Exam GHFVCC

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

Date: Thursday, October 31, 2019
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 9 questions, numbered 1 through 9.
   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.
1. (7 points) Belmont is an insurance company in Ontario that only operates in Canada. You are an actuary at Belmont trying to understand how Life Insurance Capital Adequacy Test (LICAT) affects the business.

You are given:

- Spot rate is 1.80% for Government of Canada bonds.
- Average corporate bond yield is 2.80% based on FTSE TMX All Corporate Bond Index.

(a) (1 point) Define and describe the purpose of:
   (i) LICAT total ratio
   (ii) LICAT core ratio

(b) (1 point) State the formula for:
   (i) LICAT total ratio
   (ii) LICAT core ratio

(c) (2 points) Describe each of the major risks that Belmont should consider, as categorized by the Office of the Superintendent of Financial Institutions Canada (OSFI) and measured under LICAT.

(d) (1 point) Describe how to calculate the required capital for the interest rate risk.

(e) (2 points) Calculate the initial scenario discount rates for cash flows at year 19, year 45, and year 71 for Belmont. Show your work.
2. (6 points) Liberty, a British-Columbia based company, acquired Green, a small Quebec-based company. Green currently does not offer a private insurance plan to its employees. All of Green’s active employees are under the age of 65.

Liberty’s private-drug insurance plan has the following provisions:

- Coinsurance of 60% on drugs eligible under the BC PharmaCare
- No deductible
- Annual maximum of $100,000 and lifetime maximum of $300,000
- Preferred-pharmacy network
- Premiums are paid 100% by Liberty

Liberty’s CEO wants to offer its existing private drug insurance plan to all Green employees in Quebec.

(a) (2 points) Outline what the CEO should consider before offering the Liberty private drug plan to Green employees in Quebec.

(b) (1 point) Describe how the provincial drug plans are funded in both jurisdictions (British Columbia and Quebec).

(c) (3 points) Compare and contrast retirement and disability benefits between Quebec Pension Plan and Canada Pension Plan.
Questions 3 and 4 pertain to the Case Study

3. (5 points)

(a) (1 point) Describe why plan sponsors would choose to self-insure their Long Term Disability (LTD) claims.

On January 1, 2019, Alice was hired by an employer insured by Thunderball and became disabled immediately later that day.

You are provided the following information:

<table>
<thead>
<tr>
<th>LTD Policy Information</th>
<th>Additional Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Income replacement of 60%</td>
<td>• Alice is female</td>
</tr>
<tr>
<td>• 6 month elimination period</td>
<td>• Alice’s date of birth is January 1, 1979</td>
</tr>
<tr>
<td>• Claims administration charge is 6% of claims</td>
<td>• Alice has a gross salary of $60,000</td>
</tr>
<tr>
<td>• Overhead charge is 2% of claims</td>
<td>• Assume there is no probability of disability termination during the elimination period</td>
</tr>
<tr>
<td>• At the time that the policy was sold, Thunderball was still using claim reserve factors that have been in place for many years</td>
<td>• Assume discount rate is 5%</td>
</tr>
<tr>
<td>• Disability benefits are paid at the end of each month</td>
<td></td>
</tr>
</tbody>
</table>

(b) (2 points) Calculate Alice’s disabled life reserve as at January 1, 2019, including all retention charges. State your assumptions and show your work.

On September 1, 2019, Alice remains on disability. Thunderball has developed new LTD reserve factors to better reflect LTD experience, and has recalculated Alice’s disabled life reserve using the new reserve factors.

(c) (2 points) Calculate the gain/loss generated on Alice’s reserve due to this assumption change at September 1, 2019. State your assumptions and show your work.
4. **(5 points)** You are a valuation actuary working at Pinewood Insurance Company. You are asked to review some of the company’s ancillary products.

(a) **(2 points)** Calculate the following performance measures for 2019. State the formula and show your work.

(i) **Total Asset Turnover**

(ii) **Net Profit Margin**

(iii) **Total Leverage Ratio**

(iv) **Return on Equity**

(b) **(1 point)** Identify the characteristics of an insurance contract according to IFRS 17.

(c) **(1 point)** Identify which IFRS standards (IFRS 17, IFRS 9 and/or IFRS 15) would apply to the following types of insurance related contracts/components.

(i) **Insurance Contract**

(ii) **Distinct Service Components**

(iii) **Distinct Investment Components**

(iv) **Non-Distinct Investment Components**

(d) **(1 point)** Evaluate if each of the following is an insurance contract. Justify your response.

(i) An online smartphone website offers an option to its customers to pay $20 upon phone purchase for broken phone replacement in the first year (up to a value of $2,000).

(ii) A car dealership offers an option to its customers to pay $350 upon purchase of a new car for scheduled services in the first 3 years (regular price $450).
5. (8 points) TeleHelp Co. is a small Ontario-based employer. Ten years ago, TeleHelp introduced a group benefits program, including a long-term disability (LTD) benefit with a two-year benefit period.

