Exam CSP-IC

MORNING SESSION

Date: Friday, November 2, 2012
Time: 8:30 a.m. – 11:45 a.m.

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This examination has a total of 120 points. It consists of a morning session (worth 60 points) and an afternoon session (worth 60 points).

    a) The morning session consists of 6 questions <u>numbered 1 through 6</u>.

    b) The afternoon session consists of 6 questions <u>numbered 7 through 12</u>.

    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-IC.

6. Be sure your essay answer envelope is signed because if it is not, your examination will not be graded.

1.   (*8 points*)

(a)   (*3 points*) Compare the U.S. regulatory Risk Based Capital (RBC) factor-based methodology to the Economic Capital methodology of setting capital levels for life insurance companies.

(b)   (*3 points*) List the products for which U.S. Life Insurance companies currently do not calculate RBC using a factor-based methodology, and briefly describe the methodology used instead.

(c)   (*2 points*) Company HJR owns a closed block of universal life insurance policies with a minimum credited interest rate guarantee. Briefly explain how a low interest-rate environment would affect HJR's capital levels on this block of business under each of the following capital models. Justify your answer.

(i)   U.S. Risk Based Capital (RBC) model

(ii)   Economic Capital model

2. (*8 points*) Brittany Life (BL) is a U.S. domiciled life insurance company.

(a) (*3 points*) BL's management sets its capital at 200% of the AA rating requirement as per a major rating agency. Management's main concerns are liquidity and value creation, and believe this formula gives BL the strong capital position it needs to keep borrowing costs down and satisfy its equity investors.

Evaluate whether setting the capital at this level is sufficient to address management's concerns. Justify your answer.

(b) (*5 points*) BL entered into an index swap with the largest U.S. investment bank, Gator Mallory (GM), in an attempt to hedge its separate account guarantees.

You are given the following information about the deal:

- Underlying Index = S&P 500

- Strike Price = 1000, which is 10% below the S&P 500 price at the time of the deal.

- Notional Amount = 50 billion, which is equal to BL's variable annuity separate account at the time of the deal.

- BL pays GM a flat amount calculated as a percentage of the notional amount.

- GM pays BL a floating amount calculated as a percentage of [notional amount * min (0, strike price/current price − 1)].

- The positions are netted and settled on a daily basis.

Discuss the potential risks associated with this deal, using the Federal Reserve Risk Categories and associated Elements of Insurance Risks as a guide.

3. (*8 points*) ABC Life, a life insurance company, is building a model for fair value financial reporting and solvency applications using market value margins (MVM) for insurance liabilities. For its test model, ABC uses the cost of capital method with one-year risk horizon.

(a) (*2 points*) List and explain the three key components in establishing risk margins under this methodology.

(b) (*6 points*) You are given the following model assumptions:

Product:	Single premium 10-year term life insurance
Death benefit per policy:	100,000
Issue date of all policies:	12/31/2003
Death benefits:	Paid at the end of each policy year
Single premium:	Paid at time of policy issue
Model start date:	1/1/2011
Number of lives at model start:	2,000
Expected mortality rate:	3% per annum
Risk-free rate:	4% per annum
Cost of Capital:	7% per annum

You are also given the following modeling results:

Where BEL(ds) is the "distressed scenario" best estimate liability condition using a "worst case" mortality rate, and BEL is the best estimate liability with the expected mortality rate.

Date	BEL(ds)	BEL
1/1/2012	17,985,000	16,169,000
1/1/2013	12,627,000	10,816,000
1/1/2014	7,238,000	5,428,000

(i) Calculate the best estimate liability (BEL) at the model start date. Show all work.

(ii) Calculate the market value margin (MVM) for this block of business using a one-year exposure horizon. Show all work.

4.   (*12 points*)

(a)   (*4 points*) With respect to the disintermediation and reinvestment risk:

   (i)   Define each of these two risks.

   (ii)   Explain how duration may be used to manage each of these risks.

   (iii)   Explain the impact of changes in both the yields and yield curve shape on these two risks.

