SOCIETY OF ACTUARIES

Individual Life & Annuities United States – Company/Sponsor Perspective

Exam CSP-IU

AFTERNOON SESSION

Date: Friday, April 29, 2011
Time: 1:30 p.m. – 4:45 p.m.

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This afternoon session consists of 7 questions numbered 10 through 16 for a total of 60 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 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.
6. Be sure your essay answer envelope is signed because if it is not, your examination will not be graded.

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****BEGINNING OF EXAMINATION****
Afternoon Session
Beginning with Question 10

10. (*6 points*) You are the reviewing actuary assigned to the year-end audit of Coastal Life. Coastal Life has implemented a new DAC amortization model for its variable annuity block. The appointed actuary has provided the following in response to your January 4, 2011 request for information on the new model:

> To: Reviewing Actuary
> From: Appointed Actuary, Coastal Life
> Date: January 10, 2011
> Subject: New DAC Amortization Model, Variable Annuities
>
> Below is an overview of the new DAC amortization model the company implemented for variable annuities in June 2010. We have moved from a deterministic model to a stochastic model because:
>
> - Future equity returns for the funds are randomly generated using an equity model reflecting historic patterns appropriate to the variable annuity's equity funds.
> - Estimated gross profits are calculated based on best estimate spread assumptions. The method for developing these assumptions has not changed from prior years.
> - Each random scenario generates an associated DAC amortization schedule based on actual historical results and future results projected in the scenario.
> - A distribution of DAC balances is constructed as of year-end.
> - A corridor has been defined to be the 75^{th} to 85^{th} percentile of the distribution. If the current DAC balance falls within this corridor, no "catch-up" adjustment is needed. If the current DAC balance falls outside the corridor, the "catch-up" adjustment equals the amount needed to bring the DAC balance to the nearest corridor boundary.

Assess the appropriateness and completeness of this memo per the guidance of ASOP 21 (Responding to the Auditor) and ASOP 41 (Actuarial Communication).

11. (*10 points*) You are given the following information for a three-year term life product:

- 1,000 policyholders
- Death benefit is 500,000 per policy
- All policies issued on the same day
- Single premium is paid at issue for each policy
- At issue, mortality is expected to be normally distributed with a mean of 3% and a standard deviation of 0.5%

Assume:

- Investment rate is 6%
- Cost of capital is 10%
- Ultimate Risk Exposure Method is used for fair value calculations

Based on anticipated experience at issue, internal economic capital models show the following required levels of capital:

Year	Beginning of Year Required Capital (in millions)
1	48
2	33
3	16

(a) (*6 points*) Calculate the fair value of the insurance liability immediately following the payment of the premium. Show all work.

(b) (*4 points*) By the end of the first policy year, based on credible data, you expect that future mortality will be significantly higher.

Explain the steps you would take to calculate the insurance liability at the end of Year 1 under:

(i) Fair Value Accounting

(ii) U.S. GAAP

12. (*7 points*)

(a) (*1 point*) List reasons an insurance regulator would disallow the reserve credit for a treaty based on the *Life & Health Reinsurance Agreements Model Regulation*.

(b) (*2 points*) In a financial reinsurance treaty, the following approaches can be used to preserve the reserve credits for the ceding company:

(i) Trust

(ii) Letter of Credit with the reinsurer

Identify the advantages and disadvantages of each from the ceding company's perspective.

(c) (*4 points*) Recommend any changes that would need to be made to each item below so the treaty meets the definition of reinsurance under SFAS 113. Justify your response.

(i) A direct company will establish a deposit account with the reinsurer equal to 15% of expected claims.

(ii) A reinsurer may cancel the reinsurance treaty with 30 days notice at the end of each calendar year.

(iii) The reinsurer may defer payment of claims for a maximum of five years.

(iv) A direct company may recapture business under the reinsurance treaty anytime after the tenth year.

13. (*8 points*) A Fixed Single Premium Deferred Annuity (SPDA) has the following contract features:

- Single premium of 100,000 is paid at beginning of the first policy year
- Credited interest is guaranteed to be 3.5% for the first year and 1.5% in all subsequent years
- Interest is credited at the end of each policy year
- The contract is valued on an issue year basis and the valuation interest rate is 4.5%
- The contract expires after the 5th policy anniversary
- Policy year surrender charges as a percentage of account value are as follows:

Year	1	2	3	4	5
	8%	6%	4%	2%	0%

- Policyholders have the right to annuitize at the end of each policy year.
- Surrender charges are waived on annuitization.
- The annual annuity benefit that can be purchased at the end of each policy year on a current basis is 105% of the annual annuity benefit that can be purchased on a valuation basis.

(a) (*5 points*) Calculate the CARVM reserve for the contract at the end of the first policy year under Actuarial Guideline 33. Show all work.

