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**SOCIETY OF ACTUARIES**  
**Group and Health Core Exam - Canada**

# Exam GHCORC

## MORNING SESSION

**Date:** Wednesday, November 2, 2016

**Time:** 8:30 a.m. – 11:45 a.m.

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### 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 5 questions numbered 8 through 12.

The points for each question are indicated at the beginning of the question. Questions 3, 4, 9 and 10 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 morning or afternoon session for Exam GHCORC.
6. Be sure your written-answer envelope is signed because if it is not, your examination will not be graded.

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\*\***  
**Morning Session**

**1.** (6 points) You are an actuary working at Bay Insurance Company.

(a) (1 point)

- (i) List the four major types of group insurer financial reporting.
- (ii) Identify the information about assumptions that must be included in the actuary's report filed with the Life-1 annual statement.

(b) (2 points)

- (i) Describe the requirements and purpose of Dynamic Capital Adequacy Testing ("DCAT").
- (ii) List the key DCAT components to include in your presentation to the Board of Directors and Senior Management.

(c) (2 points) One of your staff members has summarized stress testing for a group long term disability ("LTD") block as follows:

| <b>Stress Test Scenarios</b> | <b>Reserve Impact</b> |
|------------------------------|-----------------------|
| Morbidity Termination +25%   | +8.2%                 |
| Morbidity Termination -25%   | +10.5%                |
| Expenses +10%                | +2.3%                 |
| Expenses -10%                | -2.3%                 |

Critique the results.

(d) (1 point) List applicable stress tests for a group life block that are not listed in part (c).

**2.** (8 points) A trade union offers group benefits to members while actively at work. The benefits are funded by monthly contributions based on a rate of \$2.00/hour worked. The union funds and administers the group benefit plan through an Employee Life and Health Trust (ELHT).

- (a) (2 points) Compare and contrast ELHTs with Health and Welfare Trusts (HWTs) in regards to:
- (i) Treatment of key employees
  - (ii) Qualified multi-employer rules
  - (iii) Distribution of excess funds at wind-up

You are given the following information:

| <b>Year</b> | <b>Total Employee Hours (000s)</b> | <b>Non-Taxable Benefit Claims Paid (\$000s)</b> | <b>Taxable Benefit Claims Paid (\$000s)</b> | <b>Administrative Costs (\$000s)</b> | <b>Life Insurance Premiums Paid (\$000s)</b> |
|-------------|------------------------------------|---|---|--------------------------------------|--|
| 2013        | 1,550                              | 2,100   | 400   | 100                                  | 12   |
| 2014        | 1,450                              | 2,900   | 300   | 115                                  | 14   |
| 2015        | 1,450                              | 2,550   | 450   | 112                                  | 13   |

- (b) (2 points) Calculate the employer tax deductions in each of 2013, 2014 and 2015 from the perspective of a/an:
- (i) ELHT
  - (ii) HWT

Show your work.

## 2. Continued

- (c) (4 points) The union is considering establishing a retiree medical plan using surplus funds in the ELHT. The intent is to reward individuals who have been long-standing union members. The union wishes to establish a reserve within the ELHT to prefund the cost of the retiree benefits.
- (i) (1 point) Explain the risks that the union should consider when setting up the plan.
- (ii) (3 points) The union is trying to decide between offering a defined benefit plan and a health care spending account (HCSA). Propose eligibility criteria and plan provisions under each approach that would mitigate the union's risk exposure. Justify your response.

**Questions 3 – 4 pertain to the case study.  
Each question should be answered independently.**

- 3.** (11 points) Powell is a video game company located in British Columbia (“BC”) with a self-insured long term disability (LTD) plan. Powell currently operates solely in BC, but is considering expansion to other provinces in Canada. Powell has been using Thunderball as the administrator for the LTD plan for many years, and the valuation actuary for the LTD plan has relied on Thunderball’s termination rates for funding valuation purposes.

Key characteristics of the plan are as follows:

- Elimination period: 3 months
- Definition of disability: 2-year own occupation period, any occupation thereafter

You are assisting with the upcoming LTD valuation.

- (a) (1 point) Describe the existing legislative framework for self-insured LTD plans in Canada.
- (b) (8 points) The valuation actuary has asked you to perform a termination study for the purpose of adjusting the underlying termination rates for the upcoming valuation.

