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

Exam ILALFVU

AFTERNOON SESSION

Date: Thursday, October 29, 2015

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.

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 ILALFVU.
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. (10 points)

- (a) (1 point) Describe the features that determine whether a contract is a universal life contract according to SFAS 97.
- (b) (4 points) For a universal life block of business, you are given the following results for calendar year 2014:

Item	Amount
Premiums	1,000
Deferrable expenses	25
Net investment income	80
Cost of insurance (COI) charges	100
Total death benefit claims	50
Expense charges	45
Non-deferrable expenses	40
Interest credited to policyholder account balances	75
Surrender benefits	95
Account Value (AV) released due to death	10
AV released due to surrenders	100
Deferred policy acquisition costs amortized	25
Income taxes	15

Create the 2014 GAAP income statement. Show all work.

8. Continued

- (c) (5 points) For a universal life product with 1,000 policies issued, you are given the following results for the first two years and projected estimates for the following three years:

Year	Total Assessments	Excess Death Benefits	Total Account Value (end-of-year)	Number of Policies Inforce (end-of-year)
1	1,000,000	10,000	24,598,000	980
2	1,000,000	500,000	47,785,000	950
3 – estimated	1,000,000	100,000	69,552,000	920
4 – estimated	1,000,000	200,000	88,880,000	880
5 – estimated	200,000	1,000,000	110,510,400	840

Assume:

- Total assessments and excess death benefits occur mid-year
 - GAAP discount rate is 5%
 - The product has a persistency bonus of 4% of account value at end of year 5
- (i) (2 points) Calculate the persistency bonus liability at the end of year 2 using the straight line method. Show all work.
- (ii) (3 points) You are given the following present values at time 0 reflecting actual experience for the first two policy years and expected experience thereafter:
- Present value of assessments is 3,794,000
 - Present value of excess death benefits is 838,000

Calculate the excess death benefit liability at the end of year 2 in accordance with SOP 03-1. Show all work.

9. (7 points)

- (a) (2 points) Summarize the guidance as provided by SFAS 133 and the Derivatives Implementation Group when determining GAAP reserves for equity-indexed annuities.
- (b) (5 points) You are given the following information for a two year point-to-point equity-indexed annuity subject to U.S. GAAP:
- Deposit: 200,000
 - Policy load: 8%
 - Guaranteed interest rate: 3%
 - Acquisition cost as a percentage of premium: 5%

Assume:

- There are no decrements
- Acquisition cost is classified as a deferrable expense and there are no other expenses
- Discount rate: 5%

In Millions	Policy Year	
	1	2
Fair value of embedded derivative		
Beginning of year	24,474	14,960
End of year	14,960	12,264
Income	2,773	10,261

Calculate the DAC asset at the end of policy year 1. Show all work.

- 10.** (11 points) Blue Life is considering acquiring a block of fixed deferred annuities from Green Life on December 31, 2015. Both Blue Life and Green Life are U.S. companies.

Green provides the following assumptions:

Values (in millions)	December 31, 2015	December 31, 2016	December 31, 2017
Adjusted book value of block	65	N/A	N/A
Minimum required capital	40	45	49
Existing proxy DAC tax asset	70	60	50
Statutory reserve	200	250	270
Tax reserve	180	220	260
Increase in proxy DAC tax asset over prior year end	N/A	3	3

Cashflows occur at year end (in millions)	2016	2017
Premium and investment income	210	235
Benefits	17	18
Expenses	10	12
Unallocated expense	7.2	2.3

Risk free rate	2%
Expected market rate of return	10%
Beta	1.25
Tax rate	20%
Interest on capital	4%
Target capital ratio	300%

- (a) (7 points) Calculate the actuarial appraisal value at December 31, 2015 using Green's assumptions, ignoring all cashflows after 2017. Show all work.
- (b) (3 points) After reviewing Green's assumptions, Blue's actuary made the following observations:
- *Green is overly optimistic on the market return*
 - *Green is holding excessive capital for this block*

Describe the possible impact on the actuarial appraisal value based on each of Blue's observations. Justify your answer.

- (c) (1 point) Identify differences between actuarial appraisal value and embedded value calculations. No calculations are required.

- 11.** (12 points) You are an actuary at LPN, a U.S. life insurance company. You have been asked to help LPN implement principle-based reserves (PBR) according to VM-20.
- (a) (5 points) Your first task is to determine what model will be used for calculating reserves according to VM-20.
- (i) (1 point) A colleague has stated that under VM-20, the net premium reserve (NPR) serves as the reserve floor and therefore LPN only needs to calculate this reserve.
- Assess the appropriateness of this approach.
- (ii) (2 points) Explain the similarities and differences between the current CRVM approach and the VM-20 net premium approach.
- (iii) (2 points) You currently have a cash flow model that is used to project business for 10 years. The model contains liabilities for all universal life, term, and whole life business, and one set of assets that are used to support all three lines of business.
- Propose ways in which this model can be modified to calculate PBR.
- (b) (3 points) Your next task is to set assumptions to be used in principle-based reserving.
- (i) (1 point) List four assumptions that are prescribed within VM-20.
- (ii) (2 points) LPN began selling universal life with secondary guarantees (ULSG) one year ago. A colleague has said that since PBR should be based on a company's own experience, this ULSG block should use assumptions based on its past year of experience with no added margins.
- Assess the appropriateness of this approach.
- (c) (1 point) With the adoption of a principle-based approach to reserves, companies will be required to submit experience data to a statistical agent. Explain why this data collection will be valuable.

11. Continued

- (d) (3 points) LPN reinsures a portion of its life business. You are asked to research how PBR will impact reinsurance.
- (i) Explain why LPN and its reinsurer may currently have mirror image statutory reserves.
 - (ii) Explain why LPN and its reinsurer may currently have different statutory reserves for the same policies.
 - (iii) Explain why mirror image reserves are not required under principle-based reserving according to VM-20.

****END OF EXAMINATION****

USE THIS PAGE FOR YOUR SCRATCH WORK