

Exam GHFVCC

Group and Health Finance and Valuation Exam – C, Canada (3 hour segment)

Date: Wednesday, April 29, 2020

Time: 8:30 a.m. – 11:45 a.m.

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This examination has a total of 60 points.

This exam consists of 8 questions, numbered 1 through 8.

The points for each question are indicated at the beginning of the question. Questions 3 and 4 pertain to the Case Study.
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 Exam GHFVCC.
6. Be sure your written-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.

Tournez le cahier d'examen pour la version française.

CASE STUDY INSTRUCTIONS

The case study will be used as a basis for some examination questions. Be sure to answer the question asked by referring to the case study. For example, when asked for advantages of a particular plan design to a company referenced in the case study, your response should be limited to that company. Other advantages should not be listed, as they are extraneous to the question and will result in no additional credit. Further, if they conflict with the applicable advantages, no credit will be given.

****BEGINNING OF EXAMINATION****

- 1.** (8 points) You are the actuarial consultant for Russett, which currently offers post-retirement health and dental benefits. Russett prepares financial statements under IAS 19R with a fiscal year-end at December 31st.

The following disclosure information has been prepared for Russett at December 31, 2019, using a discount rate of 4.00%.

	Defined Benefit Obligation at December 31, 2019	2020 Service Cost (including interest)	2020 Expected Benefit Payment
Active	\$1,470,000	\$605,000	\$0
Retirees	\$8,560,000	\$0	\$500,000
Total	\$10,030,000	\$605,000	\$500,000

- (a) (1 point) Identify potential constraints that Russett should consider if they attempt to eliminate post-retirement health and dental benefits.

Russett has decided to offer a voluntary settlement to all 160 retirees enrolled on the plan. Each retiree electing the settlement will receive \$10,000 in exchange for termination of their retiree health and dental benefits. The settlement offer expires on May 1, 2020.

The actuarial student working on the transaction makes the following assumptions:

- Each retiree has the same defined benefit obligation and 2020 expected benefit payment
 - 10% of the retirees will accept the settlement offer
 - Service cost, interest cost and benefit payments are uniformly distributed through the year
 - All other assumptions remain unchanged from December 31, 2019
- (b) (6 points) Calculate and restate each component of the 2020 defined benefit cost using the above assumptions. Show your work.
- (c) (1 point) Critique the assumptions used by the actuarial student to calculate the restated 2020 defined benefit cost.

2. (6 points)

- (a) (2 points) Describe and compare the "building blocks" under IFRS 17 to the current CIA standards.
- (b) (1 point) Describe the "contract boundary" under IFRS 17.
- (c) (1 point) Evaluate the contract boundaries under IFRS 17 for the following contracts. Justify your response.
- (i) A 30-year reinsurance contract where the cedent (insurer) has the ability to cancel the contract at year 20 from the insurer's perspective.
 - (ii) A 30-year reinsurance contract where the cedent has the ability to recapture at year 20 from the reinsurer's perspective.
 - (iii) A 2-year group life contract where the policyholder has ability to extend the coverage for 18 more years at a guaranteed premium rate from the insurer's perspective.
- (d) (2 points) You are asked to review the IFRS 17 implications on a five-year group life coverage with premium guarantee in the first two years. You are provided with the following:

	Year 1	Year 2	Year 3	Year 4	Year 5
Premiums (beginning of year)	\$100	\$100	\$110	\$120	\$130
Expected Claims (end of year)	\$80	\$85	\$90	\$100	\$110
Cost of Capital (beginning of year)	\$12	\$11	\$11	\$12	\$13
Lapse Rate	0%	0%	30%	30%	100%

Assume the following:

- Discount Rate is 3%
- Risk Adjustment is calculated as the present value of cost of capital

Calculate each of the building blocks for this contract at time 0. State your assumptions and show your work.

Questions 3 and 4 pertain to the Case Study

- 3.** (6 points) Pinewood is completing their year-end filing for 2019. Senior management has requested a source of earnings (SOE) analysis.
- (a) (1 point) Define the use and purpose of a SOE analysis.
- (b) (2 points) List the minimum disclosure requirements for a SOE analysis.
- (c) (3 points) You are asked to compile the 2019 SOE analysis results for Pinewood and are given the following:
- Only include Premium Income and Benefit Expense in the Consolidated Statements of Operations (ignore all other expense and revenue items)
 - The disability block was closed to new business since 2017
 - All other products are sold as new business annually
 - Pinewood sets its plan for the current year based on the prior year results
- (i) (2 points) Calculate the following for 2018 and 2019:
- new business impact
 - experience gain/loss
- State your assumptions and show your work.
- (ii) (1 point) Recommend steps Pinewood can take in 2020 to improve its earnings results. Justify your response.

