
SOCIETY OF ACTUARIES
Individual Life & Annuities United States – Company/Sponsor Perspective

Exam CSP-IU

AFTERNOON SESSION

Date: Friday, April 30, 2010

Time: 1:30 p.m. – 4:45 p.m.

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This afternoon session consists of 7 questions numbered 8 through 14 for a total of 60 points. The points for each question are indicated at the beginning of the question. Question 8 pertains to the Case Study, which is enclosed inside the front cover of this exam booklet.
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 since 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 CSP-IU.

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.

CASE STUDY INSTRUCTIONS

The case study will be used as a basis for some examination questions. Be sure to answer the question asked by referring to the case study. For example, when asked for advantages of a particular plan design to a company referenced in the case study, your response should be limited to that company. Other advantages should not be listed, as they are extraneous to the question and will result in no additional credit. Further, if they conflict with the applicable advantages, no credit will be given.

**** BEGINNING OF EXAMINATION ****

Afternoon Session
Beginning with Question 8

Question 8 pertains to the Case Study.
Each question should be answered independently.

- 8.** (6 points) Minotaur Life Insurance Company is a U.S. company that writes individual disability insurance coverage. Minotaur has experienced the same interest and economic environment as in the case study. An actuarial student has prepared the memo shown below in response to an auditor request. You are the responding actuary reviewing the memo.
- (a) (4 points) Explain places, if any, where the memo does not comply with ASOP 21 and ASOP 41.
- (b) (2 points) Recommend changes, if any, in company policy regarding ASOP 21 and ASOP 41.

8. Continued

MEMO

To: Auditor
From: Minotaur Life Insurance Company Actuarial Department
Date: May 1, 2010
Subject: Answers to Your Audit Questions

You asked several questions on March 25, 2010 regarding our individual Disability Insurance line of business. Here are the answers.

Q1: Has the current economic environment affected claim incidence or termination rates?

Claim incidence tends to increase during periods of economic upheaval or downturn, however, virtually no change is seen in claim termination rates. Unfortunately, data used, methods used and basis for assumptions are not available due to lack of resources to provide detailed or summary data.

Q2: Has the current economic environment affected the mix of business recently sold?

Limited information is available on new business, mostly restricted to underwriting class and monthly benefit inforce. We just changed underwriting systems and the new system has not been configured to produce the same new business reports as the prior system. We don't know if the mix of business has changed even in general since this system was implemented six months ago.

Q3: How has the current economic environment affected the investment portfolio?

For this answer, we are relying completely on the Investment Division. The Investment Division indicates that the portfolio is completely illiquid, far below par value, and is currently earning 15%. Premium is expected to cover the liability cash flows, increasing investable amounts, so it is ok.

Disclaimer – Please don't take any of these answers as a Prescribed Statement of Actuarial Opinion, because nobody here currently complies with the continuing education requirements of the American Academy of Actuaries.

9. (10 points) The Chief Financial Officer of your company, ZYX Life Insurance Company, has asked for a report that compares several capital frameworks.
- (a) (3 points) Outline the significant elements of the Solvency II risk capital approach.
 - (b) (4 points) Assess the appropriateness of ZYX using the following capital approaches for measuring economic capital.
 - (i) RBC approach
 - (ii) Solvency IIJustify your answer.
 - (c) (3 points) ZYX has a large block of recently issued single premium immediate annuity policies. Explain how the risk of a long-term mortality improvement trend might be reflected in:
 - (i) RBC
 - (ii) Solvency II risk capital
 - (iii) Economic capital using the “Cash Balance” method

- 10.** (7 points) Globalized is a diversified life insurance company with operations in many countries and has been negatively impacted by the recession.
- (a) (3 points) Evaluate the validity of the following statements made by Globalized’s CEO. Justify your response.
- (i) “As long as we have sufficient capital backed by quality assets we should be all right.”
 - (ii) “Models have taken a lot of the judgment out of setting adequate reserves.”
 - (iii) “This is not the right time for the industry to move to market-consistent valuation.”
- (b) (3 points) Globalized has been planning to implement Enterprise Risk Management (ERM) in the organization.
- (i) Because of the recession, Globalized is now thinking of limiting the implementation of ERM to branches in those countries considered more risky.

