Exam ILALFVC

MORNING SESSION

Date: Thursday, October 29, 2015
Time: 8:30 a.m. – 11:45 a.m.

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This examination has a total of 100 points. It consists of a morning session (worth 60 points) and an afternoon session (worth 40 points).

    a) The morning session consists of 7 questions numbered 1 through 7.

    b) The afternoon session consists of 4 questions numbered 8 through 11.

    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 ILALFVC.

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.

1. (*8 points*) You have been asked to perform an actuarial review of a U.S. life insurance company's term life and universal life (UL) statutory reserves.

    (a)   (*2 points*) List six general principles to follow in performing a satisfactory audit of reserves.

    (b)   (*3 points*) You are given the following for the company's term life block:

In Millions	2012	2013	2014
Beginning face amount in force	30,000	31,500	33,075
Ending face amount in force	31,500	33,075	33,900
Beginning reserve	1,412	1,483	1,556
Valuation net premium	654	687	704
Tabular interest	60	63	65
Reserves released by death and other terminations	91	94	100
Ending reserve	1,483	1,556	1,594

        Evaluate the reasonableness of the reserves by analyzing the trend in the average tabular mortality rate. Justify your answer. Show all work.

1. Continued

(c) (*3 points*) You are given the following for the company's UL block:

In Millions	2012	2013	2014
Beginning account value	75	174	260
Deposits net of front end loads	125	113	101
Cost of insurance charges	10	9	8
Expense charges	1	1	1
Account value released by death and other terminations	19	28	36
Ending account value	174	260	328

Assume:

- Reserve is the account value.
- Deposits net of front end loads, cost of insurance charges, expense charges and account value released by death and other terminations have been separately audited and found to be accurate.
- Credited interest rates during 2012-2014 varied between 3.5% and 4.5%.
- There are no other charges or credits.

Evaluate the reasonableness of the reserves using the roll forward approach. Justify your answer. Show all work.

2. (*10 points*) With respect to IFRS:

(a)   (*2 points*)

(i)   Define transaction costs.

(ii)   Describe the transaction costs for each of the following:

- Financial instruments
- Service contracts

(b)   (*4 points*) You are given the following statements regarding an implementation of an IFRS amortized cost model:

1. *The issuer of the financial instrument determined the amortized cost using future cashflows over the relevant period with assumptions that include margins for risk and uncertainty.*

2. *Administrative costs and any contractual loadings or fees were included in the projected cashflows.*

3. *An effective interest rate was determined in order to create an appropriate amortization schedule, using the initial fair value measurement of the financial asset or liability, the incurred transaction costs and the estimated future cashflows relating to the contract.*

4. *The investor's option to surrender was calculated as the minimum of the surrender value to the policyholder, the fair value of the benefit at maturity and the amortized cost of the liability.*

5. *Income taxes were excluded from financial asset and liability calculations.*

6. *The existing liability calculation was updated for changes to contract terms, including the projected cashflows and effective interest rate calculation.*

Critique the above implementation. Recommend changes where appropriate.

2. Continued

(c)   (*4 points*) For a 3-year investment contract, you are given:

Initial Premium	10,000
Acquisition Expenses	
Advisor compensation	200
Underwriting	50
Product development	50
Marketing and advertising	50
Issue expenses	100
Fees covering transaction costs	0

Projected Liability Cash Flows (end of year):

Year	Without Margins	With Margins
1	3,000	3,100
2	3,900	4,100
3	3,989	4,350

Present Value of Liability Cash Flows:

Interest Rate	Without Margins	With Margins
4%	10,050	10,650
5%	9,850	10,450
6%	9,650	10,250
7%	9,500	10,050
8%	9,300	9,850
9%	9,100	9,650

Determine the amortized cost of the liability at the end of years 1, 2 and 3. Show all work.

3. (*8 points*) ABC Life has prepared its Dynamic Capital Adequacy Testing (DCAT) based on 2014 year-end financials. An actuarial student wrote the following process document which was used in completing this year's DCAT report:

Section	DCAT Process Document
1	*In-force and new business for all lines of business are included except for Segregated Funds. Segregated Funds are excluded due to their volatile financials.*
2	*Financial Projections* • *The financial position at the end of 2013 and 2014 will be reviewed.* • *Financials will be projected from 2015 to 2017.*
3	*The base scenario projections are based on ABC's business plan, adjusted for conservatism.*
4	*One plausible adverse scenario is tested - the "Government Deficit Ceiling Scenario":* • *Government rating is downgraded, resulting in government bond rates increasing by 200 bps with corporate spreads decreasing by 220 bps immediately.* *As a result, the following occur:* • *Inflation increases by 2%.* • *Reduction in services for taxpayers, resulting in 10% higher surrenders in whole life insurance policies.*
5	*Testing of Financial Condition:* • *Under the base scenario, ABC checks to ensure the value of the assets is greater than the liabilities throughout the forecast period and to ensure it meets the internal target capital ratio.* • *Under the plausible adverse scenario tested - without Management action being taken - ABC meets its internal target capital ratio.*
6	*Inclusion of Future Management Actions:* • *Management demands all future plausible Management Actions must be in the DCAT report.* • *For the plausible adverse scenario "Government Deficit Ceiling Scenario," repricing of whole life insurance is implemented one year after the initial shock to reflect higher lapses at older ages.*

Critique each section of the DCAT process document. Recommend changes where appropriate.

