

# EXAMINATION

22 September 2008 (pm)

## Subject SA4RSA — Pensions and other Benefits Specialist Applications

*Time allowed: Three hours*

### **INSTRUCTIONS TO THE CANDIDATE**

1. *Enter all the candidate and examination details as requested on the front of your answer booklet.*
2. *You have 25 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.*
3. *You must not start writing your answers in the booklet until instructed to do so by the supervisor.*
4. *Mark allocations are shown in brackets.*
5. *Attempt all questions, beginning your answer to each question on a separate sheet.*
6. *Candidates should show calculations where this is appropriate.*

### **AT THE END OF THE EXAMINATION**

*Hand in BOTH your answer booklet, with any additional sheets firmly attached, and 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

A company has a defined benefit pension fund that has been closed to new entrants since 1 September 2005. The fund had 200 active members and 160 pensioners on that date.

A valuation of the fund was undertaken as at 31 August 2005. The result for past service to that date, after all improvements and enhancement awards, was as follows.

<i>Item</i>	<i>Value of assets</i>		<i>Value of liabilities</i>		<i>Surplus accounts</i>	
	<i>Symbol</i>	<i>R</i>	<i>Symbol</i>	<i>R</i>	<i>Symbol</i>	<i>R</i>
Actives	$A_{t=0}^a$	220 000 000	$V_{t=0}^a$	199 500 000	$S_{t=0}^a$	20 500 000
Pensioners	$A_{t=0}^p$	209 470 000	$V_{t=0}^p$	189 970 000	$S_{t=0}^p$	19 500 000
Employer	$A_{t=0}^e$	30 000 000	$V_{t=0}^e$	- 0 -	$S_{t=0}^e$	30 000 000
Total	$A_{t=0}^T$	459 470 000	$V_{t=0}^T$	389 470 000	$S_{t=0}^T$	70 000 000

All values were after allowance for data movements on the valuation date.

The members' surplus account comprised an active members' account (the AMA) and a pensioner members' account (the PMA). These accounts were generated on the basis that the active members and pensioners are in hypothetically separate pension funds. As shown in the table, the AMA and the PMA were R20 500 000 and R19 500 000, respectively, as at 31 August 2005. There were no other accounts to cater for separate solvency or other contingency reserves.

The fund has an accrual rate for future service of 1,3% and the employer's required basic contribution rate is based on that level of accrual.

However, the rules provide that every three years any funds in the employer's surplus account shall be applied to increase the accrual rate for pensionable service since the last adjustment, from 1,3% to such higher level as can be afforded, subject to a maximum accrual rate of 2%, and provided that after any adjustment the balance in the employer's surplus account is of a sufficient size, as determined by the trustees acting on the advice of the actuary. An adjustment shall also be applied to any new pensioner in the period since the last adjustment.

In terms of the rules the employer may pay such additional contributions into the employer's surplus account as it can afford or deems prudent to make to facilitate the objective of achieving an accrual rate of 2%.

There was sufficient surplus in the employer's surplus account as at 31 August 2005 to improve the accrual rate to 2% for the three years to that date, and indeed all accrued service had been funded up to that level at that point. The employer's surplus of R30 000 000, as shown in the summary of the valuation, was after meeting the cost of the improvement to 2%.

In terms of the pension increase policy a pension increase is to be granted annually equal to the increase in the consumer price index (CPI) for the year to that date.

If the geometric difference between the investment return actually earned on the whole Fund and the valuation rate used to value the liabilities is negative, the balance of the cost of the pension increase is met by debiting the PMA, but if it is positive then the PMA is credited with the excess.

In addition to the normal annual increase, the trustees shall grant a special bonus increase at each triennial statutory valuation, provided that the balance in the PMA after such bonus is at least 10% of the value of the liabilities in respect of the pensioners. Similarly, the trustees shall grant a bonus to pensionable service at each triennial statutory valuation, provided that the balance in the AMA after such bonus is at least 10% of the value of the liabilities in respect of the active members.