The experience of the LTD benefit for the last five years is as follows:

<table>
<thead>
<tr>
<th>Paid Claims by Year of Incurral</th>
<th>Paid in 2014</th>
<th>Paid in 2015</th>
<th>Paid in 2016</th>
<th>Paid in 2017</th>
<th>Paid in 2018</th>
<th>Reserves as at Dec 31, 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>$2,000</td>
<td>$2,000</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>2015</td>
<td>$12,000</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>2016</td>
<td>$2,000</td>
<td>$10,000</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>2017</td>
<td>$6,000</td>
<td>$6,000</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>2018</td>
<td>$3,000</td>
<td>$24,000</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
</tbody>
</table>

| Paid Premiums                 | $14,000     | $16,000     | $17,000     | $19,000     | $22,000     | n/a                        |

(a) (2 points) Assume a discount rate of 0%.

(i) Calculate the “break-even” premium rate over the five-year experience period.

(ii) Calculate the cumulative savings to TeleHelp had it been paying the break-even premium rate over this period.

State your assumptions and show your work.

(b) (2 points) Describe the regulatory framework for Canadian insurers as it relates to insured LTD benefits.

TeleHelp’s CFO is considering self-insuring the LTD benefit moving forward.

(c) (2 points) Describe the Canadian Life and Health Insurance Association’s policy solutions for protecting employees on LTD.

(d) (2 points) Evaluate each of the solutions in part (c) from the perspective of TeleHelp. Justify your response.
6. (6 points) Joe works for Whitlock, which provides the following sick leave benefits to its employees:

- Annual sick leave entitlement: 100 hours
- Unused sick leave hours at end of year are accumulated in a sick bank
- Upon retirement, if the employee has met the eligibility criteria of age 60 with 10 years of service, Whitlock will pay 25% of the accumulated sick bank balance at the rate of pay at retirement

You are also provided the following information at December 31, 2020:

<table>
<thead>
<tr>
<th>Joe’s Date of Birth</th>
<th>December 31, 1985</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joe’s Date of Hire</td>
<td>December 31, 2015</td>
</tr>
<tr>
<td>Joe’s Hourly Rate of Pay</td>
<td>$30</td>
</tr>
<tr>
<td>Joe’s Sick bank balance</td>
<td>300 hours</td>
</tr>
<tr>
<td>Effective Discount rate</td>
<td>4% per annum</td>
</tr>
<tr>
<td>Salary Adjustment</td>
<td>3% per annum</td>
</tr>
<tr>
<td>Withdrawal/Termination Assumption</td>
<td>2% per annum before Age 60 0% thereafter</td>
</tr>
<tr>
<td>Retirement Assumption</td>
<td>5% per annum from Age 60 to 62 100% at age 63</td>
</tr>
<tr>
<td>Mortality Assumption</td>
<td>0% per annum</td>
</tr>
</tbody>
</table>

Assume Joe will continue to accumulate sick bank hours at the same rate as in the past.

(a) (5 points) Calculate the defined benefit obligation for Joe’s sick leave benefit at December 31, 2020, assuming Whitlock reports under IAS 19. State your assumptions and show your work.

(b) (1 point) Calculate the current service cost and interest expense for the year 2021. State your assumptions and show your work.
7. (7 points)

(a) (1 point) Describe the purpose of the Dynamic Capital Adequacy Test (DCAT) process.

(b) (2 points) List the key elements in a comprehensive DCAT report.

(c) (4 points) Compare and contrast the potential causes and ripple effects for persistency/lapse risk and morbidity risk.
8. (6 points) You are an underwriter for Stratford Life & Health Co. considering three applications for insurance from students at Crystal University in Halifax, Nova Scotia.

(a) (1 point) The first application is from Audrey. Describe considerations in determining the premium rate for this application.

(b) (1 point) The second application is from Elliot, Dean, and Glen. All are varsity rock climbers who have been unable to obtain individual insurance, so they have decided to apply as a group for life insurance coverage. Outline your response to this application.

(c) (4 points) The third application is from the photography club, which would like to offer its members travel medical insurance as part of the annual membership fee. You have agreed to accept this application and are in the process of drafting the contract.

(i) (1 point) List and describe the prerequisites for the formation of a valid, informal contract.

(ii) (3 points) List and describe standard provisions that are unique to health insurance policies.
9. (10 points)

(a) (1 point) Compare and contrast eligibility requirements for each of the Canadian and US government healthcare programs.

(b) (3 points) List key services covered under each part of US Medicare.

(c) (3 points) Sketch a flow chart of the claims process for a covered individual that has coverage under more than one plan in Canada.

You are the financial advisor to Erin, a 70-year-old retiree. Erin is currently covered under a private benefit plan sponsored by her former employer, with an out of country (OOC) coverage lifetime limit of $50,000.

(d) (2 points) Describe specific considerations and exceptions for determining the amount payable for a covered individual that has OOC coverage under more than one plan in Canada.

Erin is considering a move from Toronto to Orlando, Florida. Erin has asked for your advice to better understand her options after her move.

(e) (1 point) Describe factors that Erin should consider in deciding whether or not to purchase individual insurance after her move.

**END OF EXAMINATION**
USE THIS PAGE FOR YOUR SCRATCH WORK