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

Exam CSP-IC

AFTERNOON SESSION

Date: Friday, April 27, 2012
Time: 1:30 p.m. – 4:45 p.m.

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This afternoon session consists of 6 questions numbered 8 through 13 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-IC.
6. Be sure your essay answer envelope is signed because if it is not, your examination will not be graded.

Tournez le cahier d'examen pour la version française.

475 N. Martingale Road
Schaumburg, IL 60173-2226

Printed in the U.S.A.
Exam CSP-IC Front Cover

****BEGINNING OF EXAMINATION****
Afternoon Session
Beginning with question 8

8. (*4 points*) You are responsible for reviewing the qualifications of Appointed Actuaries. Your assistant has provided you with excerpts from an initial review of the proposed Appointed Actuary of Life Insurance Company ABC.

The proposed Appointed Actuary:

- Worked for the same Canadian life insurance company for the past 15 years
- Performed valuation of Canadian actuarial liabilities for past 7 years
- Ensures company compliance with CIA's Standards of Practice and current regulation and legislation
- Keeps current with CIA's continuing professional development requirement
- In process of applying for Appointed Actuary Certificate from CIA
- Has been the subject of an adverse finding by a CIA Disciplinary Tribunal

Critique the suitability of the above actuary as an Appointed Actuary in accordance with guidelines of the Office of Superintendent of Financial Institutions (OSFI).

9. (*7 points*) JSDS Life is a Canadian life insurer with U.S. branch operations who has written participating life insurance policies in all provinces since 1980.

You are given the following:

- Company's fiscal year end is December 31st.
- Cash dividends were paid in all calendar years.
- Reinsurance utilized and ceded on a 20% quota share basis.
- Assets include the following uncollectible amounts:
  - Residential mortgages some of which are currently in default;
  - Premiums receivable for life insurance policies in Canada;
  - Corporate bonds some of which are doubtful.
- Transition Properties as of December 31, 2006:
  - Fair Market Value: 4,000,000
  - Cost Amount: 1,000,000

For the Year 2010 the statements below outline what procedures were followed in determining portions of JSDS's taxable income:

(i) Premiums written from both Canadian and U.S. branch operations were included.

(ii) The same premium tax rate was applied against all direct insurance premiums written less a 20% deduction for premiums which were ceded to the reinsurer on a quota share basis.

(iii) For assets which are doubtful, 100% of the amounts owing were deducted.

(iv) Method used to determine Maximum Tax Actuarial Reserves (MTARs):
- Pre 1996 policies: 1.5 Yr Full Preliminary Term
- Post 1995 policies: As reported in the financial statements

(v) Any insurance policy with a negative reserve had their reserve set to zero.

(vi) For Investment Income Tax (IIT) the tax calculated using a tax rate of 10% of our Corporate Bond yield × (MTARs less Policy Loans) on all life insurance policies.

(vii) The impact of Transition Properties were excluded.

Assess the accuracy of each of these statements.

10. (*12 points*)

(a) (*6 points*)

(i) List the 3 techniques used to determine a reliable fair value for the Fair Value Option.

(ii) Explain how proponents and opponents of fair value accounting would view each of these techniques.

(b) (*3 points*) Recommend an appropriate technique for determining a fair value for each of the following:

(i) A block of 5-year and 10-year coupon bonds maturing in the next 3 years.

(ii) A block of 62-month and 124-month coupon bonds maturing in exactly 2 years.

(iii) A large single investment sold as a debt security, with an option to switch to an equity-based version within 3 years of maturity.

Justify your recommendations.

(c) (*3 points*) Explain the importance of the following criteria used to assess the merits of an accounting model for measurement of the fair value of liabilities for insurance contracts, based on the article "An Approach for Measurement of the Fair Value of Insurance Contracts."

(i) Consistency between components within an insurance contract and between insurance contracts.

(ii) Consistency between the measurement approaches used for all financial contracts.

(iii) Consistency with accepted economic pricing methodologies.

11. (*11 points*) ESLT Life, a Canadian life insurance company, is unable to complete its CALM valuation in time for its quarterly reporting. It has established a roll-forward approach to approximate the company's quarter-end reserves using the detailed CALM roll-forward approach as below:

Step 1: Prior to the current quarter end's date, perform the CALM process to calculate the true CALM reserve as of the previous quarter end.

Step 2: Solve for a level equivalent interest rate vector that discounts the previous quarter's liability cash flows to the previous quarter's CALM reserves.

Step 3: Add in the liability movement which equals the present value of liabilities at the current quarter end less the present value of liabilities at previous quarter end.

Step 4: Add in the movement due to changes in reinvestment rates.

Step 5: Add in any change in unrealized gains and losses during the quarter.

(a) (*4 points*)

(i) Evaluate the appropriateness of each of the above steps with respect to the approximation of the Canadian GAAP policy liabilities.

(ii) Recommend any changes that need to be made to the above approach to ensure compliance with the approximation approaches outlined in the CIA Consolidated Standards of Practice (CSOP).

