SOCIETY OF ACTUARIES
Life Finance & Valuation - Canada

Exam ILALFVC

AFTERNOON SESSION

Date: Thursday, October 30, 2014
Time: 1:30 p.m. – 3:45 p.m.

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This afternoon session consists of 4 questions <u>numbered 8 through 11</u> 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 ILALFVC.

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.

8. (*9 points*)

(a)   (*2 points*) Explain how the following items are handled under general Canadian corporate tax legislation, and why such treatment is inappropriate for the taxation of life insurers:

      (i)   Deductions for liabilities

      (ii)   Foreign income for multi-nationals

(b)   (*7 points*) You are an actuary responsible for financial reporting on a Par block for a Canadian domiciled insurance company. You have been given the following information, for both the Par block, and all Canadian policies in-force for the company:

	Par Block		All Canadian Insurance Policies	
	31-Dec-12	31-Dec-13	31-Dec-12	31-Dec-13
Gross Statutory Policy Liabilities	10,000	11,000	200,000	215,000
Net Statutory Policy Liabilities	8,000	8,500	160,000	170,000
Incurred But Not Reported Claims	50	70	600	800
Unearned Premium Reserves	100	150	700	850
Maximum Tax Actuarial Reserves (MTARs)	9,000	9,750	180,000	189,000
Actual Tax Reserves Deducted	9,000	9,600	180,000	185,000

8. Continued

Excerpt from 2013 Statutory Income Statement	Par Block	All Canadian Insurance Policies
Premiums		
Direct premiums received - life	2,500	19,000
Ceded premiums paid - life	(200)	(2,000)
Amounts received in respect to annuities	-	12,000
Experience Rating Refund	50	200
Investment Income		
Imputed Interest Benefit on Real Property	10	1,000
Repayment of policy loans	20	2,000
Other investment Income	500	9,900
Claims	1,200	23,000
Policyholder dividends	400	800
Expenses		
Acquisition expenses	50	600
Other expenses	250	2,000
Commissions	100	1,500

Determine the 2013 after-tax net income for this par block assuming a tax rate of 35%. Show all work.

9. (*10 points*) You are the Appointed Actuary of Theta, a Canadian Life Insurer. You are required to approve Theta's 2013 year-end financial disclosure. Theta reports its income classification under CICA 3855.

(a) (*3 points*) Explain the key challenges created by the Section 3855 implementation.

(b) (*3 points*) Theta backs its liabilities with the bond portfolio shown below.

Value at Year-end	Book Value		Market Value		Coupon / Interest Income	
Category	2013	2012	2013	2012	2013	2012
Held for Trading	30,000	27,000	27,000	26,000	100	50
Available for Sale	50,000	48,800	70,000	69,000	300	100
Held to Maturity	20,000	20,200	25,000	23,000	200	200
Total	**100,000**	**96,000**	**122,000**	**118,000**	**600**	**350**

Calculate the following for Theta's bond portfolio as the end of 2013:

(i) Net Income

(ii) Other Comprehensive Income (OCI)

(c) (*4 points*) Your actuarial assistant has summarized the steps followed to prepare Theta's 2013 year-end financial statement and tax statement. Critique each of the following statements.

(i) Fair Value Option (FVO) is applied to loans to small companies, private bonds, and Toronto Stock Exchange (TSX) traded investments;

(ii) Premium tax rates are determined by Theta's head office jurisdiction;

(iii) There are no tax implications for policy loans;

(iv) Investment Income Tax (IIT) is calculated assuming a 15% tax rate applied to net investment income.

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10. (*12 points*) You are peer reviewing work completed by a Canadian life insurance company's Appointed Actuary.

    (a)   (*3 points*) Explain the peer reviewer's role and obligations as they relate to an assumption change memo.

    (b)   (*9 points*) The Appointed Actuary has provided the following Universal Life assumption change recommendation memo for your peer review:

From: Appointed Actuary
To: Senior Management
Subject: 2015 Assumption Change Recommendations
Date: October 20, 2014

This memo contains the 2015 assumption changes recommendations for Universal Life policies.

