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

# Exam GHCORC

## MORNING SESSION

**Date:** Wednesday, May 4, 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 8 questions numbered 1 through 8.
  - b) The afternoon session consists of 6 questions numbered 9 through 14.

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 at a major consulting firm. Your client Fort Mfg. is a large employer that has approximately 2,000 unionized employees. Fort is considering offering retiree life insurance as there has been a demand from employees who would like to continue their life insurance coverage after retirement.

In Fort's industry, several other large employers provide retiree life benefits to unionized employees through a health and welfare trust.

Fort would like you to help design its retiree life insurance program.

- (a) (1 point) Describe the different design options for retiree life insurance.
- (b) (3 points) The life insurance for Fort's active employees is currently underwritten on a fully insured basis with insurer Broadway Financial. Fort is considering obtaining a quote from Broadway Financial for retiree life insurance. You are asked to provide the following advice:
- (i) Evaluate the different options and considerations to set the rates for retiree life insurance under a group term policy.
  - (ii) Describe funding alternatives for retiree life insurance benefits and explain how retirees will be taxed under each funding arrangement.
- (c) (2 points) For a flat benefit amount of \$50,000, Broadway Financial quoted an annual premium of \$600 per retiree. Critique the following three options and propose a recommendation to Fort.
- (i) Purchase term life policy with face amount of \$50,000 for each retiree assuming premiums are fully paid by Fort.
  - (ii) Provide each retiree with a Health Spending Account with annual credit allowance of \$600.
  - (iii) Increase each retiree's annual pension by \$600 in lieu of providing the benefit.

Justify your response.

2. (8 points) You are an actuary working for Quadra Insurance Company and are responsible for preparing the annual financial accounting for Esquimalt Solutions. Esquimalt sponsors a group benefits program that is insured by Quadra under a retrospective premium arrangement. You are given the following for the financial year ending December 31, 2014:

Total Premium	\$1,100,000
Total Paid Claims	\$1,250,000
Pooled Claims	\$75,000
IBNR at 12/31/2014	\$25,000
IBNR at 12/31/2013	\$75,000
General Expenses	3% of premium
Profit Charge	0.25% of premium
Risk Charge	0.5% of premium
Pooling Charge	4% of premium

- (a) (1 point) Calculate the surplus or deficit as of December 31, 2014 assuming no prior period surplus or deficit. Show your work.
- (b) (2 points) From Esquimalt's perspective, describe the advantages and disadvantages of the following:
- Keeping a surplus with Quadra.
  - Repaying a deficit to Quadra immediately.
- (c) (1 point) You are given the following:
- Quadra expects a health care trend rate of 7% for next year
  - Quadra charges 4% on deficit carry-over
  - Quadra credits 2.5% on surplus kept in the account
  - Esquimalt achieved a 6% internal Return on Investment (ROI) in the previous year
  - Esquimalt's business outlook suggests a prospective ROI of 2.5%
  - Risk free interest rate is 1.75%
  - CPI increase is expected to be 2.3% next year

Recommend how Esquimalt should address the following situations.

- A surplus is available.
- A deficit is incurred.

Justify your response.

## **2. Continued**

- (d) (2 points) Explain how Quadra's financial statements will change assuming the surplus or deficit in a given year will be carried forward to the following year.
- (e) (2 points) Quadra is proposing an increase to the premium rate and an increase to the pooling charge. Outline two strategies for Esquimalt to mitigate the renewal increase. Justify your response.

**Questions 3 and 4 pertain to the Case Study.  
Each question should be answered independently.**

**3.** (7 points) You are an actuary at Skyfall Canada assisting Another Day with redesigning its benefits program. The client would like to introduce employee cost sharing into its plan design, which is currently 100% employer paid.

(a) (2 points) The table below is an excerpt from Another Day’s employee handbook summarizing tax implications for employees in Manitoba and Quebec. Evaluate the accuracy of the information in the table, and recommend any corrections.