(b) (*3 points*) The company is adding a return of premium benefit feature to its SPDA contracts. The benefit feature pays 100% of the premium upon full surrender within the first two policy years.

Calculate the CARVM reserve at the end of the first policy year for the SPDA contract with the return of premium feature. Show all work.

14. (*12 points*) ABC Life cedes 80% of its whole life business through a coinsurance treaty with XYZ Re.

You are given the following information:

Policy Assumptions	
Face Amount	500,000
Premium	5,000
Policy Fee	25
Mean Reserves–Year 1	400
Commissions–Year 1	95%
Commissions–Year 2+	5%
Premium Tax	2.5%
Expenses	
Underwriting & Issue – per policy	350
Maintenance – per policy per year	25

Assume the following:

- ABC Life and XYZ Re each have initial surplus of 600
- ABC Life and XYZ Re each assume investment rate of return of 10%
- XYZ Re pays an expense allowance to ABC Life as follows:
  Policy year 1 – 100%
  Policy year 2-10 – 15%
  Policy year >10 – 7.5%
- ABC Life retains the policy fee
- XYZ Re reimburses ABC Life for the premium tax paid
- Premium is paid at the beginning of the year
- Death claims of 10,000 paid at end of Year 1

(a) (*8 points*)

(i) Calculate the Gain from Operations for both ABC and XYZ for Year 1. Show all work.

(ii) Determine the amount of surplus relief that ABC receives from this reinsurance agreement at the end of Year 1. Show all work.

(b) (*2 points*) Recommend an alternative form of reinsurance that would provide surplus relief, including its advantages and disadvantages.

(c) (*2 points*) Identify situations where reinsurance could assist ABC Life with its income tax planning.

15. (*10 points*) CBA Life, a U.S. insurance company, is acquiring a block of non-participating, two-year term life policies from ZYX Life.

(a) (*6 points*) You are given the following information about a sample policy from this block:

Face amount: 100,000
Gross annual premium: 500

Best Estimate Assumptions	Year 1	Year 2
Mortality Rates	0.45%	0.59%
Lapse Rates	10%	n/a
Interest Rates	5%	5%

Assumptions that Include Provision for Adverse Deviation	Year 1	Year 2
Mortality Rates	0.46%	0.60%
Lapse Rates	5%	n/a
Interest Rates	5%	5%

Assume:

- The Best Estimate lapse assumption is based on ZYX's company experience studies which are fully credible.
- The Best Estimate mortality assumption is based on industry experience.
- Lapses and deaths are assumed to occur at the end of the year.
- There are no expenses on this product.

(i) Calculate the GAAP Net Level Premium for the policy using the Best Estimate Assumptions. Show all work.

(ii) Evaluate the appropriateness of the provisions for adverse deviation, taking into consideration guidance outlined in ASOP 10 (Financial Statements under GAAP). Justify your answer.

15. Continued

(b) (*4 points*) You are given the following information for the block of business for sale by ZYX Life:

Assets		Liabilities and Capital	
Treasurys	1,000,000	Reserves	5,600,000
Corporate A-rated Bonds	3,000,000		
Commercial Mortgages	2,000,000		
		Required Capital	400,000
Total	6,000,000	Total	6,000,000

Assume:

- There are no transaction costs or taxes.
- Upon transfer to CBA, the embedded value for this block of business would be 800,000.
- CBA Life will maintain the current reserve.
- Only the C-1 capital component of required capital will change.
- Ignore Bond Size Factors in calculating required capital
- The following C-1 factors apply:

Asset Type	C-1 Factor
Treasurys	0%
Corporate A-rated Bonds	1%
Commercial Mortgages	4%

- Ignore RBC covariance adjustment.

ZYX has offered to transfer the liabilities and assets equal to 5,000,000. In addition, ZYX will allow CBA to select the asset mix for transfer from the above portfolio.

Evaluate the adequacy of ZYX's offer. Justify your answer.

16. (*7 points*) An actuarial student has made the following recommendations for U.S. GAAP reporting for an insurer's Universal Life (UL) line of business:

(i) To simplify GAAP benefit reserve calculations, use the statutory CRVM reserve as a proxy for the GAAP benefit reserve.

(ii) Capitalize all first year expenses and commissions.

(iii) Build a reserve that levelizes benefits as a constant percentage of policy charges.

(iv) Establish a claim fluctuation reserve to smooth annual financial results.

(v) Amortize DAC over 10 years to speed up the emergence of profits.

(vi) Use 105% of the company's experience mortality in calculating the expected gross profits.

(vii) Replace current UL policies with a higher margin product to amortize DAC at a lower rate.

Evaluate the appropriateness of each of the recommendations.

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

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