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Questions 3 and 4 pertain to the Case Study

4. (9 points) You are a consulting actuary at JD Consultants. Your client, Gym-N-Juice, with over 1,000 employees in Western Canada, offers its employees a long-term disability (LTD) plan, which is insured through Thunderball Corporation with the following provisions:

- Monthly benefit of 66.67% of pre-disability earnings
- Maximum benefit of \$3,500 per month
- 6-month elimination period
- 24-month own occupation period
- Canada Pension Plan (CPP) disability benefits are direct offsets

(a) (3 points)

- (i) List the eligibility requirements for CPP disability benefits.
- (ii) Describe the 2016 CPP expansion.
- (iii) Explain how the CPP expansion will impact the LTD benefits paid by Thunderball.

(b) (6 points) Gym-N-Juice received the renewal from Thunderball, which reflected three disabled members on LTD at December 31, 2018. You are provided the following information:

Claimant	Duration from disability (months)	Disability Age	Gender	Pre Disability annual salary	Average monthly pensionable CPP earnings	CPP disability benefit status	Thunderball reported reserve
Andrew	48	38	M	\$55,000	\$2,832	Approved in 2015	\$210,203
Jessica	9	49	F	\$80,000	\$2,003	Pending in 2018	\$213,500
Scott	27	32	M	\$52,000	\$2,333	Rejected in 2016	\$231,409

4. Continued

- Thunderball confirmed that starting at this renewal, they have used the newest reserve factors developed by their internal team for the purpose of calculating reserves
- Historically, 60% of pending CPP disability benefits are approved
- Pending CPP disability benefit will be approved retroactively to December 31, 2018
- The same reserve factors apply for both the LTD plan and CPP disability benefit
- The CPP disability monthly benefit amount is based on the year the CPP disability benefit is approved, in accordance with the following:

Year	CPP Flat amount	CPP Disability Maximum
2014	\$456	\$1,236
2015	\$466	\$1,265
2016	\$471	\$1,291
2017	\$478	\$1,314
2018	\$485	\$1,336

- (i) (4 points) Calculate the best estimate reserves for Thunderball for each of the disabled members. State your assumptions and show your work.
- (ii) (1 point) Assess the reasonableness of Thunderball's reported reserves using your response from (i). Justify your response.
- (iii) (1 point) Describe possible reasons why Scott's claim was approved under the Gym-N-Juice LTD plan but rejected under CPP disability benefit.

5. (6 points)

- (a) (2 points) In 2016, the federal government announced changes to the Employment Insurance rules effective January 1, 2017.
- (i) Describe the changes.
 - (ii) List and describe the key implications for plan sponsors.
- (b) (4 points) Hudson & Co. offers a Long Term Disability (LTD) plan for which the premium is entirely paid by employees. Employee A has been approved for the following disability benefits starting January 1, 2019:
- LTD benefits of \$1,500 per month
 - Canada Pension Plan (CPP) benefits of \$500 per month
 - CPP Cost of Living Adjustments (COLA) will be 1% and 2% on January 1, 2020 and January 1, 2021, respectively

Employee A's only disability income will come from LTD and CPP. Assume an effective tax rate of 30%.

- (i) (2 points) Calculate the net disability income Employee A will receive from each source, and in total, in 2019, 2020, and 2021. Show your work.
- (ii) (2 points) Effective January 1, 2020, the LTD plan was amended such that benefit amounts will be increased by 2.0% each January 1.

Calculate the disability income Employee A will receive from each source, and in total, in 2020 and 2021. State any assumptions and show your work.

- 6.** (7 points) Emma, an employee at Welby Inc., gave birth on January 1, 2017. Emma's annual salary was \$65,000, and she was working full-time for Welby Inc. for the prior five years.

Emma's husband James worked at company Miller Enterprises. James' annual salary was \$75,000 and he was working full-time with Miller Enterprises for the prior eight years.

Neither Welby Inc. nor Miller Enterprises offer a Supplemental Unemployment Benefit (SUB) program to their employees.

- (a) (2 points) Compare and contrast key benefit provisions of the basic plan and the special plan offered under the Quebec Parental Insurance Plan (QPIP).

Emma and James are both eligible for QPIP and would like to assess their career lifetime costs versus benefits for the Employment Insurance (EI) and QPIP programs.