Evaluate the appropriateness of this approach.
 - (ii) Explain why the emerging environment of increasingly sophisticated markets and distribution systems makes ERM important in the design and pricing of new products.
- (c) (1 point) Globalized uses the internal control framework published by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

Identify the minimum information that must be attested to with respect to the internal controls of actuarial values.

- 11.** (9 points) You have been asked to set assumptions in preparation for principles-based valuation for similarly priced and distributed products.

You are given:

Block	Product	Administrator	Experience Data
#1	Whole Life	Third-Party	Unreliable, Untimely
#2	Whole Life	In-House	Complete, Credible, Timely

- (a) (1 point) Explain the value of data collection to the process of principles-based valuation.
- (b) (5 points) Evaluate the appropriateness of each of the following statements with respect to conditions of a principles-based valuation as found in the Standard Valuation Law (SVL).

A principles-based valuation:

- (i) Must capture all the main benefits and guarantees associated with the contracts.
- (ii) Must incorporate assumptions that are best estimate.
- (iii) Must adopt internal controls consistent with principles-based valuation and evaluate the effectiveness of those controls.
- (iv) Cannot use company data that is not credible.
- (v) Must use company experience plus a margin for assumptions over which the company has no control.
- (c) (3 points) The following assumptions are used for Block #2:
- Mortality margin is 10%.
 - Lapse rate margin is -10%.
 - Prescribed interest rate movements are used for the deterministic reserve calculation.

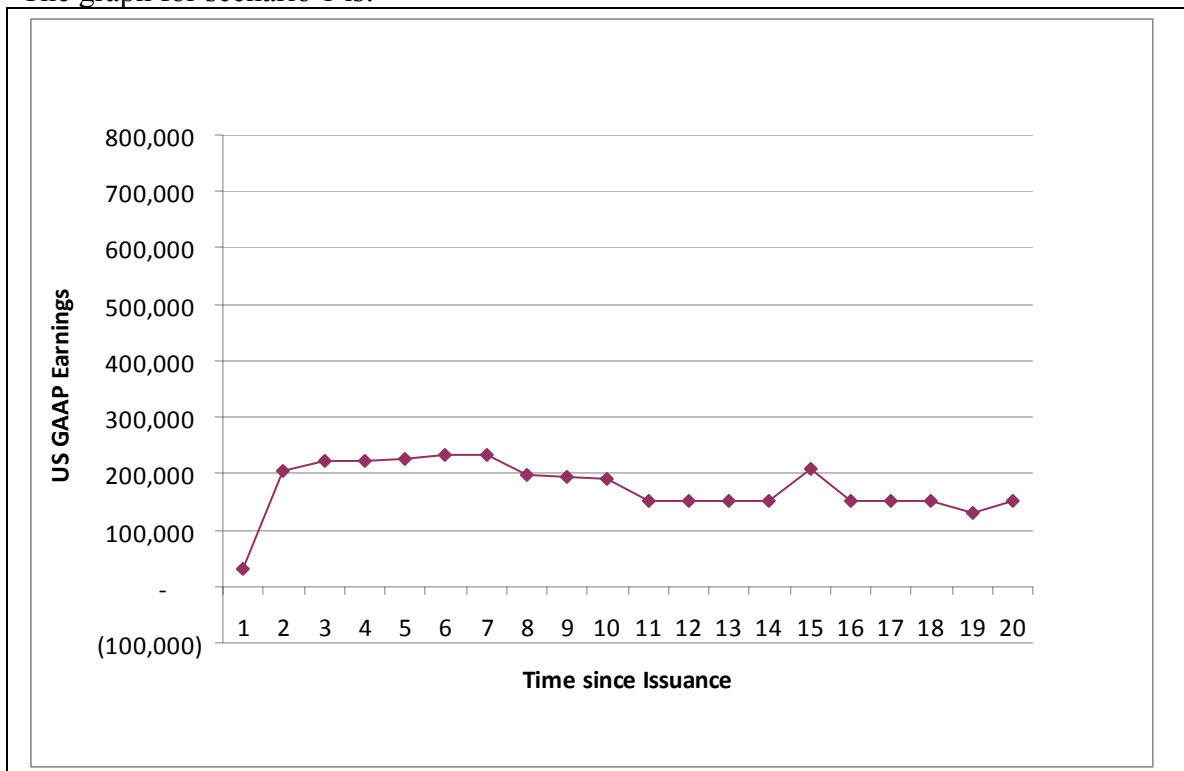
Assess the appropriateness of using these assumptions for Block #1 under VM-20, “Requirements for Principle-Based Reserves for Life Products.”

