
SOCIETY OF ACTUARIES
Life Finance & Valuation – U.S.

Exam ILALFVU

AFTERNOON SESSION

Date: Friday, May 2, 2014

Time: 1:30 p.m. – 3:45 p.m.

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This afternoon session consists of 4 questions numbered 8 through 11 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.
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 ILALFVU.

Written-Answer Instructions

1. Write your candidate number at the top of each sheet. Your name must not appear.
6. Be sure your essay answer envelope is signed because if it is not, your examination will not be graded.

****BEGINNING OF EXAMINATION****

Afternoon Session
Beginning with Question 8

- 8.** (7 points) Fast Life Insurance Company was recently licensed to sell term life, universal life, and variable annuities. The company has grown rapidly in the three years since inception. Fast Life's Chief Actuary has made the following suggestions:
- *“The company is so new that regulators could not possibly expect us to perform cash flow testing for this coming year end. Instead, Fast Life can do other testing that takes up less time.”*
 - *“Fast Life should discontinue using a consulting actuary as our Appointed Actuary in order to reduce expenses. This role can be performed by a new actuary who has little experience with the products Fast Life sells, but has worked in the valuation area of his prior company for three years where he helped with statutory and tax reporting for other life products.”*
 - *“Since Fast Life is so new and has no actual experience to go on, we should set our Life Insurance GAAP mortality assumption equal to our Statutory mortality assumption until more credible actual experience emerges.”*

Critique the Chief Actuary's suggestions.

9. (10 points) You are the valuation actuary for NOLA Life. NOLA sells a variety of life and annuity products in the U.S. and is currently developing a new 15-pay limited payment life insurance product with level premiums and a level face amount.

(a) (3 points) Your actuarial student has made the following recommendations for the statutory valuation:

- (i) Assumptions are needed for mortality, lapses and interest rates.
- (ii) Assumptions should be conservative since they are locked in at issue.
- (iii) Assumptions should be determined by taking NOLA's current best estimate and including a conservative provision for adverse deviation.

Critique the student's recommendation.

9. Continued

(b) (7 points) You are given the following information for a single policy:

- Face amount: 100,000
- Annual 15-pay gross premium: 3,500
- Issue age: 40
- Premiums are payable at the beginning of the policy year
- Benefits are paid at the end of the policy year
- Valuation interest rate assumption: 3%
- Valuation mortality rate per 1000 for the first policy year: 2.03
- Present value of future benefits (PVFB) at end of policy year t :

t	PVFB
0	35,406
1	36,339
5	40,274

- $\ddot{a}_{40:\overline{15}|} = 12.06$
- $\ddot{a}_{41:\overline{14}|} = 11.41$
- $\ddot{a}_{41:\overline{19}|} = 14.28$
- $\ddot{a}_{45:\overline{10}|} = 8.63$

For each of the following reserve methods:

- Net level premium method
- One year full preliminary term method (FPT)
- Commissioners Reserve Valuation Method (CRVM)

- (i) Calculate the reserve at the end of policy year 5. Show your work.
- (ii) Explain why the reserve differs under the three methods.
- (iii) Indicate whether or not each method is appropriate for statutory valuation. Justify your answer.

10. (11 points)

- (a) (1 point) Describe three ways in which embedded value differs from actuarial appraisal value.
- (b) (10 points) BWF Life was in the process of purchasing DBM Life, when regulators shut down DBM for New Business on 31 Dec 2012 and postponed the sale. BWF determined that the embedded value of DBM's inforce business was 5 billion at 31 Dec 2012. One year later, at 31 Dec 2013, the sale to BWF was allowed.

You are given:

- BWF and DBM are U.S. companies
- No distribution to shareholders occurred during 2013
- Actual terminations are equal to expected during 2013
- There is no debt backing required capital
- Risk Discount Rate is 15%
- After-tax rate of return on invested assets supporting surplus is 5%
- All income items occur mid-year.

	Value at 31 Dec 2012 (millions)
Present Value of Book Profits	4,000
Required Capital	1,400
Free Surplus	500
Non-admitted Assets	100

- Non-admitted assets at 31 Dec 2013 are 100 million.

10. Continued

2013 Income Statement	(millions)	
	Expected *	Actual
Premiums	2,000	1,900
Investment Income	1,500	1,400
Interest on Capital	100	100
Claims	1,200	1,200
Expenses	300	400
Commissions	100	100
Increase in Statutory Reserves	600	500
Net Income Before Taxes	1,400	1,200
Taxes	400	400
After-tax Income	1,000	800
Increase in Required Capital	400	400
Distributable Earnings	600	400

*** Using assumptions from the 31 Dec 2012 Embedded Value calculation**

Assume no change in future assumptions.

- (i) (7 points) Determine the embedded value at 31 Dec 2013. Show your work.
- (ii) (3 points) Explain what the impact on Embedded Value might be with respect to each of the following events:
 - An increase in the target RBC Ratio from 200% to 225% during 2013.
 - BWF expects a 10% reduction in expected expenses in the forecast of distributable earnings.
 - A transaction which replaces some of the equity capital with debt capital paying 10%.

11. (12 points) LWS Insurance Company is calculating the Economic Capital for a long term care (LTC) insurance product.

(a) (3 points) Recommend which of the following two models is more appropriate for the LTC product:

- The Cash Flow Runoff model, or
- The One Year Mark To Market model.

Justify your recommendation.

(b) (3 points) Identify and describe the aspects of modeling the morbidity risk for the LTC block.

(c) (6 points) LWS's Chief Financial Officer has made the following statements:

- “The LTC Economic Capital models used by LWS should be based on stochastic analysis.”*
- “Since Economic Capital is greater than the capital reported in the GAAP balance sheet, the capital held by LWS is adequate.”*

Critique each statement.

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

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