

# Exam GHFVCC

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

**Date:** Tuesday, November 2, 2021

### INSTRUCTIONS TO CANDIDATES

#### General Instructions

1. This examination has 7 questions numbered 1 through 7 with a total of 60 points.

The points for each question are indicated at the beginning of the question. Questions 6 and 7 pertain to the Case Study.

2. 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 provided in this document.

#### Written-Answer Instructions

1. Each question part or subpart should be answered either in the Word document or the Excel file as directed. Graders will only look at work in the indicated file.
  - a) In the Word document, answers should be entered in the box marked ANSWER. The box will expand as lines of text are added. There is no need to use special characters or subscripts (though they may be used). For example,  $\beta_1$  can be typed as beta\_1 (and ^ used to indicate a superscript).
  - b) In the Excel document formulas should be entered. Performing calculations on scratch paper or with a calculator and then entering the answer in the cell will not earn full credit. Formatting of cells or rounding is not required for credit.
  - c) Individual exams may provide additional directions that apply throughout the exam or to individual items.
2. The answer should be confined to the question as set.
3. Prior to uploading your Word and Excel files, each file should be saved and renamed with your five-digit candidate number in the filename.
4. The Word and Excel files that contain your answers must be uploaded before the five-minute upload period expires.

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

## Navigation Instructions

Open the Navigation Pane to jump to questions.

Press Ctrl+F, or click View > Navigation Pane:



## **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.**

**1.**

(8 points) Blades of Steel is a steel manufacturer in Ontario specializing in the production of steel products. The CEO of Blades of Steel is concerned about the rising costs associated with workers compensation.

- (a) (1 point) Describe employee groups who are covered for workers compensation benefits in Canada.

ANSWER:

- (b) (1 point) Describe how workers compensation benefits are funded in Canada.

ANSWER:

- (c) (2 points) List and describe the benefits provided by workers compensation coverage in Canada.

ANSWER:

# 1. Continued

You have been provided with the following reported health claims as of January 2021:

	<b>Alvin</b>	<b>Jennifer</b>	<b>Theodore</b>
Employee Age	40	50	60
Monthly Income	\$6,000	\$6,500	\$7,500
Family Status	Single	Married with 2 dependent children	Married with no children
Nature of Claim	Steel beam fell on leg at the plant	Fell off ladder while painting house	Severely burnt hands while forging steel at the plant
Prognosis	Off work for 1 month	Off work for 2 months	Cannot work again
Monthly healthcare claims related to prognosis	\$100	\$2,000	\$500

Additional information is provided:

- Interest rate is 3% per year
- Healthcare claims increase each month and trend at a rate of 5% per year
- Assume COLA of 2% per year (applied at end of year)
- Any workers compensation income replacement is payable at 85% of gross earnings
- Assume all costs are paid at month-end
- Job rehabilitation programs cost is \$150 per employee per month (paid at end of month)
- Benefits are paid out until age 65

- (d) (3 points) Calculate the present value of workers compensation benefits for each of the listed employees above. State any assumptions and show your work.

*The response for this part is to be provided in the Excel spreadsheet.*

- (e) (1 point) Propose incentives to encourage Blades of Steel to better manage the cost of workplace accidents. Justify your answer.

ANSWER:

## 2.

(8 points) You are an actuary working in the tax department of a Canadian Life and Health insurance company.

- (a) (1 point) List and describe the inclusions in net income that are permitted under the special tax provisions applicable to life insurers.

ANSWER:

- (b) (3 points) Describe the deductions from income that are permitted under the special tax provisions applicable to life insurers.

ANSWER:

## 2. Continued

You have been given the following information on three blocks of life insurance policies as at December 31, 2020:

	<b>Universal Life Policy</b>	<b>Group Life Policy</b>	<b>10-year Term Policy</b>
Issue date	01-Apr-16	01-Jul-20	01-Jul-18
Number of Policies	100	1	50
Total life reserves (December 31, 2019)	\$5,695,403	\$0	\$2,175,000
Total life reserves (December 31, 2020)	\$6,291,667	\$250,000	\$2,450,000
Change in experience refund reserve	\$0	\$12,500	\$0
Total policyholder loans in 2020	\$37,500	\$0	\$0
Total policyholder withdrawals in 2020	\$25,000	\$0	\$0
60-month moving average yield on bonds	3.75%	3.75%	3.75%
Investment losses carried forward	\$56,000	\$0	\$0

- (c) (4 points) Calculate the investment income tax on these three blocks of policies as of December 31, 2020. State any assumptions and show your work.