<b>Benefit</b>	<b>Taxability</b>
Basic Life	First \$50,000 not taxable, premium for additional coverage taxed based on Table 1 rates
Basic AD&D	Premiums not taxable and benefits provided tax-free
Disability	Benefits are taxable
Extended Health Care and Dental Care	Premiums paid by employer are taxable and benefits provided tax-free
HSA	Unused credits are carried forward and taxed in next year

(b) (3 points) Another Day is considering reducing the Basic Life Insurance benefit to one times annual earnings and supplementing it with Optional Employee Life Insurance options of one times, two times, or three times annual earnings. Another Day’s insurer has confirmed that the Basic Life Insurance premium rate would not change and the required Optional Life Insurance rates are as follows:

**Monthly Rates per \$1,000 of coverage**

Age	Non-Smoker		Smoker	
	Male	Female	Male	Female
< 29	\$0.03	\$0.02	\$0.08	\$0.04
30 – 39	\$0.05	\$0.03	\$0.10	\$0.06
40 – 49	\$0.13	\$0.08	\$0.25	\$0.15
50 – 59	\$0.35	\$0.25	\$0.75	\$0.40
60 – 69	\$0.90	\$0.50	\$1.90	\$0.95
70 +	\$ –	\$ –	\$ –	\$ –

### 3. Continued

You are given an example of a 43-year-old male smoker earning \$80,000 per year who would move from the current plan to electing two times annual earnings under the new plan. Calculate the additional earnings that would be required to allow this employee to maintain his current coverage for life insurance at the same cost. Assume a marginal income tax rate of 40% and no sales tax. Show your work.

- (c) (2 points) The client would also like to review the Long Term Disability (LTD) benefit. Assume:
- Effective income tax rate of 25% if annual earnings are under \$55,000
  - Effective income tax rate of 35% if annual earnings are \$55,000 or over
- (i) Calculate the non-taxable LTD benefit percentage to ensure the same after-tax LTD benefit amount for an employee earning \$80,000 per year. Show your work.
- (ii) Another Day proposes to implement the benefit percentage calculated in (i). Critique this suggestion.



*Questions 3 and 4 pertain to the Case Study.  
Each question should be answered independently.*

**4.** (13 points) You recently became the consulting actuary for Another Day. You are reviewing the preliminary accounting results for the following employee benefits programs that Another Day recognizes under IAS 19:

- Retiree benefits plan (DBO duration of 20), and
- Continuation of Extended Health Care and Dental Care benefits for employees on Long Term Disability (DBO duration of 9).

- (a) (2 points) Define and provide examples of the four major categories of employee benefits covered under IAS 19.
- (b) (2 points) Compare and contrast the methodology for the calculation of defined benefit cost for the two benefits under IAS 19.
- (c) (6 points) Another Day's CFO expects strict adherence to the financial accounting standards. Select assumptions proposed by your team are outlined below:

	<b>December 31, 2014</b>
Discount rate	3.5% (4.0% as at December 31, 2013)
Retirement age	62
Family composition	60% married

#### 4. Continued

As backup, your team has also provided an excerpt of the discount rate curve for the current and prior year-ends:

Duration	Discount Rate	
	12/31/2013	12/31/2014
8	3.3%	2.9%
9	3.5%	3.0%
10	3.6%	3.1%
15	4.0%	3.4%
16	4.0%	3.5%
17	4.1%	3.7%
19	4.2%	3.8%
20	4.2%	3.8%
21	4.3%	3.9%

Evaluate the appropriateness of each assumption provided for each benefit program being valued, and recommend any changes. Justify your response.

- (d) (3 points) Your team has prepared the following results:

	Retiree medical benefits	Continuation of benefits for disabled employees
DBO at Dec. 31, 2013	\$17,500,000	\$1,000,000
DBO at Dec. 31, 2014	\$19,000,000	\$1,100,000
Expected benefit payments for 2014	\$250,000	\$45,000
Actual benefit payments for 2014	\$200,000	\$50,000

The plans are funded on a pay as you go approach. The obligation for new disabilities in 2014 was \$120,000 as measured at the end of the period. The service cost calculated at the beginning of the period for retiree medical benefits in 2014 was \$300,000.

