EXAMINATION

5 November 2014 (am)

Subject F104 — Pensions 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.*
3. *Save your work regularly throughout the examination on the supplied computers' 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 seven (7) questions, beginning your answer to each question <u>on a new page</u>.*
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

QUESTION 1

i. By considering the probability of providing the benefit and the expected cost of the benefit, outline ways in which surplus or deficit may arise on a defined benefit retirement fund. [6]

Consider a large defined benefit pension fund. The analysis of surplus indicates that salary increases resulted in a substantial deficit at the latest statutory actuarial valuation. You have been asked by the trustees to investigate this further and comment on the ongoing impact of salary increases on the fund.

ii. Describe briefly the data and information you would need for this investigation. [4]

[Total 10]

QUESTION 2

You are the actuary to a defined benefit fund. The recent valuation results are as follows:

	R'000
Assets	7 155
Liability:	
Pensioner Liability	2 200
Active liability	5 450
Total liability	7 650
Value of future service benefits for all active members allowing for future salary increases	29 025
Value of benefits accruing for all active members in the year after the valuation date allowing for future salary increases	1 845
Value of all future member contributions allowing for salary increases	10 125
Value of member contributions in the year after the valuation date	675
Member contribution rate	6%

i. Calculate the Standard Contribution Rate using the Projected Unit Credit (control period 1) and the Attained Age funding methods. [2]

ii. Define the Modified Contribution Rate and calculate it using both of the methods in part i. above, stating any assumptions you make. [3]

iii. A certain accounting standard requires the use of the Projected Unit Credit method for open schemes. Outline the main aims of accounting methods in general and hence suggest why this funding method might have been adopted for the accounting standard, as opposed to the Attained Age method. [4]

[Total 9]

PLEASE TURN OVER

QUESTION 3

All employees working for a large industrial company are compelled to join that company's defined contribution retirement fund. The employer's contribution rate towards retirement benefits is a fixed percentage of salary, and administration expenses and the cost of insured benefits is met via a separate contribution by the employer. Members may select their own contribution rate. The company is concerned that members are contributing too little to the fund and may have inadequate retirement benefits as a result.

i. The employer has approached you to create an online model that members can use to estimate the minimum required member contribution rate that will produce a target retirement benefit with 95% certainty. Describe such an online model that you could create, including key parameters and assumptions. [12]

ii. Outline other ways that the employer can encourage higher member contribution rates. [4]

[Total 16]

QUESTION 4

A large motor vehicle manufacturer sponsors a large balance of cost defined benefit retirement fund. The fund rules define the age retirement benefit as a monthly pension which is a function of pensionable service and earnings at retirement. The rules do, however, allow members to commute at most one-third of the actuarial liability value of the pension benefit for a cash lump sum at retirement. For the purposes of commutation, the actuarial liability value is calculated on a best-estimate basis as at the exit date.

i. The trustees are concerned that members are taking too much of their benefits as cash and wants to encourage members to take more of their benefit as a pension without altering the commutation terms. Outline some of the benefit design options available to them to encourage members to take the pension benefit. [6]

ii. The fund currently calculates commutation factors for each retiree who wants to commute their pension for cash. These are calculated on a current best estimate basis. One of the trustees has complained this is an unnecessary administrative burden as the fund can just use the commutation factors used to calculate the expected present value of the annuity benefits for the last statutory actuarial valuation. Comment on this complaint using examples to illustrate your point. [8]

[Total 14]

PLEASE TURN OVER

QUESTION 5

In a certain developing country, the State offers a monthly income benefit payable on accidental death or disability. The monthly benefit is equal to 75% of the accident victim's monthly earnings at the accident date and is paid directly to the accident victim in case of disability or to their family in case of death. The accident victim must be aged between 18 and 60 at the time of accident and the benefit ceases at the accident victim's 60^{th} birthday. The benefit is financed from general tax revenue. This is currently financed on a pure pay-as-you-go basis.

The State has put forward a reformed scheme, which has two proposed changes from the existing scheme:

- The monthly benefit will be a fixed amount specified by the State.
- The benefit is to be partially funded instead of any form of pay-as-you-go.

i. The State believes the reformed scheme will better meet the needs of recipients than the existing scheme. Discuss this assertion. [4]

ii. Outline the risks to the State inherent in the level and incidence of the benefits in the reformed scheme. [3]

iii. Briefly describe the scaled premium, general average premium and terminal funding methods, specify how the contribution rate is calculated under each and how the fund is built up under each. [5]

iv. Outline the considerations in setting an investment strategy for this scheme and suggest an appropriate investment strategy that could be adopted for this social security scheme. [9]

v. Explain the effect a sudden and sustained decrease in mortality for men and women between the ages of 18 and 60 would have on the cost of the reformed scheme assuming it does not influence the level of the monthly benefit in any way. [4]

[Total 25]

PLEASE TURN OVER

QUESTION 6

A union sponsors a large defined contribution retirement fund. The employer contributes 7.5% of fund salary from which a deduction is made for insured death benefits and the balance is invested in the member's accumulated fund. The rules for this fund specify that the death benefit is equal to the accumulated fund plus a lump sum life assurance benefit provided by an insurer. This total benefit will be paid as a lump sum. Currently, the insured benefit is a flat death benefit of 3 times annual fund salary at a current cost of 2% of fund salary.

It has been suggested that in future, the fund contributes 2% towards the death benefit and the insurer provides a death benefit such that the multiple of salary is determined by the age-band of the member and is closer to the amount produced by a 2% contribution for that age band. Compare and contrast the current and proposed death benefit options, highlighting any problems that might be experienced in moving to the proposed arrangement.

[Total 12]

QUESTION 7

Consider the following economic assumptions used for the 2011 and 2014 statutory actuarial valuations for a defined benefit pension fund in a certain country.

Economic assumption	**2014**	**2011**
Investment returns	8.90% pa	7.78% pa
Effective post-retirement discount rate (allowing for pension increases)	5.25% pa	4.05% pa
Inflation	6.43% pa	5.62% pa
Salary inflation	7.43% pa	6.62% pa

i. For both 2011 and 2014, calculate the pension increase percentage that has been factored into the effective post retirement discount rate and express it as a percentage of inflation. [2]

The regulator in this country wishes to introduce measures that would require each defined benefit fund to choose a percentage of price inflation called the 'minimum percentage'. Each year, the minimum percentage must be multiplied by the annual inflation rate to give the minimum annual increase on pension benefits that must be granted in that year provided the fund is fully funded. You may assume that all defined benefit funds are funded by regular contributions.

ii. Outline the impact that this regulation is expected to have on defined benefit retirement funds in different situations. [10]

iii. Outline the impact that this regulation is expected to have on discontinuing defined benefit retirement funds in terms of sources of funds and allocation of assets. [2]

[Total 14]

END OF PAPER