running for the last 50 years. When reaching the retirement age of 65, members may use their retirement benefit to purchase an annuity in the open market through a broker or may convert their benefit to a basic life annuity within the fund without having to pay commission. Over the last 50 years, longevity has been improving.

- i. Considering both the notional defined contribution design and the open-market option, explain the longevity risk this fund faces and the effectiveness and limitations of the design in mitigating this risk.  
[6]

The country is hit by a sudden onset of a mysterious disease which can be fatal in adults. The mortality rate for this disease increases with age. Scientists conclude the impact on mortality will fade to near zero over the next 100 years as effective treatment and prevention programmes are rolled out.

- ii. Explain the impact this would have on the population pyramid of the country over the next 100 years.  
[4]

[Total 10]

**PLEASE TURN OVER**

## QUESTION 5

The employer sponsor to a fully funded, closed final salary retirement scheme is in financial distress and has asked the board of trustees to adapt the scheme funding methodology from the Projected Unit Method (PUM) to the Current Unit Method (CUM).

- i. Compare and contrast the PUM and CUM funding methods. [5]
  - ii. Discuss reasons why the employer would prefer the CUM of funding over the PUM. [2]
  - iii. Describe how the contribution rates would evolve over time for both the proposed CUM and current PUM. [4]
  - iv. Outline the risks other than contribution risks associated with changing the funding method from the PUM to the CUM. [5]
- [Total 16]

## QUESTION 6

A certain employer has a relatively generous leave offering for employees. However, the employer requires that at the financial year-end, employees must have an outstanding leave balance of 5 days or less. For the purposes of this calculation, any leave booked in the following year is not counted towards the outstanding balance.

- i. Explain the reasons why the employer may have such a rule in place together with the generous leave allowance. [5]

One of the employer's executives suggests that all leave balances in excess of 5 days at the company's financial year end should be converted into an additional voluntary contribution (equal in value to the leave days) into the employer-sponsored retirement fund.

- ii. Outline the factors that should be considered before implementing this suggestion. [6]
- [Total 11]

**PLEASE TURN OVER**

## QUESTION 7

You are the actuary to a large final salary retirement scheme that is open to new members. All of the fund benefits are underwritten by the employer which is a large multi-national corporation. The fund consists of comparably large active member and pensioner groups. For the past decade the fund has granted pension increases in line with inflation and has paid bonus pensions at least once per year.

The trustees have asked you to review the investment strategy currently in place.

- i. Outline the factors that you would take into account when reviewing the current investment strategy.

[10]

The fund has a policy that at any time, if any pensioner's fund pension is less than the state provided pension, the fund pension will be automatically topped up to equal the state pension benefit.

- ii. Comment on this element of the benefit design.

[5]

[Total 15]

## QUESTION 8

- i. Describe the two possible approaches that can be taken in estimating a person's income needs in retirement.

[6]

Darsh is a 48-year-old actuary. He has two children in primary school who will be out the house and finished school by his planned retirement age of 65. He revised his retirement savings goals when his second child was born and makes use of member investment choice in his occupational defined contribution retirement fund. However, Darsh is about to become a dad again, to twins.

- ii. Describe how the birth of the twins is likely to affect Darsh's financial planning if he still plans to retire at age 65.
- iii. Apart from changing his investment strategy, what choices should Darsh consider with respect to his occupational retirement fund to improve his funding position at retirement.
- iv. Being an actuary, Darsh is a big fan of asset-liability modelling. Explain how he would use this technique to ascertain a new investment strategy.

[6]

[3]

[7]

[Total 22]

**END OF PAPER**