(b) (*7 points*) For the roll-forward CALM reserve determination, you are given the following cash flow reports and asset information report:

11. Continued

Inforce assets at December 31, 2011

Cash	350,000	
Maturity Date of Bonds	**Maturity Value**	**Market Value**
June 30, 2012	500,000	497,519
December 31, 2012	1,000,000	985,222

Term	**Spot Interest Rates – Annual Effective**
6-month bills	1.0%
12-month bills	1.5%
18-month bills	1.5%

Cash Flow Report at Dec 31st, 2011

Date	Asset Cash Flow	Liability Cash Flow
June 30, 2012	500,000	500,000
December 31, 2012	1,000,000	1,000,000

Cash Flow Report at March 31st, 2012 (prior to Asset trade)

Date	Asset Cash Flow	Liability Cash Flow
June 30, 2012	500,000	500,000
December 31, 2012	1,000,000	900,000
March 31, 2013		400,000

(i) (*2 points*) Calculate the true CALM reserves at Dec 31, 2011 using cash flows and asset information given above. Show all work.

(ii) (*2 points*) Calculate the liability movement at March 31, 2012 using the cashflow reports and the annual effective spot interest rates. Show all work.

(iii) (*3 points*) You are given the following additional information on the assets traded at March 31, 2012.

Asset trades occurring on March 31, 2012

	Maturity Date	Maturity Value	Market Value
Sale	December 31, 2012	100,000	99,206
Purchase	March 31, 2013	400,000	395,648

Calculate the adjustments made to reflect the changes in the interest rates during the first quarter of 2012 with respect to new business and unexpected liability movement.

12. (*13 points*) Your company is an A-rated company and values a block of newly sold Term-to-100 (T100) policies. The T100 policies have been sold to high net worth individuals with a minimum face amount of 500,000 and offers preferred underwriting.

You are given the following:

Best Estimate Liability	10,000,000
Mortality PfAD (Provision for Adverse Deviation)	5,000
Lapse PfAD	10,000
Expense PfAD	3,000
C3 - Interest Rate Mismatch PfAD	14,000
C1 - Asset Default PfAD	2,000
C1 - Investment Expense PfAD	1,000
Total Reserves Including PfADs	10,035,000

(a) (*2 points*) Justify why this block of policies qualifies as an insurance contract under IFRS.

(b) (*4 points*) Your company is looking into the impact of valuing this product under IFRS Phase II as described in the 2010 Exposure Draft on Insurance Contracts.

Your boss has made the following recommendations as an approach to estimate the value of the same block of policies under IFRS:

(i) Use best estimate cash flows

(ii) Use the CALM best estimate interest rate to discount the cash flows

(iii) Add the total of all of the PfADs in order to come up with a risk adjustment

Evaluate the recommendation's and suggest any appropriate changes.

12. Continued

(c) (*2 points*) Justify which of the following liability cash flows you would include as part of your best estimate cash flows:

- Premiums, Benefit Payments
- Premium Tax, IIT, Corporate Income Taxes
- Policy administration and maintenance costs, Commissions
- Underwriting department costs (The not taken up rate is 9%)
- Reinsurance recoveries
- Investment Returns net of expenses and defaults
- CEO Salary
- Overtime for call center support

(d) (*2 points*) Evaluate each of the following as possible investment options for use in deriving a discount rate for the liability cash flows:

- Government of Canada treasury bills
- U.S. treasury bonds, average time to maturity is 10 years
- AA-rated Canadian corporate bonds, average time to maturity is 20 years
- A-rated Canadian private placements, average time to maturity is 15 years
- European High yield and distressed bonds, average time to maturity is 6 years

(e) (*3 points*) Your boss has suggested using a confidence level approach for determining the risk adjustment.

(i) List reasons why your boss has suggested the confidence level approach and indicate when this approach would be appropriate.

(ii) Assess the appropriateness of the 90% confidence level.

13. (*13 points*)

(a) (*3 points*) Define the direct and indirect methods of determining Fair Value Liabilities and include the advantages and disadvantages of each method.

(b) (*5 points*) You are given the following information (in Canadian dollars):

Fair Value of Liabilities at end of year 1	10,000
Market Value of Assets at end of year 1	10,500
Tax Value of Liabilities at beginning of year 1	12,000
Tax Value of Assets at beginning of year 1	18,966
Liability Cash Flow at end of year 1	1,000
Asset Cash Flow at end of year 1	850
Expense Cash Flow at end of year 1	200
Canadian risk-free rate	2.50%
Additional spread on liabilities	0.50%
Additional spread on assets	0.25%
Cost of Capital	6.00%

Determine:

(i) The Fair Value of Liabilities at the beginning of year 1.
(ii) The implied Required Profit in year 1.
(iii) The Market Value of Assets at the beginning of year 1.
(iv) The implied corporate tax rate in year 1.

(c) (*5 points*) You are given the following information with respect to currency risk:

- Liability cash flow at end of year 1 (in Canadian dollars): 1,000
- Asset backing the above liability is denominated in U.S. dollars.
- Current spot rate: 1.00 USD buys 0.975 CAD
- U.S. risk-free rate = 1.6%
- Canadian risk-free rate = 2.5%
- Historical standard deviation over 1-year periods = 0.056

Determine the Provision for Adverse Deviation for currency risk.

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

USE THIS PAGE FOR YOUR SCRATCH WORK

USE THIS PAGE FOR YOUR SCRATCH WORK