
SOCIETY OF ACTUARIES

Life Pricing

Exam ILALP

AFTERNOON SESSION

Date: Wednesday, April 25, 2018

Time: 1:30 p.m. – 3:45 p.m.

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This afternoon session consists of 4 questions numbered 7 through 10 for a total of 40 points. 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 because 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 ILALP.
6. Be sure your written-answer envelope is signed because if it is not, your examination will not be graded.

Tournez le cahier d'examen pour la version française.

****BEGINNING OF EXAMINATION****

Afternoon Session
Beginning with Question 7

7. (12 points)

- (a) (3 points) A small U.S. life insurance company primarily sells term insurance, targeting the middle-income market in western states. The underwriting process is efficient and profits have been excellent.

Assume the following.

- A large eastern state recently passed a law that allows its residents to deduct a portion of annuity premiums paid from their taxable income.
- The CEO would like to quickly develop an annuity product to take advantage of this opportunity.

Describe three reasons why the CEO's strategy may not be successful.

- (b) (6 points) An actuary at your company has asked for assistance to prepare the figures for a nonforfeiture demonstration in accordance with the requirements of the NAIC Standard Nonforfeiture Law (SNFL) for Individual Deferred Annuities.

The actuary has provided you with the following information for an Individual Deferred Annuities:

Account(s)	Fixed only
Guarantee Rate	0.5%
Contract Loads	None
Surrender Charges	Percent of Contract Value
Free partial Withdrawals	10% per year, non-cumulative
Market Value Adjustments	None
Minimum Nonforfeiture Interest rate	3%
Maturity Date	End of contract year 10
Maturity Value of Paid-up Annuity Benefits	Account value at maturity

7. Continued

End of Contract Year	Purchase Payment	Guaranteed Account Value	Guaranteed Cash Value
1	25,000	25,125	23,090
2	0	25,251	23,433
3	0	25,377	23,778
4	0	25,504	24,127
5	0	25,631	24,478
6	0	25,759	24,832
7	0	25,888	25,189
8	0	26,018	26,018
9	0	26,148	26,148
10	0	26,279	26,279

- (i) Determine whether the guaranteed cash surrender value at the end of contract year 1 satisfies the prospective (present value) test described in Section 6 of the SNFL.
- (ii) Determine whether the guaranteed cash surrender value at the end of contract year 10 satisfies the retrospective (accumulation) test described in Section 4 of the SNFL.
- (iii) Contrast these guaranteed cash surrender values to those required in Canada.

Show all work.

- (c) (3 points) You have been asked to develop and price an Equity Indexed Annuity with both an indexed and a fixed (non-indexed) option.

Develop a strategy to address pricing considerations for each of the following potential situations:

- (i) The options used to fund the indexed-based crediting become unavailable in the market.
- (ii) Surrenders are well above expected during periods when competitors have increased the rates offered on new products.
- (iii) A period of low or negative nominal interest rates.

8. (9 points) PQR Life, one of the largest term insurance carriers in the market, is pricing a 10-year Term product. The product has level rates for the first 10 years, followed by Yearly Renewable (YRT) rates, which are significantly higher than the initial level rates.

This product was priced using an ROI target on distributable earnings.

- (a) (3 points) You are given the following year 1 information for the new product:

Premium	5,000
Investment Income	100
Death Benefits	321
Increase in Statutory Reserve	450
Surrenders Benefits	535
Commissions	6,500
Acquisition Expenses	2,000
Maintenance Expenses	363
Increase in Target Surplus	1,200

- Tax rate is 35% and premium tax is 2.5%
- Investment return on target surplus is 10%

Calculate the distributable earnings in year 1. Show all work.

- (b) (2 points) PQR's current reserve basis is XXX with AG48 financing of reserves.
- Analyze the impact to PQR of the adoption of VM-20
 - Recommend actions PQR can take to minimize the impact of VM-20.
- (c) (4 points) An inforce block of policies is reaching the end of the initial 10-year term period.
- (3 points) Describe three approaches that would reduce policy lapses after the initial level term.
 - (1 point) Recommend the approach PQR should select. Justify your answer.

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9. (10 points) CBT Life is developing a new Equity Indexed Annuity (EIA) and considering three index crediting designs:

	Design 1	Design 2	Design 3
Index	S&P 500	S&P 500	S&P 500
Index crediting method	1 year point-to-point	1 year point-to-point	Daily average
	80% participation	100% participation	150% participation
	0% floor	0% floor	0% floor
	8% cap	No cap	6% cap
	No margin	1.00% margin	No margin

- (a) (5 points) The hedging team has produced the following report assessing the design options:

*To: Product Development team
From: Hedging team
Re: EIA index crediting designs*

We have completed our analysis of the three EIA index crediting designs.

Design 1: *A static hedge program will be easy to implement for Design 1. We will simply enter into a call spread option with a notional amount equal to 80% of the premium. The call spread option is comprised of buying an at-the-money call option and selling a call option with a strike 8% higher than the current index level.*

Design 2: *We could implement a static hedge by purchasing a call option with a strike price 1% higher than the initial index level. However, we feel that a dynamic hedge program is a better option. We will hold a position in futures to offset the measured delta in the liability portfolio. Based on the daily market performance over the past year, this strategy will cost 20% less than the corresponding static hedge. Therefore, for your current pricing, you can assume 80% of the cost we quoted for the static hedge. To make this option even more attractive, we suggest removing the floor and increasing the participation rate.*

Design 3: *We will not be able to meet the “Hedged as Required” criteria given the options readily available in the market today and the Over-the-Counter (OTC) market is currently cost prohibitive. Therefore, this design should be discarded because we will not have a reserving method that complies with AG35.*

9. Continued

Critique the Hedging team's report with respect to:

- (i) Regulatory concerns
 - (ii) Expected hedge performance
- (b) (5 points) CBT's Modeling team is proposing a stochastic equity scenario generation model for the new EIA product. The proposed model uses geometric Brownian motion to model equity returns and the resulting scenarios are intended to be arbitrage-free. You have been asked to perform a comprehensive peer review of the model.
- (i) (1 point) Identify the primary areas of consideration when conducting a peer review according to *Stochastic Modeling: Theory and Reality from an Actuarial Perspective*.
 - (ii) (1 point) Propose a relevant question that you would address in the peer review for each of the areas of consideration.
 - (iii) (3 points) Describe the methods you would use to answer each question.

10. (9 points)

- (a) (3 points) During 2010, a Canadian resident was choosing to purchase one of two Canadian individual whole life insurance policies:

Policy A: 10-Pay Endowment at Age 80

Policy B: Lifetime Level Premium Maturing at Age 120

Describe for each policy:

- (i) A comparison to the exemption test policy (ETP);
 - (ii) The potential frequency of recurring taxation; and
 - (iii) The taxation of death proceeds.
- (b) (2 points) Determine whether or not each of the following transactions is a disposition.
- (i) An assignment for the purpose of securing a loan (other than a policy loan)
 - (ii) A surrender
 - (iii) A lapse which occurred six months prior for non-payment of premium
 - (iv) Deemed disposition occurring due to no longer qualifying as an exempt policy
 - (v) A lapsed policy reinstated within 60 days
 - (vi) Policy sold at arm's length
 - (vii) The proceeds of a policy loan taken in 1979
 - (viii) Payments as a disability benefit
- (c) (4 points) Compare and contrast the tax treatment of a non-prescribed annuity contract issued to a Canadian policyholder on July 1, 1985 with another issued on July 1, 1995.

****END OF EXAMINATION****
Afternoon Session

USE THIS PAGE FOR YOUR SCRATCH WORK

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