Assume the following:

- During Emma's lifetime, she will give birth twice
 - No past or future increases to QPIP and EI employee premiums
 - No past or future annual salary increases to James and Emma
 - Emma will work full-time for 25 years during her lifetime
 - James will work full-time for 30 years during his lifetime
 - Emma and James both work in Quebec and each have an effective income tax rate of 30%
- (b) (4 points) Evaluate which QPIP plan Emma and James should choose to maximize their career lifetime value under these programs. Show your work.
- (c) (1 point) The federal government is considering making benefit improvements such as extending the duration or increasing the maximum benefits to EI.

List factors the Quebec government should consider as it addresses the adequacy of its QPIP plan.

7. (10 points) You are the consulting actuary for Rigdon Inc., a national solar energy company with a traditional benefit plan. Rigdon offers the following benefits:

- Medical and dental benefits, including a Health Spending Account (HSA), which are provided on an Administrative Services Only (ASO) basis
- Life and Long Term Disability (LTD) benefits, which are fully insured
- Short term disability (STD) benefits, which are provided through a self-insured salary continuance plan
- There are currently no employee contributions

As demographics have changed, employees have indicated that the current benefit structure no longer meets their needs. Rigdon's controller has asked you to discuss alternatives to address these concerns.

(a) (3 points)

- (i) (2 points) Explain the tax implications, from the employees' perspective, for each of the benefits offered by Rigdon.
- (ii) (1 point) Describe any changes to the tax implications, from the employees' perspective, that would result from moving the insured benefits from employer-paid to employee-paid.

(b) (4 points) Fenton Inc., one of Rigdon's competitors, offers a flexible benefit plan to its employees.

- (i) (2 points) List and briefly describe the key principles governing the structure of a flexible benefit plan.
- (ii) (2 points) Describe the Canadian Revenue Agency (CRA)'s rules with respect to rollovers of credits and claims under an HSA.

7. Continued

- (c) (3 points) Based on employee feedback, Rigdon has decided to implement a flexible benefit plan called FlexBen. Rigdon's current basic life benefit provides \$100,000 in coverage for all employees at an annual cost of \$400 per employee. Under FlexBen, there will be an optional life benefit where employees may purchase coverage up to \$500,000 based on the following table:

Annual cost per \$100,000 of coverage		
Age	M	F
Under 50	\$360	\$240
50 and over	\$840	\$600

Rigdon initially proposed to provide \$400 in flex credits to all employees in order to "buy back" the same level of life insurance coverage. Assume all employees have an average income tax rate of 25%.

Consider the following two "typical" employees:

Name	Age	Gender
Jean	60	Female
George	30	Male

- (i) (2 points) Calculate the total financial implication for each employee to maintain their current coverage level, including any applicable tax implications. State any assumptions and show your work.
- (ii) (1 point) Critique the new FlexBen program.

8. (8 points) Rowley is a global insurer headquartered in Canada. They are investigating the impacts of LICAT on their business. Rowley has recently launched Product A which is an optional group annuity product in Canada and the US.

(a) (1 point)

- (i) Define the longevity risk under the LICAT framework.
- (ii) State the formula and components used to calculate longevity risk.

(b) (2 points) Describe how each longevity risk component is calculated.

Rowley has sold two policies of Product A. Julien is a customer in Canada that bought Product A using tax-qualified retirement savings. Tom is a customer in the U.S. that bought Product A using post-tax income.

(c) (2 points)

- (i) (1 point) Explain how the calculation would differ between the policies sold to Julien and Tom.
- (ii) (1 point) State the shock factors to be used for policies sold to Julien and Tom. Justify your response.

To investigate the LICAT impact, the CFO asks you to run some sensitivity tests on the annuity business on the December 31, 2018 balance. He provides you with the following assumptions:

Assumption	Best-estimate assumption (for all ages)
Mortality	2%
Mortality Improvement	1% per year
Morbidity	0.5%
Morbidity Improvement	0.5% per year
Interest rate	3%

8. Continued

You are given the following information about Tom's policy:

- Annual payment of \$5,000 payable at January 1 of every year
 - Payments begin January 1, 2020 and last payment is January 1, 2022
 - Premiums were collected upfront, so Tom will not lapse his policy
 - Tom is currently 65 years old as of January 1, 2019
- (d) (3 points) Calculate the LICAT longevity risk capital for Tom's policy. State your assumptions and show your work.

****END OF EXAMINATION****

USE THIS PAGE FOR YOUR SCRATCH WORK