

Exam ILALFVU

AFTERNOON SESSION

Date: Thursday, November 1, 2018

Time: 1:30 p.m. – 3:45 p.m.

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This afternoon session consists of 4 questions numbered 7 through 10 for a total of 40 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 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 ILALFVU.
6. Be sure your essay answer envelope is signed because if it is not, your examination will not be graded.

Canadian version of this exam is recognized by the Canadian Institute of Actuaries.

****BEGINNING OF EXAMINATION****

**Afternoon Session
Beginning with Question 7**

7. (10 points) You are given the following report:

*To: Internal Audit Department
From: Actuarial Student
Date: December 31st, 2017
Subject: Audit Results*

This report summarizes the audit we finalized on September 30th, 2017 on the Variable Annuity (VA) reserving model. EFS software was purchased because of its robust capability of calculating both statutory and GAAP financials.

The scope of the audit was to evaluate the controls over the VA model and the process of reporting statutory reserves. Therefore, auditing of the assumptions in depth was beyond the scope and we rely on the Experience Studies team to develop reasonable assumptions.

Our documentation of the process as follows:

- *Step 1: The policy extracts needed for reserving are provided via an automated feed to EFS from a centralized data warehouse. This warehouse is controlled by the IT department.*
- *Step 2: After the model is run, the VA Reserving team uploads the financial results directly to the financial reporting system. The model results are security protected during the upload process.*
- *Step 3: After the upload process, the VA Reserving team validates that the total reserve balances from EFS model tie out to the financial reporting system.*

Because of the fully-automated process, the VA Reserving team does not have a peer-review process after the model is run and results are reported.

Internal Audit's only finding is the lack of peer-review is a material weakness in the team's process.

We will need to prepare a report for management's MAR section 16 assertion regarding effectiveness of internal controls over the reporting process. I recommend the following:

- *To the best of my knowledge, the internal control process over the financial reporting process for VA is effective. The material weakness identified above will be resolved in the second half of 2018.*
- *We still need an independent auditor to attest to the effectiveness of the internal control for the resulting audited statutory financial statement.*
- *The CEO and CFO will be at their quarterly board meeting at the time of assertion, so the Director of Internal Audit will be signing the management report to regulators instead.*

Please reach out to me with any concerns.

7. Continued

- (a) (2 points) Evaluate the appropriateness of this report as it relates to ASOP 41, Actuarial Communications.
- (b) (4 points) Identify the risks that are present in the process, according to Model Audit Rule (MAR) section 16, after the resolution of the identified material weaknesses.
- (c) (3 points) Critique the actuarial student's recommendation regarding the MAR section 16 assertion. Propose possible changes.
- (d) (1 point) Recommend testing techniques that can be used to mitigate the model risk in the VA reserving model.

8. (9 points) PEK Life prepares U. S. GAAP financials.

- (a) (3 points) PEK is performing recoverability testing on a cohort of newly issued term life policies. You are given the following information for this cohort at issue:

	Assumption Set	
	Best Estimate With PAD	Best Estimate
PV Future Benefits	40,102	37,288
PV Future Acquisition Expenses	9,387	9,335
PV Future Maintenance Expenses	184	181
PV Future Gross Premiums	37,948	37,377
PV Future GAAP Benefit Premiums	40,102	37,288
PV Future GAAP Acquisition Expense Premiums	9,387	9,335
PV Future GAAP Maintenance Expense Premiums	184	181

Assume all acquisition expenses are deferrable.

Perform the recoverability test and quantify any necessary adjustments. Show all work.

- (b) (4 points) PEK is performing loss recognition testing on its entire term life block. You are given the following information for this block as of the valuation date:

	Assumption Set	
	Current Valuation Basis	Current Best Estimate
PV Future Benefits	51,302	37,227
PV Future Acquisition Expenses	3,545	3,479
PV Future Maintenance Expenses	191	187
PV Future Gross Premiums	39,399	38,666
PV Future GAAP Benefit Premiums	41,635	38,574
PV Future GAAP Acquisition Expense Premiums	9,746	9,657
PV Future GAAP Maintenance Expense Premiums	191	187

Assume all acquisition expenses are deferrable.