Powell’s actual termination experience (death and recovery) over the last five years is outlined below:

| <b>Distribution of Actual Terminations within the last 5 years</b> |   |     |    |   |   |               |
|--|---|-----|----|---|---|---------------|
| <b>Age at Disability</b>   | <b>Duration Since Disability (In Years)</b> |     |    |   |   | <b>Totals</b> |
|  | 1   | 2   | 3  | 4 | 5 |               |
| 27   |   |     |    |   |   | 0             |
| 32   | 9   |     |    |   |   | 9             |
| 37   | 11  | 34  |    |   |   | 45            |
| 42   | 60  | 20  | 7  |   | 4 | 91            |
| 47   | 75  | 70  | 17 | 8 |   | 170           |
| 52   | 65  | 45  |    |   |   | 110           |
| 57   |   |     |    |   |   | 0             |
| <b>Total</b>   | 220   | 169 | 24 | 8 | 4 | 425           |



### 3. Continued

Powell's exposure (in years) based on disabled individuals over the last five years is outlined below:

| Distribution of Exposure of LTD claimants within the last 5 years |                                      |     |    |    |   |        |
|---|--------------------------------------|-----|----|----|---|--------|
| Age at Disability   | Duration Since Disability (In Years) |     |    |    |   | Totals |
|   | 1                                    | 2   | 3  | 4  | 5 |        |
| 27  |                                      |     |    |    |   | 0      |
| 32  | 20                                   |     |    |    |   | 20     |
| 37  | 46                                   | 41  |    |    |   | 87     |
| 42  | 112                                  | 101 | 40 |    | 6 | 259    |
| 47  | 81                                   | 75  | 41 | 56 |   | 253    |
| 52  | 72                                   | 71  |    |    |   | 143    |
| 57  |                                      |     |    |    |   | 0      |
| Total   | 331                                  | 288 | 81 | 56 | 6 | 762    |

- (i) (3 points) Calculate the expected number of terminations for each age/duration over the last five years. Show your work.
- (ii) (5 points) Recommend adjustment(s) to the current termination rates used in the valuation of Powell's LTD plan. Show your work and justify your response.
- (c) (2 points) The valuation actuary has asked you to help draft the funding report. He provides the following table of contents as a starting point:

| Section            | Page |
|--------------------|------|
| Introduction       | 1    |
| Summary of results | 2    |
| Actuarial opinion  | 5    |
| Membership data    | 10   |

- (i) List and describe the additional sections, if any, that are required in the report.
- (ii) List the statements required in the actuarial opinion.

**Questions 3 – 4 pertain to the case study.  
Each question should be answered independently.**

**4.** (8 points) Another Day, Inc. has decided to provide coverage for its Quebec employees under a separate contract with a new insurance carrier. No plan design changes are being made. Another Day has asked you to assist with the transition to the new insurer.

(a) (3 points)

(i) (1 point) Three months after the transition of the group Another Day becomes aware that a participant provided an incorrect age to the new insurer.

Describe the impact this will have on the participant's coverage.

(ii) (2 points) Six months after the transition of the group Another Day advises that a participant who was formerly disabled has become disabled again due to the same cause. This employee returned to work one month after the transition and had been working on a full time basis until the recurrence of his disability.

Sketch the timeline of responsibilities related to this employee for each of the new and former insurers.

**4. Continued**

- (b) (5 points) The new insurer has provided the following draft insurance contract for your review:

|                                   |  |
|-----------------------------------|--|
| <b>General Provisions</b>         |  |
| Insurer                           | NewCo. Financial Services  |
| Policy No.                        | A2345678-9   |
| Policyholder                      | Another Day, Inc.  |
| Benefit                           | Dental Care  |
|                                   |  |
| <b>Summary of Plan Provisions</b> |  |
| Coinsurance                       | 80% basic<br>50% major<br>50% orthodontics   |
| Maximums <sup>1</sup>             | \$2,500 per year basic and major combined<br>\$2,000 per lifetime orthodontics   |
| Reasonable & customary charges    | Eligible expenses are limited to the dental fee guide for the current year   |
| Exclusions                        | No benefits payable for cavities arising from inconsistent or inappropriate use of dental floss  |
| <b>Notes</b>                      |  |
|                                   | 1 Maximums apply to each insured person covered under the plan. Notwithstanding the foregoing, no coverage is provided for orthodontics if the insured is not less than 18 years of age. |

- (i) (1 point) Define a contract of adhesion under the Quebec Civil Code and describe the major consequences of this definition for an insurance contract.
- (ii) (2 points) Compare and contrast the content required in the insurance contract versus a group insurance plan description.
- (iii) (2 points) Critique the draft dental contract for Another Day. Assume that the table provided represents the entirety of the contract for this benefit.

5. (11 points) Montgomery & Sons (Montgomery) produces electronic office equipment. During the past four years it has reported the following financial indicators:

|                             | 2012    | 2013    | 2014    | 2015    |
|-----------------------------|---------|---------|---------|---------|
| Net Income (in millions)    | \$47.8  | \$50.3  | \$60.0  | \$64.6  |
| Sales Revenue (in millions) | \$1,000 | \$1,200 | \$1,500 | \$1,850 |
| Total Assets (in millions)  | \$700   | \$740   | \$800   | \$1,000 |
| Retention Ratio             | 95%     | 95%     | 95%     | 95%     |
| Financial Leverage          | 1.9     | 1.8     | 2.1     | 2.0     |

Montgomery's leadership wants to know if they can rely on past performance as a good indicator of future results.