*The response for this part is to be provided in the Excel spreadsheet.*

### 3.

(10 points) You are the actuary responsible for the reporting of the Life Insurance Capital Adequacy Test (LICAT) at XYZ.

(a) (4 points) Explain how the required capital component for morbidity risk is calculated for the following group insurance products:

(i) Short Term Disability

(ii) Long Term Disability

(iii) Health and Dental

ANSWER:

(b) (2 points) Describe the two adjustments to the insurance risk required capital formula to account for special policyholder arrangements.

ANSWER:



### 3. Continued

You are given the following:

Insurance risk	Gross component (IR <sub>i</sub> )	Level and trend components (LT <sub>i</sub> )
Mortality	\$900,000	\$600,000
Longevity	\$2,000	\$2,000
Morbidity – incidence	\$60,000	\$20,000
Morbidity – termination	\$5,000	\$3,000
Lapse sensitive	\$400,000	\$250,000
Lapse supported	\$150,000	\$90,000
Expense	\$20,000	\$0

Risk	Component
Credit risk	\$400,000
Market risk	\$150,000
Property and casualty risk	\$50,000

- Insurance Risk Requirement = \$761,903

- (c) (3 points) Calculate the following:
- Diversified Risk Requirement (D)
  - Undiversified Risk Requirement (U)
  - Adjusted Diversified Requirement (K)

State any assumptions and show your work.

*The response for this part is to be provided in the Excel spreadsheet.*

- (d) (1 point) Assess the impact of K on LICAT ratios. Justify your response.

ANSWER:

#### 4.

(13 points) You are the consulting actuary for Nexon Canada. Nexon has a non-unionized workforce and operates in the oil and gas industry. Retiree benefits are voluntarily provided by Nexon and there are no written contracts. Entitlement to these retiree benefits is communicated in various written documents, including benefits handbooks and internal memoranda, and verbally discussed with employees. Nexon has consistently said that the company will pay for retiree benefits.

The key provisions of the current retiree benefit plan are the following:

- Employees must attain age 55 with at least 5 years of service at retirement to be eligible for retiree benefit coverage
- Benefits are 100% paid by Nexon
- The life insurance benefit is \$15,000 and provided for the retiree's lifetime
- The health and dental benefit are a continuation of the benefits provided during active employment and provided for the retiree's lifetime

As a result of serious financial losses sustained by Nexon, the CFO is planning to advise the retirees that Nexon will be reducing or eliminating post-retirement benefits.

The CFO would like you to recommend ways Nexon can reduce the liability associated with its retiree benefit program.

- (a) (3 points) Create a memo to the CFO suggesting plan design options to reduce the company's retiree benefit obligation.

ANSWER:
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#### 4. Continued

(b) (2 points) Identify issues associated in making changes to the retiree benefit plan for the following groups:

- (i) Existing retirees
- (ii) Employees who are several years away from retirement
- (iii) Employees who are close to retirement
- (iv) New employees

ANSWER:

(c) (1 point) Compare the situation of Nexon to the one described in the Lacey v. Weyerhaeuser Co case heard in British Columbia's Supreme Court.

ANSWER:

(d) (2 points) Describe the rationale behind the decision of the Supreme Court of British Columbia in Lacey v. Weyerhaeuser Co.

ANSWER:

#### 4. Continued

Nexon prepares financial statements under IAS 19R with a fiscal year-end of December 31<sup>st</sup>.