4. (*7 points*)

(a) (*4 points*) You are peer reviewing an actuarial student's dividend calculation for participating policyholders.

There are two blocks of participating policies:

- A closed block resulting from demutualization
- An open block

The open block is approximately ten times the size of the closed block. New business continues to be added to the open block.

The student makes the following recommendations:

(i) *Merge open and closed participation blocks to*:

- *Increase credibility*
- *Support dividend payment on new business*

(ii) *Smooth dividends paid so they are not significantly different from previous years*

(iii) *A dividend payout of 5% of the participating accounts to all policyholders*

(iv) *A 15% payment to the shareholders from the participating accounts*

(v) *An increase to the dividend stabilization reserve to support growth*

Critique the above recommendations.

(b) (*2 points*) Contrast the following:

- Principles for deciding on fairness for changes made to adjustable policies
- Principles for deciding on fairness for participating dividends

(c) (*1 point*) Explain why reinsurers do not share in policyholder dividends paid on participating policies.

5. (*9 points*)

(a) (*3 points*) Your company has a closed block of nonrenewable term insurance. The total face amount remaining is 2,000,000. All policies will expire on December 31, 2015.

Assume:
- Interest rate is 4%
- $q_x = 0.01,$ death is assumed to occur at the end of the year
- $e_x = 12$

Calculate the mortality risk volatility component under MCCSR at December 31, 2014. Show all work.

(b) (*6 points*) Your company has purchased a block of index-linked UL products.

(i) Describe the differences in the determination of the Asset Default (C-1) MCCSR capital factor for index-linked UL products compared to non-index-linked UL products.

(ii) List the conditions your company must adhere to when managing the assets for this block of business.

(iii) You are given:

End of Quarter	Correlation Factor (CF) For Previous 52 Weeks
Q3 2014	94.24%
Q2 2014	94.46%
Q1 2014	94.75%
Q4 2013	94.14%
Q3 2013	94.22%

	Standard deviation of asset returns	Standard deviation of returns credited to policyholder funds	Correlation between returns credited to policyholder funds and asset returns
52 weeks ending December 31, 2014	0.118	0.124	0.99

Calculate the December 31, 2014 Asset Default (C-1) MCCSR required capital factor applicable to this product. Show all work.

6. (*12 points*) Euro Life (EL) is a European-based company subject to Solvency II requirements. EL is considering the purchase of YNK Life, a U.S. company.

(a) (*4 points*) EL plans to develop an economic capital model for YNK.

Identify the approach in developing the economic capital model and the resulting outcome if EL's only concern is:

(i) U.S. statutory reporting

(ii) Solvency II

(iii) Embedded value (EV)

(b) (*5 points*) You are given the following Risk Based Capital (RBC) data for YNK:

Asset risk other	100 Million
Asset risk common stock	20 Million
Interest risk	50 Million
Insurance risk	100 Million
All other risks	0 Million
Class 4 bonds	50 issuers
Bond Class 3 factor	0.046
Bond Class 4 factor	0.10
First 50 issuers factor	2.5
Next 50 issuers factor	1.3
RBC ratio	175%

Describe the U.S. regulatory consequences of:

(i) (*1 point*) YNK's current capital position.

(ii) (*4 points*) YNK's resulting capital position if they sell the current bond portfolio for statement value and reinvest the proceeds in 100 issuers of Class 3 bonds.

Show all work.

(c) (*3 points*) EL is also considering purchasing a Canadian Life Insurance Company, which is subject to Canadian MCCSR Requirements.

Compare the components within C-1, C-2 and C-3 risks between MCCSR and RBC.

7. (*6 points*) Supra Reinsurance has an automatic YRT agreement with Vega Insurance Company on its whole life product. Both Supra and Vega are domiciled in the U.S.

The automatic reinsurance agreement is a 50% quota-share agreement in excess of the ceding company's retention limit of 100,000. The auto binding limit is 1,000,000.

In addition, the Waiver of Premium (WP) rider attached to the policy is coinsured under a separate reinsurance agreement with Supra at a 75% quota share, with allowances of 80% in the first policy year and 10% in renewal policy years.

Vega issued a 500,000 whole life policy to a 45 year-old non-smoker male with annual premiums of 5,300. This policyholder selected a level face amount, and purchased the WP rider for an additional 50 per year.

The reinsurance YRT rates for a 45 year-old male non-smoker are 45% of mortality table M.

You are given:

Duration	Cash Value Per 1000
10	47
20	143
30	351
40	598
50	847

Mortality table M (q_x per 1000):

Issue age	Duration		
	1	2	3
45	0.42	0.59	0.74
46	0.46	0.62	0.76
47	0.50	0.64	0.80

Premium tax is 5%.

7. Continued

(a)   (*3 points*) Calculate the net amount payable in the second policy year by Vega to Supra for this policy under these reinsurance agreements. Show all work.

(b)   (*3 points*) Supra is not licensed in Vega's state of domicile. Recommend a solution that would allow Vega to claim a reserve credit on its statutory statement.

END OF EXAMINATION
Morning Session

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