- (a) (2 points)
- (i) Describe the life cycle of a successful company.
  - (ii) Explain the possible consequences for each of excessive growth and slow growth.
- (b) (8 points) Outline a memo to Montgomery's leadership taking a position on growth levels since 2012. Your response should address:
- How actual growth levels compare to the sustainable growth rate;
  - Three sustainable growth "what if" scenarios for 2015, each testing a different variable;
  - A recommended target growth level;
  - A description of three strategies to reach your recommendation; and
  - Limitations/disadvantages for each recommended strategy.

Show your work and justify your response.

- (c) (1 point) Explain the impact of inflation on growth rates and Montgomery's financial statements.

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**6.** (11 points) You are the benefits consultant for Natoma Utilities (NU), a company with operations in Alberta, Ontario and Quebec. NU is concerned about rising drug costs and is looking for ways to ensure the sustainability of the plan.

(a) (4 points)

- (i) Summarize the 2010 Ontario drug reform and its implications for plan members, plan sponsors, and pharmacies.
- (ii) NU expected that drug costs under the benefits plan would have decreased as a result of the drug reform in Ontario. However, it experienced an increase in drug costs in 2013 and 2014.

Explain the factors that could have contributed to the increase.

(b) (7 points) Drugs for the treatment of high blood pressure are a significant cost under the NU plan. A new specialty drug for high blood pressure was recently introduced to the market. At the same time, insurers are recommending the introduction of a step therapeutic alternative as another way to manage costs.

Key cost factors for high blood pressure drugs are listed below:

- Patients must take one pill daily
- Drug costs:
  - Brand name: \$160 per 10 pills
  - Therapeutic alternative: \$120 per 25 pills
  - Specialty: \$10,200 annually
- Dispensing fee: \$15 for generic drugs

- (i) (2 points) Compare the cost of the generic drug in Ontario to the cost of the therapeutic alternative drug. Assume the therapeutic alternative drug is 80% effective. Show your work.
- (ii) (4 points) NU is considering whether to add the new specialty drug to its drug formulary. The new specialty drug is expensive but very effective: recent research indicates that it could reduce absenteeism by 80% compared to current treatment options.

## 6. Continued

The following assumptions have been provided:

- Average absenteeism rate for employees with high blood pressure: 25 days per year
- All employees work 8 hours per day

Calculate the hourly pay rates that would make the specialty drug more cost effective when compared to brand name and generic drugs, respectively. Show your work.

- (iii) *(1 point)* Discuss other considerations when deciding whether to list the new specialty drug on NU's drug formulary.

7. (5 points) Chris is a newly retired 67-year-old residing in Saskatchewan with the following health insurance coverage:
- Retiree group benefits plan
    - Drug coverage: 90%
    - Medical services and supplies: 100%
    - Out-of-province emergency: 100% up to \$25,000 lifetime maximum
  - Individual travel medical insurance purchased through Laguna Insurance Company (Laguna)
    - Out-of-province emergency: 90% for duration of trip

In early 2015 Chris traveled to Florida for elective hip replacement surgery. The surgery was successful, but Chris suffered an unrelated stroke during the same trip. The hospital notified Laguna of Chris' stroke.

Chris incurred the following costs:

|                    | <b>Hip Replacement Surgery</b> | <b>Emergency Hospital Stay (Stroke)</b> | <b>Additional Costs (Stroke)</b> |
|--------------------|--------------------------------|---|----------------------------------|
| Flight             | \$2,000                        | \$0                                     | \$0                              |
| Hospital           | \$45,000 (4 days)              | \$10,000 (2 days)                       | \$0                              |
| Physician          | \$15,000 (4 visits)            | \$3,000 (2 visits)                      | \$0                              |
| Meals, etc.        | \$100                          | \$0                                     | \$0                              |
| Ambulance          | \$0                            | \$1,500                                 | \$0                              |
| Prescription drugs | \$0                            | \$500                                   | \$0                              |
| Elective MRI scan  | \$0                            | \$0                                     | \$750                            |

Assume Saskatchewan provincial health insurance pre-set rates are \$100 per day for emergency out-of-province hospital services and \$60 per visit for emergency out-of-province physician services.

- (a) (1 point) Compare and contrast the reciprocal fee arrangement between Saskatchewan and:
- (i) Florida
  - (ii) other Canadian provinces
- (b) (1 point) Define and identify the Primary and Secondary Plan(s). Justify your response.



**7. Continued**

- (c) (1 point) Identify the First Carrier and describe its responsibilities.
- (d) (2 points) Calculate the costs to:
  - (i) Saskatchewan provincial health insurance plan
  - (ii) Retiree group benefits plan
  - (iii) Laguna plan
  - (iv) Chris

Show your work.

**\*\*END OF EXAMINATION\*\***  
**Morning Session**

**USE THIS PAGE FOR YOUR SCRATCH WORK**