SOCIETY OF ACTUARIES
Life Pricing

Exam ILALP

AFTERNOON SESSION

Date: Wednesday, November 1, 2017
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.

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****BEGINNING OF EXAMINATION****
Afternoon Session
Beginning with Question 7

7. (*11 points*) ABC is launching a new non-renewable 10-year term life insurance product. ABC uses both Embedded Value (EV) based on after-tax solvency earnings and Return on Equity (ROE) to measure product profitability.

ABC has a hurdle rate of 8% and a marginal tax rate of 35%.

You are given the following projected financials for the first three years:

Year	Premium	Solvency Reserves	Pre-Tax Solvency Earnings	After-Tax Solvency Earnings	Required Capital	Investment Income on Required Capital	Earnings Reserves
1	403	350	-148	-96	1,040	60	180
2	347	310	191	124	950	70	276
3	298	295	98	64	840	50	415

The present value of projected financials for years 4 and later are as follows:

Premium	Pre-Tax Solvency Earnings	Increase in Required Capital	Investment Income on Required Capital
600	400	-350	190

(a) (*5 points*)

(i) Calculate the ROE for each of the first three years. Show all work.

(ii) Calculate the EV. Show all work.

(iii) Assess whether ABC should launch the product based on these results. Justify your answer.

7. Continued

(b) (*2 points*) Describe the effect of reinsurance on this product's ROE and EV measures.

(c) (*4 points*) ABC's pricing consultant suggested using distributable earnings to calculate EV.

(i) Explain which EV calculation methodology is more appropriate for ABC. Justify your answer.

(ii) Assess whether ABC should launch the product based on the pricing consultant's EV measure. Show all work.

8. (*10 Points*) DMF Life is a midsized US insurance company currently selling Whole Life (WL) and Universal Life (UL). DMF is introducing a fully underwritten 20-year level term product with a conversion privilege.

DMF plans to use their WL and UL experience to develop mortality assumptions for the new term product. Genetic testing was used for the fully underwritten products prior to a recent regulation banning it for underwriting purposes.

A breakdown of the business is as follows:

Product	**Underwriting**	**Average Policy Size (000)**	**Block Status**
Whole Life (Single life)	Simplified	500	Open
Whole Life (First to die)	Full	1,000	Open
Universal Life	Simplified	500	Closed

(a) (*3 points*) Critique the following excerpts from the most recent mortality study:

- ***Mortality improvement**:*
  Trends in mortality improvement due to medical advances were ignored to increase the conservatism of the mortality assumptions.
- ***Policy class definition:***
  Due to the lack of credible data, all products were combined into the same policy class.
- ***Data disclosure:***
  Data was provided and reviewed exclusively by a third party administrator.

(b) (*3 points*) Describe adjustments that should be made to the most recent mortality experience in order to develop mortality assumptions for the new term product.

8. **Continued**

(c) (*4 points*) You are given the following information for a male age 40:

Policies inforce on January 1	8,000
New policies entering on July 1	2,000
Lapses on July 1	160
Lapses on October 1	30
Deaths between January 1 and December 31	40

Assuming a calendar year study:

(i) (*1 point*) Calculate q_{40}.

(ii) (*3 points*) Determine whether 53 claims out of 10,000 policies for males age 40 using a 95% confidence interval is reasonable.

Show all work.

9. (*10* points) MJB Life is a medium-sized company selling term insurance products using direct mail distribution in the US and Canada. As recent sales have been poor, the Chief Financial Officer (CFO) has proposed the following changes:

- Introduce internet marketing in addition to the current direct mail distribution method.
- Change the underwriting method from non-medical underwriting to simplified issue underwriting.
- Apply "Big Data" analytics on micro market segmentation.

(a) (*6 points*) Assess each of the proposed changes for their impact on each of the following:

(i) Sales

(ii) Expenses

(iii) Mortality experience

(b) (*4 points*) The CFO is concerned about the impact of the poor recent sales on the MJB's projected financials, particularly the breakeven year and new business strain.

(i) Define breakeven year and new business strain.

(ii) Compare breakeven year and new business strain for the following distribution channels:

- Internet
- Direct mail
- Independent agents

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10. (*9 points*)

(a) (*1 point*) Describe the advantages of submitting life insurance forms for review through the Interstate Insurance Product Regulation Commission (IIPRC).

(b) (*3 points*) You have been asked to evaluate an inforce Indexed Universal Life (IUL) policy with the following characteristics at issue:

Face Amount	100,000
Death Benefit Option	Level
Cumulative Premiums Paid	22,000
Guideline Single Premium	20,000
Guideline Level Premium	2,000
7-Pay Premium	4,000

Construct an example of a premium payment pattern under Internal Revenue Code sections 7702 and 7702A for each of the items below:

(i) IUL qualifies as life insurance and is a Modified Endowment Contract (MEC).

(ii) IUL qualifies as life insurance and is not a MEC.

(iii) IUL does not qualify under the definition of life insurance.

10. Continued

(c) (*5 points*)

(i) Describe the illustration regulations and/or guidelines for the non-guaranteed elements for policies issued in US and Canada.

(ii) Describe the illustration regulations and/or guidelines on interest rates linked to market performance for policies issued in US and Canada.

(iii) Identify which illustration regulations or guidelines apply to each of the following four policies:

A. Universal life with non-guaranteed elements issued in the US.

B. Indexed universal life with non-guaranteed elements issued in the US.

C. Indexed universal life with non-guaranteed values and features issued in Canada.

D. Fully guaranteed non-participating whole life issued in Canada.

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

USE THIS PAGE FOR YOUR SCRATCH WORK