SOCIETY OF ACTUARIES
Individual Life & Annuities Canada – Design & Pricing

Exam DP-IC

MORNING SESSION

Date: Thursday, November 1, 2007
Time: 8:30 a.m. – 11:45 a.m.

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This examination has a total of 120 points. It consists of a morning session (worth 60 points) and an afternoon session (worth 60 points).

   a) The morning session consists of 8 questions numbered 1 through 8.

   b) The afternoon session consists of 9 questions numbered 9 through 17.

   The points for each question are indicated at the beginning of the question.

2. Failure to stop writing after time is called will result in the disqualification of your answers or further disciplinary action.

3. While every attempt is made to avoid defective questions, sometimes they do occur. If you believe a question is defective, the supervisor or proctor cannot give you any guidance beyond the instructions on the exam booklet.

Written-Answer Instructions

1. Write your candidate number at the top of each sheet. Your name must not appear.

2. Write on only one side of a sheet. Start each question on a fresh sheet. On each sheet, write the number of the question that you are answering. Do not answer more than one question on a single sheet.

3. The answer should be confined to the question as set.

4. When you are asked to calculate, show all your work including any applicable formulas.

5. When you finish, insert all your written-answer sheets into the Essay Answer Envelope. Be sure to hand in all your answer sheets since they cannot be accepted later. Seal the envelope and write your candidate number in the space provided on the outside of the envelope. Check the appropriate box to indicate morning or afternoon session for Exam DP-IC.

6. Be sure your essay answer envelope is signed because if it is not, your examination will not be graded.

Tournez le cahier d’examen pour la version française.

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****BEGINNING OF EXAMINATION****
INDIVIDUAL LIFE & ANNUITIES CANADA – DESIGN & PRICING
Morning Session

1. *(4 points)*

(a) Describe considerations in setting profit goals for your company.

(b) Explain factors affecting your ability to grow new business production given a specific after-tax Return on Equity (ROE) objective.

(c) Explain why Return on Investment may not equal ROE.

2. *(6 points)* You priced your company's first Fixed Single Premium Deferred Annuity product and will be presenting your work to the Chief Actuary.

(a) Describe the disclosures and communications you will make regarding the data used to price this product, as required by ASOP #23, *Data Quality*.

(b) Explain the interest rate risks associated with this product.

(c) Recommend a strategy regarding the use of U.S. speculative-grade corporate bonds in the investment portfolio. Justify your answer.

3. *(6 points)* Company ABC sells fully underwritten term life insurance products through independent brokers and varies premium rates by preferred and non-preferred rate classes.

You are given:

Normal rate of mortality	5.00 per thousand
Normal lapse rate	10% per year
Percentage of preferred	80%
Average mortality rate for preferred	4.00 per thousand
Average mortality rate for non-preferred	9.00 per thousand
Average preferred premium rate	4.40 per thousand
Average non-preferred premium rate	9.90 per thousand
Expenses	5% of premium

(a) Explain how setting the dividing line between rate classes will impact:

(i) Mortality.

(ii) Assumptions other than mortality.

(b) For re-entry type products, newly underwritten lives have a mortality rate of 2.00 per thousand and an additional lapse rate of 20%, of which 75% are selective.

Determine the increase in the mortality rate of the remaining group, ignoring the distinction between preferred and non-preferred, using:

(i) The Preservation of Total Deaths Theory.

(ii) The Principle of Conservation of Deaths.

Show all work.

(c) Calculate the impact on the profit margin assuming that 5% of the preferred class should have been classified as non-preferred. Show all work.

4. *(11 points)* You are pricing a Long Term Care Insurance (LTCI) rider that accelerates the death benefit of a Universal Life (UL) policy.

You are given:

- Your company has no prior experience with LTCI riders.
- The objective is to become an innovative leader in this market.
- The definitions of the conditions covered will differ from the competition and will include two conditions not covered by other companies.
- The payout of the rider varies by condition.
- There is a guaranteed minimum death benefit.

(a)

(i) Describe the four-field process mapping concept.

(ii) Explain the benefits of applying this concept in the development of the LTCI rider.

(b) Explain issues specific to the LTCI rider that need to be addressed in design and pricing.

(c) Outline alternatives for a terminally ill policyholder to obtain benefits from the base UL policy before death.

5. *(13 points)* Your company is launching its first Equity-Indexed Single Premium Deferred Annuity.

(a) Explain issues that should be addressed in the feasibility stage of the product development process.

(b) Describe pricing pitfalls specific to this type of product.

(c) You are given:

Single Premium	100,000
Index Period	5 years
Index	S&P 500
Index Growth Method	Point to Point
Floor return	0%
Ratchet	Annual
Margin	0.60% (applied after participation rate)
Cap	8.0% (applied after margin)
Guaranteed Minimum Account Value	90% of single premium accumulated at 3% annually
Net earned rate on assets	5%
Present value of expenses	3% of single premium

- S&P 500 Index Values:

Policy Duration	Index Value
0	1100
1	1050
2	1250
3	1350
4	1400
5	1200

- Option costs for the given margin and cap rates:

Participation rate	5-year Option Cost (as Percent of Premium)
85%	7.75%
90%	8.50%
95%	9.25%

Determine the Index Account Value at the end of 5 years, assuming that the participation rate is set to achieve a present value of profit of 5% of the single premium.

(d) Describe static and dynamic hedging techniques that could be used to support this type of product.

6. *(7 points)* ABC Life is a well-established company, which has been selling whole life insurance exclusively through its captive agent channel. The company is entering the term insurance market, selling through independent agents.

(a) *(1 point)* Identify and describe ABC Life's corporate growth strategy.

(b) *(3 points)* You have been asked to assess the feasibility of a term product.

(i) List key questions to answer during the product development process.

(ii) Explain the relevance of these key questions to the new product.

(c) *(3 points)* The initial pricing will be below the competition, at the expense of profitability, in order to "make a splash" in the market.

(i) Identify and describe this pricing strategy.

(ii) Explain alternative pricing strategies that the company could consider.

7. *(7 points)* XYZ Life Insurance Company has a career agency system selling life insurance to the middle-income market.

(a) List reasons why individuals lapse their life insurance coverage.

(b) Explain why a 13-month lapse rate is commonly used to measure persistency.

(c) Describe sales force incentives that XYZ can implement to improve persistency.

(d) Describe strategies that XYZ's conservation unit could implement to improve persistency.

8. *(6 points)*

(a) *(1 point)* Explain the requirements necessary for market segmentation to be effective.

(b) *(5 points)* Describe the primary bases used for segmenting consumer markets.

****END OF EXAMINATION****
****Morning Session****