Recommendation 1:   Maintain the current Universal Life expected mortality assumption

The current expected mortality assumption is based on the company's fully credible Universal Life mortality experience study for policy anniversaries 2008-2012. An updated experience study, for 2009-2013 policy years, shows a slight increase in the overall Universal Life mortality experience. There is not enough data to determine if this is a new experience trend or simply a fluctuation. We will maintain the current expected assumption.

Recommendation 2:   Reduce the mortality MfAD from $12/e_x$ to $10/e_x$

The last two company Universal Life mortality studies are fully credible. As we now have two fully credible experience studies, we recommend reducing the MfAD.

Recommendation 3:   Update Universal Life unit expenses

The recommendation is based on the experience study completed earlier this year, which reflects two significant changes since the prior study. Lower expenses are now allocated to the Universal Life product line. A new UL administrative process, which is expected to result in major process improvements, will be implemented by the end of 2014. Current projections show that unit expenses could decrease from $40 to $20 per policy over the next 5 years. Only half of the expected savings have been assumed for valuation.

Inflation will continue to be applied as per the selected CALM scenario.

10. Continued

Recommendation 4:   Reduce the expense MfAD from 7.5% to 5%

The expense assumption is based on current experience, as both an expense study and a review of the allocations by product were performed earlier in the year. The assumed expense savings over the next 5 years are conservative as only half of projected savings is used.

Recommendation 5:   No change to the expected lapse assumption

UL lapse rates are based on the company's experience study for three complete policy years ending in 2008-2010. The lapse study is normally run every 3 years. The study for policy years ending in 2011-2013 has not been completed yet due to other priorities but is expected to be available in the next six months. In the interim, we reviewed the 2008-2012 UL Level COI industry lapse study released earlier in the year. The ultimate lapse rates in the industry study are about 1% lower than the expected assumption used by the company. We will review the company's lapse rates when the results from the 2011-2013 lapse study are available.

Recommendation 6:   Increase the Canadian large cap equity return assumption
                    from 9% to 9.5%

The Canadian large cap equity index return was 10.1% over the last 5 years, 9.8% over the last 10 years, and the long-term historical average is 9.3%. We decided to increase the return used in valuation to better align it with the 5 and 10 year averages. This is still close to the long-term historical average.

Recommendation 7:   Continue to use Prescribed Scenario 1 for reported reserves

Scenario 1 results in the highest liability of all the prescribed scenarios, consistent with the CALM results from the prior 3 years. Two additional scenarios were considered and tested, and resulted in higher liabilities than scenario 1. These additional scenarios are considered too adverse and will not be used to report reserves in the future.

Critique each of these recommendations.

11. (*9 points*) Green Life, a Canadian life insurance company, recently acquired a block of individual Universal Life policies from Blue World Insurance. The valuation actuary recommends combining Green Life's existing UL block with the newly acquired Blue World block.

(a)   (*3 points*) List and describe the general considerations and potential factors for determining differentiation for mortality table construction.

(b)   (*6 points*) Management is considering fully integrating the two blocks, including setting a combined mortality table for valuation and experience monitoring.

You are given the following:

- The mortality ratios are based on the existing industry Universal Life mortality table.
- The industry mortality ratio reflects recent industry experience on comparable Universal Life policies to those in the Green Life and Blue World blocks of business.
- The factor from the normal distribution table corresponding to $p = 90\%$ and $r = 3\%$ is 3007.

	Mortality Ratio
Green Life Block	73.2%
Blue World Block	66.4%
Combined Green Life and Blue World Blocks	70.9%
Industry Universal Life Data	80.9%

	Company Actual Number of Claims	Company Expected Claims with 100% Industry Mortality Table
Green Life Block	857	820
Blue World Block	407	372
Combined Green Life and Blue World Blocks	1,264	1,192

(i)   (*5 points*) Calculate the expected number of claims for the combined block of business in aggregate and by block using the Limited Fluctuation Credibility Theory (LFCT) Normalized Method with a simple Poisson model with $p = 90\%$ and $r = 3\%$.

11. Continued

(ii)   (*1 point*) Recommend whether or not to combine the mortality table for the Green Life and Blue World blocks. Justify your answer.

END OF EXAMINATION
Afternoon Session

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