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12. (6 points) You are reviewing the emergence of earnings for new business, as discussed in the SOA's International Financial Reporting Standard (IFRS) research paper. You have the following four scenarios for a Universal Life product:

Scenario	Reporting Basis	RBC	Cost of Capital
1	US GAAP	100%	12%
2	IFRS	100%	12%
3	IFRS	400%	12%
4	IFRS	100%	6%

The graph for scenario 1 is:



- (a) (2 points)
- Sketch a new graph for scenario 2.
 - Explain any differences between the graphs for scenarios 1 and 2.
- (b) (2 points)
- Sketch a new graph for scenario 3.
 - Explain any differences between the graphs for scenarios 2 and 3.

12. Continued

(c) (2 points)

(i) Sketch a new graph for scenario 4.

(ii) Explain any differences between the graphs for scenarios 2 and 4.

13. (10 points) BOSS CO is a U.S. life insurance company that writes variable annuities with a Guaranteed Minimum Withdrawal Benefit (GMWB). You are given:

A simplified stochastic model of the total liability produced the following results:

Present Value of Accumulated Deficiencies	
Scenario 1	(2,248,000)
Scenario 2	799,000
Scenario 3	422,000
Scenario 4	(1,490,000)
Scenario 5	2,804,000
Scenario 6	663,000
Scenario 7	1,283,000
Scenario 8	1,991,000
Scenario 9	(205,000)
Scenario 10	2,327,000

The standard scenario results for each policy are as follows:

Age	Number of Policies
55	200
65	400

Basic Adjusted Reserve	
Age 55	Age 65
1,000	2,000

PV of Negative Accumulated Net Revenue		
<i>t</i>	Age 55	Age 65
1	317	224
2	423	2,135
3	364	4,325
4	473	2,201
5	386	776

13. Continued

- (a) *(1 point)* List the problems with the prior statutory reserving approaches that led to AG 43 being developed.
- (b) *(4 points)* Compare the methodology for determining the GMWB liability under AG 43 and that prescribed under US GAAP.
- (c) *(5 points)* Calculate the total reserve under AG 43. Show all work.

14. (12 points) ABC Direct enters into a pro rata YRT reinsurance agreement with XYZ Re on the following product:

- Single Premium, level death benefit, UL product.
- Length of the UL product is 4 years.
- Face amount is 50,000 and single premium is 5,000.
- Investment earnings rate is 6%.
- Credited interest rate is 4%.
- YRT reinsurance is obtained on 70% of the net amount at risk (NAR)
- YRT reinsurance rates per 1,000 are as follows:

Year	1	2	3	4
YRT Rate	1.80	2.10	2.50	3.00

- Cost of insurance (COI) rates are equal to 100% of the YRT rates.
- Expected mortality is assumed to be 60% of the YRT rates.

Assume:

- The product is not in loss recognition.
- First year deferred expenses of 50 are 100% covered by a first year expense allowance from the reinsurer.
- No commissions or other maintenance expenses are present.
- Interest provision for adverse deviation is 0.50%.

- (a) (1 point) Identify the US GAAP standard that applies to:
- (i) ABC Direct
 - (ii) XYZ Re
- (b) Calculate the following for **both** ABC Direct and XYZ Re at the end of policy year **2** using US GAAP methods.
- (i) (4 points) Net Benefit Reserves
 - (ii) (7 points) DAC

Show all work.

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