When an active member retires there is a transfer of surplus in the AMA to the PMA in respect of the member. The amount transferred at the end of year  $t$  is defined as  $S_t^n$ . In addition, any shortfall in the reserve held in respect of the member as an active member relative to the reserve required for him as a new pensioner is met by debiting the AMA. In the opposite case the AMA would be credited with the difference.

There have been no changes to the benefit structure in the three years to 31 August 2008.

In the three years from 1 September 2005 to 31 August 2008 the income and outgo were as follows. Ignore Retirement Funds Tax and commutation.

<i>Item of income or outgo</i>	<i>Symbol</i>	<i>Financial year</i>		
		<i>2005/06</i> <i>t=1</i>	<i>2006/07</i> <i>t=2</i>	<i>2007/08</i> <i>t=3</i>
		<i>R</i>	<i>R</i>	<i>R</i>
Required contributions	$C_t^r$	9 070 000	9 570 000	10 067 000
Additional contributions by employer	$C_t^v$	800 000	900 000	1 000 000
Lump sum death and withdrawal benefits	$L_t$	2 505 000	2 650 000	2 800 000
Pensions	$P_t$	15 100 000	16 000 000	16 920 000
Operational expenses – actives	$E_t^a$	120 000	115 000	110 000
Operational expenses – pensioners	$E_t^p$	110 000	120 000	130 000
Investment return net of fees	$I_t$	99 070 000	85 500 000	25 310 000

The items of income and outgo were uniformly spread over each year.

New retirements take place at the end of each financial year. In the three years from 1 September 2005 to 31 August 2008 the reserves of active members on their retirement and the reserves required for them as new pensioners were as follows.

<i>Data for new pensioners</i>	<i>Symbol</i>	<i>Financial year</i>		
		<i>2005/06</i> <i>t=1</i>	<i>2006/07</i> <i>t=2</i>	<i>2007/08</i> <i>t=3</i>
		<i>R</i>	<i>R</i>	<i>R</i>
Active member reserves on retirement	$V_t^r$	1 250 000	5 000 000	3 100 000
Reserves required as new pensioners	$V_t^n$	1 500 000	5 750 000	3 430 000

The valuation basis adopted for the valuation as at 31 August 2005 was retained throughout the period to 31 August 2008. The basis allows for a level rate of interest in the pre- and post-retirement periods, namely  $\dot{i}$ , for a level rate of salary escalations, namely  $\mathcal{S}$  and a level rate of pension increases, namely  $u$ . In practice, actual salary increases,  $e_t$ , and actual pension increases,  $\dot{j}_t$ , occurred at the end of each financial year  $t$ . Except in regard to early and late retirement, for which no allowance is made in the valuation, the actual demographic experience has been very close to the assumptions.

Answer each of questions (i), (ii) and (iii) on the basis of the data and definitions as given.

- (i) On the assumption that the assets are invested in a single portfolio for the fund as a whole,
- write down a formula to show how you would determine the investment return net of the investment management fees for year  $t$ , defined as  $\mathcal{R}_t$ ; and [1]
  - apply that formula to calculate the return for year  $t = 1$ . [1]
- (ii) Derive formulae to show how you would estimate the surplus accounts as at 31 August 2006, 2007 and 2008 before meeting the cost of any improvement in the accrual rate or the award of any bonus. [8]
- (iii) Derive formulae for parts (a) and (b) below to estimate the cost, as at 31 August 2008, of:
- increasing the accrual rate from 1,3% to 2% for pensionable service over the last three years; and [2]
  - awarding a 10% bonus to accrued pensionable service and pensions in course of payment. [1]
  - Outline two shortcomings in your estimate of (a). [2]
- (iv) Discuss the risks associated with the pension increase policy, the rule that governs the improvement in the accrual rate and the rule that governs the award of bonus service and bonus increases to pensions. [16]

[Total 31]

## Question 2

You are a consulting actuary. One of your firm's clients is considering extending its operations to another African country (Country X).