Perform the loss recognition test as of the valuation date and quantify any necessary adjustments. Show all work.

- (c) (2 points) List three reasons why earnings for the term life block may not emerge as a level percentage of premium.

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9. (10 points) DME Life sells a flexible premium variable universal life product with a 10-year secondary guarantee. The product has a minimum premium design such that a policy will stay in force regardless of fund performance if cumulative paid premiums exceed cumulative minimum premiums.

(a) (5 points) You are given the following information for a flexible premium variable universal life policy:

	Time 0	End of year 5
Present value of guaranteed benefits assuming guaranteed maturity premiums (GMPs) are paid	35,000	41,000
Present value of net level valuation premiums	35,000	31,000
Guaranteed maturity fund (GMF) value	0	9,500
Current fund value	0	7,600

Assume:

- GMP = 2,375
- Net level valuation premium = 2,200
- CRVM expense premium = 125

- (i) Calculate the CRVM reserve at the end of year 5 based on the Universal Life Model Regulation. Show all work.
- (ii) Explain whether the CRVM reserve would increase or decrease if the current fund value exceeded the GMF value at the end of year 5. No calculations are required. Justify your answer.

9. Continued

(b) (5 points) You are given the following information for a flexible premium variable universal life policy:

- Face amount: 1,000,000
- Current fund value at end of year 5: 90,000
- Guaranteed minimum death benefit (GMDB) equal to the face amount during the first 10 policy years
- Valuation interest rate: 4%
- Actuarial Guideline 37 (AG 37) Attained Age Level Reserve (AALR) at end of year 4: 12,500
- There is no excess death benefit during year 5.
- The current fund value at the end of year 5 projected to the end of year 10 using valuation interest and mortality is positive throughout the projection period.

Year	Valuation Mortality Rate
5	0.012
6	0.013
7	0.014
8	0.015
9	0.016
10	0.017

Calculate the AG 37 GMDB reserve at the end of year 5. Show all work.

10. (11 points)

- (a) (4 points) NRT Life is looking for surplus relief to improve the financials of its new Fixed Deferred Annuity product.

You are given:

- 50% Quota-Share
- 5% Expense Allowance

Pre Reinsurance Balance Sheet

Balance	Cedent	Reinsurer
(+) Cash	0	0
(+) Bonds	500	0
(-) Reserves	500	0
(+) Receivable/Payable	0	0
(=) Surplus	0	0

Construct a post reinsurance balance sheet for this block similar to the above, assuming the treaty structure is:

- (i) Mod-Co
- (ii) Mod-Co with Funds Withheld
- (iii) Part-Co

10. Continued

You are given following reinsurance proposal from HND Re:

<u>Reinsurance Term Sheet between NRT Life and HND Re</u>	
Cedent:	NRT Life
Reinsurer:	HND Re
Quota-Share:	60%
Experience Refund:	Positive experience for the mortality below the level of valuation mortality is transferred back to the cedent
Reinsurer Domicile:	Bermuda
Collateral Provision:	Assets backing 50% of reserves reinsured will be held in a qualified trust
Form of Collateral:	Investment Grade securities and conditional and revocable LOCs
Recapture Provision:	HND Re can terminate this treaty at any time, and NRT Life must recapture the treaty after 5 years
Payback Provision:	Current and future experience refunds can be offset, when losses occur, based on a schedule of payments

- (b) (4 points) Evaluate the proposal from the perspective of regulatory compliance.

Question 10 continued on the next page.

10. Continued

- (c) (3 points) After entering into the agreement described in (b), your employee makes the following statements:
- A. *Statutory accounting still requires us to reflect the ceded block in our Actuarial Opinion analysis*
 - B. *An alternative and potentially cheaper approach to achieving surplus relief could have been to enter into a non-proportional reinsurance treaty*
 - C. *If the regulator refuses to acknowledge risk transfer in our treaty at any point, we are required to account for premiums and benefits of the treaty on our income statement*
 - D. *We must disclose the financial impacts of the treaty on our statutory statements. The counterparty will also become public information*
 - E. *At the time of the transaction, any gain or loss we incur will be recognized immediately in the Summary of Operations*

Critique the statements.

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