INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

23 April 2014 (pm)

Subject SA2 – Life Insurance 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 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.*

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 both questions, beginning your answer to each question on a new page.*

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.

1 A UK life insurance company reports on a realistic basis and is open to new business.

(i) List the key components of the future policy related liabilities for such a company. [2]

An actuarial student is checking the stochastic model which is used to calculate the company's future policy related liabilities. She is checking the output of one average scenario on one model point for the valuation as at 31 December 2013, and has been given the following information:

Model point information:

- Single premium unitised with profits investment bond
- Original term 10 years
- Maturity date 31 December 2015
- Current accrued guaranteed benefit (including 2013 reversionary bonus) = £8,000
- Current asset share = £10,000
- Current smoothed asset share = £11,000
- Historic with profits fund earned investment returns were 1% per annum in both 2012 and 2013
- Current reversionary bonus = 3% per annum (compound)

Definition of the cost of guarantees:

= {The higher of the guaranteed benefit and the asset share} minus the asset share

Definition of the cost of smoothing:

= Benefit paid minus {the higher of the guaranteed benefit and the asset share}

[Note these definitions are at the time of claim and before any discounting.]

Scenario information:

- The company invests only in equities and fixed interest assets
- The equity backing ratio is 50% for all years
- Equities and fixed interest assets both earn 5% per annum over 2014 and 2015
- The smoothed asset share will increase at the end of each year by the three year geometric average of the most recent and two preceding years' with profits fund earned investment returns
- Withdrawals are assumed to be 10% in total over 2014 and 2015 combined
- Maturity benefit payouts are based on the smoothed asset share
- Currently market value reductions (MVRs) are being applied on surrender such that the surrender value is equal to the (unsmoothed) asset share
- The reversionary bonus remains at 3% per annum in 2014 and 2015
- Expenses over 2014 and 2015 can be ignored

(ii) Calculate the cost of guarantees and the cost of smoothing (both at the time of claim) for this model point. [6]

The next step in the student's checking process is to test what happens to the results if the only changes made to the scenario are the investment returns assumed for 2014 and 2015. For both 2014 and 2015, the return for equities is now assumed to be –50% per annum and for fixed interest it is 0% per annum.

(iii) Calculate the cost of guarantees and the cost of smoothing (both at the time of claim) for the same model point under these amended investment return assumptions. [5]

The actual cost of guarantees and smoothing generated by the model for this alternative investment return scenario and for the same model point are £1,200 (cost of guarantees) and £300 (cost of smoothing). These results can be assumed to be correct.

The main reason for the differences between these figures and the student's second set of calculations (i.e. the figures obtained in part (iii)) is that the model allows for various dynamic management and policyholder actions, and hence other elements of the overall scenario are automatically adjusted.

(iv) Discuss the potential management and policyholder actions which the company may be modelling, and how these may have affected the results. [16]

The company also writes personal pension products with guaranteed annuity options. For such contracts, the company does not always assume the policyholder behaviour that would result in the more onerous reserve for the company.

(v) Explain the situations in which the company may be allowed to do this under Peak 1 for this contract. [5]

For its conventional with profits whole life assurance contracts, the company applies bonuses at the same rates as for its conventional with profits endowment assurances.

For the Peak 2 liabilities, the with profits benefit reserve (WPBR) for the whole life contracts is based on a prospective calculation.

(vi) State the conditions that the company needs to meet in order to be able to use a prospective calculation for its WPBR. [2]

The company no longer sells endowment assurances, and has noted that projections show that eventually there will be no endowment assurances left on which to base the whole life bonuses and payouts.

(vii) Discuss the actions that the company could take to address this situation. [5]

To meet Solvency II requirements, the company has built a simplified model which is based on a polynomial equation. The company first runs its stochastic model and then uses the output to calibrate the simplified model.

(viii) Discuss the process that the company might go through in order to calibrate the simplified model. [Note that a discussion of the choice of the model is not required.] [7]

[Total 48]

2 (i) Outline the legislation which affects a UK life insurance company's ability to price its products on the basis of gender. [5]

A UK life insurance company has sold immediate annuities to the open market for a number of years. In early 2012, the pricing actuary was asked to write a report for the marketing director on the potential implications for the business of the EU Gender Directive and the related European Court of Justice ruling of 2011.

(ii) Outline the points that would have been included in this report to the marketing director. [18]

A report was also prepared for the Chief Risk Officer on the potential impact of gender neutral pricing on the company's key risks and risk management controls.

(iii) Outline the points that would have been included in this report to the Chief Risk Officer. [11]

It is now 2014, and the company is re-pricing its immediate annuity business.

(iv) Describe how the company could model expected future mortality for pricing new annuity business. [11]

It has been suggested that the company should use a longevity swap.

(v) Discuss this suggestion. [7]

[Total 52]

END OF PAPER