Country X has a state funded salary and service related defined benefit pension fund. The pension benefit is based on career average salary. There is a provision to revalue each year's salary by a maximum of the accumulated increase in the consumer price index from the year following receipt of that salary up to retirement. This provision is subject to the level of investment return earned. Instead of participating in the state fund an employer may establish a private defined contribution pension fund for its employees, or participate in a defined contribution umbrella fund. The taxation provisions are the same under each option.

Contributions to the state fund are 7% of salary from employees and currently 7% of salary from employers. Participating employers can be required to pay additional contributions, or indeed receive contribution rebates, depending on the fund's experience and the level of surplus. Death and disability benefits are included. An employer may only terminate its participation in the state fund in respect of new employees. It must then establish its own defined contribution fund or join a defined contribution umbrella fund. If the employer winds up, any of its employees in the state fund become deferred pensioners of that fund. If it has its own private fund or if it participates in an umbrella fund, the members would be subject to the respective wind-up provisions.

If the employer chooses a private pension fund or an umbrella pension fund then contributions of no less than 8% from the employer and 7% from the employee must be made to the defined contribution fund.

Your client has asked you to accompany him on his next visit to Country X so that you may investigate the three options and advise him accordingly.

- (i) List the issues you intend to investigate. [12]

You have identified that Country X is similar to South Africa in terms of stability and economic outlook, that foreign employees are not eligible to join the state fund and that the private administrators, umbrella funds and insurers have modelled their defined contribution products along the same lines as those offered in South Africa.

While you have not yet completed your investigation, the Human Resources Manager has asked for a summary of your findings thus far and your views in regard to matters that you must still look into.

- (ii) Outline the advantages and disadvantages of using an umbrella pension fund instead of a private pension fund. [7]
- (iii) Discuss the main factors that have influenced your choice between the state fund and a private or umbrella pension fund. [12]
- (iv) Set out the issues in respect of any foreign employees. [3]

[Total 34]

### Question 3

You are the valuator of Fund XYZ, a defined benefit pension fund that offers a pension upon retirement at age 65 of 2,5% per year of pensionable service of final salary averaged over the last 12 months of service. The pension is guaranteed for 5 years, and a 2/3rds reversionary spouse's pension is payable for the remaining lifetime of the spouse, and full price inflation pension increases are targeted. Members contribute 7% of salaries, with the employer contributing the balance of the cost to meet the defined benefits. The withdrawal benefit and death-in-service benefit is a return of member contributions accumulated at 6% per annum compound, subject to the legislated minimum benefits. The employer provides separate death and disability insured benefits on an unapproved basis. The assets are invested in a pooled portfolio.

Fund XYZ is sponsored by Company XYZ, a major JSE-listed manufacturing company employing approximately 2 000 employees. Until 1999 all employees of Company XYZ were members of Fund XYZ, and the Fund was in a very strong financial position with the statutory actuarial valuation as at 1 January 1999 having reported a 150% funding level.

Company XYZ restructured its pension funding arrangements as from 1 January 2000. A valuation exempt defined contribution pension fund was established for all new employees, and Fund XYZ was closed to new entrants. Members contribute 7% of salaries towards the defined contribution fund, with the Company contributing 12% of salaries excluding the cost of the separate unapproved insurance schemes. All pensioners were outsourced to an insurance company via annuities in the names of the pensioners on generous terms such that their reasonable benefit expectations were fully satisfied.