The following disclosure information was prepared for Nexon at December 31, 2020:

	Number of Employees / Retirees	Defined Benefit Obligation (DBO)	2021 Service Cost (at beginning of year)	2021 Expected Benefit Payments
Actives – Under Age 50	800	\$42,400,000	\$3,120,000	\$0
Actives – Over Age 50	180	\$22,680,000	\$612,000	\$0
Retirees	150	\$10,650,000	\$0	\$630,000
Total	1,130	\$75,730,000	\$3,732,000	\$630,000

Nexon plan to amend the retiree benefit plan for employees under age 50 as at December 31, 2020 as follows:

- Health, dental and life insurance benefit coverage will end at age 65
- From age 65 to age 75, the retiree will be entitled to a flat Health Care Spending Account of \$3,000 per year
- There will be no changes to the plan provisions for active employees over age 50 and current retirees

Your manager has given you the following assumptions:

- Discount rate: 2.5% per annum
  - Termination rate: 0.0% per annum
  - Pre-retirement mortality rate: 0.0% per annum
  - Retirement rate: 100% at age 60
  - Reduction in the active under age 50 DBO and Service Cost due to the benefit termination age changing from lifetime to age 65: 65%
  - The average age of the actives under 50 group is 42 years
  - The average service of the actives under 50 group is 13 years
  - Age 60 10-year annuity factor deferred to age 65 (no trend): 7.5
- (e) (4 points) Calculate the estimated change in the 2021 defined benefit cost for the retiree benefit plan due to the above plan changes. State any assumptions and show your work.

*The response for this part is to be provided in the Excel spreadsheet.*

#### **4. Continued**

Nexon has decided to proceed with the above plan changes.

- (f) *(1 point)* Recommend next steps for Nexon to proceed to amend its post-retirement benefits. Justify your answer.

ANSWER:
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## 5.

(8 points) You are the actuary responsible for the implementation of the International Financial Reporting Standards (IFRS) 17 at XYZ Life Insurance Company (XYZ) in Canada.

- (a) (1 point) List the key differences in comparing a valuation under IFRS 17 to the current valuation practice under Canadian GAAP.

ANSWER:

- (b) (1 point) Describe how IFRS 17 will impact the role of the appointed actuary.

ANSWER:

XYZ offers individual term life insurance products and fully insured group insurance products (Life, Short Term Disability, Long Term Disability, Health and Dental).

- (c) (2 points) Propose an appropriate measurement method for each of XYZ's products. Justify your answer.

ANSWER:

The individual pricing team of XYZ is planning to launch a renewable 10-year term individual life insurance product in 2022. The expected cash flows and assumptions for the base scenario are provided in the Excel spreadsheet.

- (d) (2 points) Create the reconciliation of:
- (i) (1 point) Risk Adjustment
  - (ii) (1 point) Contractual Service margin

State any assumptions and show your work.

*The response for this part is to be provided in the Excel spreadsheet.*

- (e) (2 points) Construct a mock-up of a Profit and Loss statement under IFRS 17 for XYZ without providing any numbers.

*The response for this part is to be provided in the Excel spreadsheet.*

**Questions 6 and 7 pertain to the Case Study**

**6.**

(6 points) ABC is a company located in British Columbia (BC) and offers a supplemental medical plan for its employees on a self-insured basis. Its plan is administered by Living Daylights.

During the benefit review with Living Daylights, the CEO of ABC expressed his concern regarding ABC's significantly higher brand drug utilization relative to its peer companies.

- (a) (1 point) List and describe the three recommendations of the Canadian Life and Health Insurance Association (CLHIA) to ensure affordable prescription drugs in Canada.

ANSWER:

You are given the following information for ABC for 2020:

<b>Annual Salary</b>	<b>Number of employees</b>
\$40,000	50
\$50,000	30
\$60,000	40
\$70,000	20
\$80,000	10
\$90,000	10

- ABC's employees and their salaries will not change in 2021
- The average plan cost, including all taxes and fees, for 2020 is \$92 per employee per month and is 100% paid by ABC
- The group benefits budget for 2021 is the same as in 2020

## 6. Continued

You are also given the following information:

Annual BC Payroll	Employer Health Tax Rate	Maximum Annual Tax
Up to \$500,000	0.00%	\$0.00
\$500,000 - \$750,000	0.98%	\$7,313
\$750,001 - \$1,000,000	1.46%	\$14,625
\$1,000,001 - \$1,250,000	1.76%	\$21,938
\$1,250,001 - \$1,500,000	1.95%	\$29,250
Over \$1,500,000	1.95%	\$29,250 + 1.95% of payroll over \$1,500,000

Assessable earning maximum for BC Workplace Safety & Insurance Board (WSIB)	\$100,000
Year's Maximum Pensionable Earnings	\$61,600
Employment Insurance Maximum Yearly Insurable Earnings	\$56,300
Canada Pension Plan employer rate	5.45%
Employment Insurance employer rate	2.21%
BC WSIB assessment rate	1.55%

The CEO is considering providing a salary increase in 2021 instead of offering the supplemental medical plan.

- (b) (3 points) Calculate the 2021 salary increase that would be cost neutral for ABC. State any assumptions and show your work.

*The response for this part is to be provided in the Excel spreadsheet.*

- (c) (1 point) Assess the impact of the proposed change for employees. Justify your answer.

ANSWER:



**6. Continued**

Instead of eliminating its supplemental medical plan entirely, Living Daylights is considering implementing changes to its drug plan.

- (d) *(1 point)* Recommend cost saving options to address the CEO's concern regarding ABC's higher brand drug utilization relative to its peer companies. Justify your answer.

ANSWER:
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**Questions 6 and 7 pertain to the Case Study**

**7.**

(7 points) You are the consulting actuary at Skyfall for Another Day.

Another Day would like to know how the group benefits they provide to their employees are taxed.

- (a) (1 point) Explain how Another Day can offer each benefit in exhibit 1 on a tax-free basis for employees.

ANSWER:

You are given the following information for Another Day's Health Care Spending Account (HCSA):

- The total HCSA claims paid in 2020 was \$500,000
  - The annual fee charged for administering the plan equals 4% of claims plus \$1,000
  - Distribution of incurred claims by province:
    - 50% Ontario employees
    - 20% British Columbia employees
    - 30% Quebec employees
- (b) (2 points) Calculate the total amount of taxes paid by Another Day for the HCSA benefit. State any assumptions and show your work.

*The response for this part is to be provided in the Excel spreadsheet.*

## 7. Continued

Another Day made a change to their vision plan in 2021 so that the plan now covers vision claims up to the reasonable and customary charges.

You are given the following information on Jack, an employee of Another Day:

- Jack's wife, Nichole, has coverage with a different insurer, and her vision plan is "pay as billed" with 80% coinsurance and a \$500 maximum per 24 months
- Nichole submits a vision claim of \$300
- Another Day's reasonable and customary charge for a vision claim is \$220
- Both Nichole and Jack did not have any vision claims in the past 24 months

- (c) (1 point) Calculate the change in the out-of-pocket amount for Jack's family resulting from this plan change. State any assumptions and show your work.

*The response for this part is to be provided in the Excel spreadsheet.*

Due to the post pandemic economic environment, Another Day wants to decrease the cost of its employee group benefits plan.

You assist Another Day in preparing a request for proposal (RFP) to obtain quotes from group insurers. As a result of the RFP, Another Day is planning to move their group benefits plan to another insurer.

- (d) (1 point) Describe the replacement contract provisions needed to protect current covered employees from loss of insurance.

ANSWER:

- (e) (1 point) Describe what will happen to members who are not actively at work at the termination date of the current insured contract.

ANSWER:

## 7. Continued

Another Day is also considering moving to a non-taxable Long-Term Disability (LTD) plan for its unionized employees, with all other LTD plan specifications remaining the same.

Another Day's unionized employees are classified into 3 categories:

	Category 1	Category 2	Category 3
Annual Salary	\$30,000	\$50,000	\$70,000
Province	Ontario	Manitoba	British Columbia

Assume that LTD premium rates remain unchanged.

- (f) (1 point) Calculate the annual LTD employee cost for each category under a taxable arrangement versus a non-taxable arrangement. State any assumptions and show your work.

*The response for this part is to be provided in the Excel spreadsheet.*

**\*\*END OF EXAMINATION\*\***