For each program:

- (i) Calculate the defined benefit cost recognized in profit and loss in 2014
- (ii) Calculate the defined benefit cost recognized in other comprehensive income in 2014

State your assumptions and show your work.

**5.** (7 points) You are the appointed actuary for Seymour Insurance Company. Your auditors are reviewing the year-end financial statements, and have asked you to provide some additional background. Seymour reports under IFRS, and the auditors have confirmed that best practice for financial statements is to comply with Educational Note: Classification of Contracts under International Financial Reporting Standards.

(a) (3 points) Sketch a decision tree of the general process for classifying contracts.

(b) (1 point) Define the following terms, as they apply to IFRS 4:

(i) Policyholder

(ii) Insured event

(iii) Significant insurance risk

(c) (3 points) The auditors have identified one group of contracts with which they have concerns. You are given the following:

- These contracts are currently valued at \$5,200
- Future claims are expected to be \$1,000 in each of the next 5 years (the remaining lifetime of the contracts), increasing annually with inflation
- Claims handling costs are projected to be 5% of claims
- The present value of embedded options and guarantees is estimated at \$120
- The carrying value of deferred acquisition costs and intangible assets related to the contract totals \$275
- Annual inflation is 2%
- Discount rate is 5%

Calculate the deficiency, if any, to be recognized in the profit and loss statement. Show your work.

**6.** (10 points) One of your clients has recently hired a new Chief Human Resource Officer (CHRO) for its Canadian operations. The CHRO has a background with U.S. benefits programs and is unfamiliar with Canadian benefits.

(a) (4 points)

- (i) Compare and contrast the key benefits and eligibility requirements of the Alberta provincial health care program, U.S. Medicare, and U.S. Medicaid.
- (ii) Draft a memo to the CHRO explaining how the typical components of an employer-sponsored private plan would supplement the Alberta provincial health care program.

(b) (2 points) The CHRO inquires further about the funding of provincial programs.

- (i) List the sources for funding provincial health care.
- (ii) Explain the five criteria and conditions set out by the Canada Health Act for provincial health plans and how these criteria are related to funding.

(c) (4 points) The CHRO inquires about the Employment Insurance (EI) premium reduction program.

- (i) (1 point) Explain the key advantage of this program for each of the EI fund, the plan sponsor and employees.
- (ii) (3 points) Recommend whether the weekly indemnity benefit plan design should be adjusted in order to qualify for the EI premium reduction program, based on the following information:
  - Flat salary of \$45,000 for all employees
  - Current employee EI premium rate of 1.88% of taxable income
  - EI premium reduction of 15%
  - Current self-insured weekly indemnity plan design:
    - Current maximum weekly benefit of \$400
    - Expected ASO claim rate of \$2,000 per employee per year

Show your work.

**7.** (5 points)

(a) (2 points)

- (i) Define the DuPont formula used to analyze enterprise growth.
- (ii) Describe the purpose of each of its components.

(b) (3 points) You are reviewing two possible investment choices. Given both companies have the same Return on Equity (ROE) of 5%, you need to perform additional financial analysis. You are also given the following information:

Company A:

- Total Assets = \$5,000
- Asset Turnover Ratio = 10.0%
- Leverage Ratio = 2.5

Company B:

- Total Assets = \$150,000
- Return on Assets = 1%
- Revenue = \$15,000

Recommend an investment choice. Justify your response and show your work.

**8.** (4 points)

- (a) (1 point) Describe the types of life insurance policy reserves that must be included in an insurer's income.
- (b) (1 point) Define a taxable life insurance policy (from the perspective of an insurance company), and describe any policies that are specifically excluded.
- (c) (2 points) Calculate the 2015 life investment income tax based on the following factors:
- 2015 average maximum tax actuarial reserves for taxable life insurance policies = \$195,740,000
  - Investment income on reserves = 1.3%
  - No experience rating refund reserve adjustment
  - 2015 policy dividend payment = \$1,640,000
  - Historical investment losses not yet recognized:
    - 1992 = \$76,000
    - 1998 = \$98,000
    - 2011 = \$47,000

Show your work.

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

**USE THIS PAGE FOR YOUR SCRATCH WORK**

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