All active members were given the opportunity to voluntarily transfer to the defined contribution fund with transfer values being determined as 130% of accrued actuarial reserve as per the Fund's statutory actuarial valuation basis, and approximately 90% of members accepted the offer to transfer. No benefit enhancements were granted to those members who elected to remain in the defined benefit arrangement, but a rule amendment was registered that future retirees could uplift their full actuarial reserve upon retirement, and then purchase a pension from any insurer of their choice and structured according to personal needs. The balance of surplus was apportioned to an employer reserve account in Fund XYZ, and Company XYZ thereafter commenced a contribution holiday to this Fund following receipt of the Registrar's approval.

Following the enactment of the Pension Funds Second Amendment Act on 7 December 2001, the trustees of Fund XYZ applied to have the full credit balance in the employer reserve account transferred to the employer surplus account, and the Registrar approved such transfer in terms of S15F of the Pension Funds Act.

You have subsequently completed three statutory actuarial valuations of Fund XYZ at 1 January 2002, 1 January 2005 and 1 January 2008. These reports show that the number of contributing members has decreased from an initial 200 after the bulk transfer of members to the defined contribution fund, to 180 at 1 January 2002, 140 at 1 January 2005 and 120 at 1 January 2008, and also that there were no other members of the Fund throughout the period.

These valuations were each compliant with the Registrar's PF 117, and each valuation revealed that the assets outside the employer surplus account were valued at less than the accrued liabilities of the remaining members. A corresponding debit was made to the employer surplus account at each valuation date such that the accrued liabilities were fully

funded, and the statutory report was then submitted to the Registrar. Because of the large amount standing in the employer surplus account at each valuation date, it was decided that there was no need to establish a solvency reserve. The valuation basis and method were unchanged at each valuation date except for updating economic assumptions to reflect then current nominal and real interest rates.

The trustees did not identify any past improper uses of surplus, and accordingly submitted a nil surplus scheme in terms of S15B of the Act, and the Registrar recorded this nil surplus scheme during 2003.

Your valuation reports reveal that the employer surplus account grew from an initial R40 million allocation at the date the Registrar approved the S15F application to R120 million as at 1 January 2008.

Shortly after receipt of the S15B scheme approval, the trustees debated the pros and cons of the two approaches to apportioning surplus arising after the surplus apportionment date as per S15C of the Act.

- (i) Identify these two approaches and list the advantages and disadvantages of each approach. [4]

A rule amendment was subsequently registered during 2005 whereby all surplus revealed at future statutory actuarial valuations of the Fund would be entirely apportioned to the employer surplus account.

Company XYZ's share price has underperformed its sector over the past few years, and a new executive management team has been put in place to rectify the situation. The newly appointed financial director has been given a brief by the board of directors to improve the return on capital. She has also been made a company-appointed trustee of Fund XYZ. She is of the view that the money in the employer surplus account represents an inefficient use of the Company's capital, and is uncomfortable for Company XYZ to continue to sponsor any defined benefit arrangements in view of the risks to the Company's balance sheet. She has proposed that all remaining members be transferred to the defined contribution arrangement, a position strongly supported by the other company-appointed trustee, being the newly appointed human resources director, who in addition wishes to implement more flexible remuneration arrangements for all staff.

The Trustees have requested a report from you on the legal methods an employer has to beneficially access the money in an employer surplus account.

- (ii) List the methods open to an employer to access the money in an employer surplus account. [3]
- (iii) Set out the methods that should be considered in the case of Company XYZ so that it may gain access to this money as soon as possible, outlining any associated risks and pitfalls. [8]

The Trustees have also requested that you report on possible transfer values in respect of the remaining members to the defined contribution arrangement.

- (iv) Discuss the matter of possible transfer values. [8]

The Trustees have asked you to bear in mind that the intention is to avail the employer of the maximum possible amount in the employer surplus account for the use of Company XYZ.

(v) Given this intention, discuss whether such a transfer should be made voluntary or compulsory for members. [4]

(vi) Discuss whether or not you agree with the view that the proposed changes to the current arrangement will achieve all the objectives of the new executive management team. [8]

[Total 35]

**END OF PAPER**