(b)   (*8 points*) You are given the following:

Assumptions:
   - No asset default risk or investment expenses
   - Bonds have a 1,000 par value and coupons are payable semi-annually

Assets available for purchase as of June 30, 2011:

	Maturity Date	Annual Coupon Rate	Yield to Maturity
Bond A	December 31, 2011	2.00%	1.00%
Bond B	June 30, 2012	6.00%	1.20%

Liability cash flows as of June 30, 2011:

Date	Liability Cash Flow
December 31, 2011	3,090
June 30, 2012	2,060

   (i)   Calculate the portfolio of bonds and its cost under the cash flow match strategy. Show all work.

   (ii)   Calculate the portfolio of bonds under the duration match strategy using the Macaulay duration at 5%. Show all work.

5. (*12 points*) You are given the following information:

- ABC Reinsurance Company offers two types of reinsurance: Yearly Renewable Term (YRT) and Proportional Coinsurance.

- XYZ Life Insurance Company has a block of term insurance policies of small average size and a limited amount of surplus. They are looking to increase their market share without increasing the volatility of its earnings.

(a) (*2 points*)

 (i) Explain the two types of reinsurance offered by ABC Reinsurance Company.

 (ii) Recommend the type of reinsurance which would be most suitable for XYZ.

(b) (*7 points*) You are given the following financial information for XYZ:

	Current Year			Beginning of Year	End of Year
Premium	100,000	Assets		40,000	64,500
Investment Income	2,200				
Death Claims	50,000	Reserves		0	20,000
Expenses	25,000	Required Surplus		0	40,000
Increase in Reserves	20,000				
After Tax Income	4,500				

- XYZ's Required Surplus has only two components, where 50% is based on a constant factor of the net face amount and 50% is based on a constant factor of the net reserves.

- The income tax rate will not change regardless of the reinsurance arrangement. There is no market value adjustment to the assets and no external sources of surplus.

- Quota Share % = 75

5. Continued

Calculate the change in XYZ's Free Surplus at the end of the year under:

(i)   YRT ceded arrangement where:
- The Net Amount At Risk is the Initial Face Amount
- YRT Ceded Premium = 40,000 for the year
- There is no reserve credit
- XYZ's revised Investment Income will be 2,000 for the year.

(ii)   Coinsurance arrangement where:
- Expense Allowance = 25% of the ceded premium
- XYZ's revised Investment Income will be 2,000 for the year.

Show all work.

(c)   (*3 points*) ABC is going to perform cash flow testing on its assumed business from XYZ. Explain the responsibilities of ABC's actuary under ASOP #23 – Data Quality with respect to:

(i)   False data

(ii)   Incomplete or inconsistent data

6.   (*12 points*) With respect to the July 2010 Exposure Draft – Insurance Contracts, IASB:

(a)   (*4 points*)
  (i)   Define the Initial Measurement and its key components.

  (ii)   List the considerations in determining the discount rate used in the calculations of the Initial Measurement.

(b)   (*3 points*)
  (i)   Assess whether the following statements are true or false. If false, correct the statement to ensure it is true:

  1.   In order for the embedded derivative (ED) to be separated from its host contract under IAS 39, the ED's economic characteristics should be closely related to its host contract.

  2.   If separated, the embedded derivative should be measured at fair value under IAS 39.

  3.   The risk adjustment shall be the chief actuary's best estimate of provision for adverse deviation for the insurance contract.

  (ii)   Explain the process used to determine the present value of the cash flows if the insurance portfolio is reinsured.

(c)   (*5 points*) You are given the following information for a Universal Life insurance portfolio:

Initial Annual Premium	200
Acquisition Costs	100
Incremental Acquisition Costs	60
Expected Present Value of Premiums	3,000
Expected Present Value of Claims	2,500
Risk Adjustment	150

Calculate the insurance liability, under International Financial Reporting Standards (IFRS):

(i)   At initial recognition, and

(ii)   Immediately after initial recognition under IFRS.

Show all work.

END OF EXAMINATION
Morning Session

USE THIS PAGE FOR YOUR SCRATCH WORK

USE THIS PAGE FOR YOUR SCRATCH WORK