SOCIETY OF ACTUARIES
Group and Health Core Exam - Canada

Exam GHCORC

MORNING SESSION

Date: Wednesday, April 26, 2017
Time: 8:30 a.m. – 11:45 a.m.

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 5 questions numbered 9 through 13.

   The points for each question are indicated at the beginning of the question. Questions 3, 4, 11 and 12 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.

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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. (*4 points*)

(a) (*1 point*) Describe the key drivers of volatility in earnings after issue for insurance products using:

(i) The Canadian Asset Liability Method (CALM)

(ii) The simplifying approximation

(b) (*1 point*) Explain why source of earnings (SOE) analysis typically includes a distinction between first policy period and renewal periods for group insurance.

(c) (*1 point*) List items typically included in an SOE analysis for renewal periods.

(d) (*1 point*) Describe advantages and disadvantages of the two methods for reflecting reinsurance in SOE analysis.

2. (*7 points*) You have been hired to provide consulting advice to a large university that is in negotiations with its employees. The university employees are represented by two associations: one for academic staff and one for non-academic staff. Both associations and the university are hoping to reach a three year agreement (2015 through 2017).

Benefits currently included in the negotiations are as follows:

	2014 Total Premiums			**Assumptions**	
	Academic	Non-Academic	Employee Premium Cost Share	Annual Trend/Salary Growth	Annual Population Growth
Basic Life	$505,000	$524,000	0%	0%	0%
Long Term Disability	$4,270,000	$4,432,000	25%	0%	0%
Extended Health Care	$4,000,000	$7,560,000	40%	8%	0%
Dental Care	$2,790,000	$5,208,000	40%	4%	0%

Neither association offers short term disability.

You are also given the following information about university employees:

	2014 Data	
	Academic	Non-Academic
Covered Employees	1,500	2,800
Average Income	$135,000	$75,000

(a) (*2 points*) You provided a cost projection for a new short term disability plan. In the projection, the Employment Insurance premiums for employees in one of the associations changed at a different rate than for employees in the other association.

Explain possible reasons for the difference.

2. **Continued**

(b) (*5 points*) The university and associations have agreed that only the premium cost sharing under the plan will change: the university will pay 70% of the associated premiums for each benefit and employees will pay 30%.

(i) Calculate the change in 2017 premiums to the employees for each of the academic and non-academic associations and explain why the changes may differ. Show your work.

(ii) Recommend a more tax effective cost sharing arrangement. Justify your response.

(iii) Critique your recommendation in part (ii) over the duration of the contract, including its impact on both academic and non-academic employees.

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

3. (*10 points*) You are an actuary working for Living Daylights Life and Health Insurance Company (Living Daylights). The CFO has asked you to review the financial statements for 2013 and 2014.

(a) (*5 points*)

(i) Calculate the following performance measures for each of 2013 and 2014. Show your work.

- Return on Equity
- Total Leverage Ratio
- Net Profit Margin
- Total Asset Turnover

(ii) As part of annual budgeting and forecasting, the CFO would like to assess the performance measures from part (i) with a focus on:

- Year-over-year trends in each performance measure from part (i)
- Drivers of each trend
- Recommended trend assumptions for 2015 projections

Draft a memo to the CFO addressing his requests. Justify your response.

(b) (*5 points*) The CFO has also asked you to assess Living Daylights' income statements for 2013 and 2014.

(i) Describe the advantages and disadvantages of the PMPM income statement approach.

(ii) Construct a PMPM income statement for 2014. Assume 300,000 covered members. Show your work.

(iii) Calculate the year-over-year change in net income PMPM if 2014 covered members increased 20% over 2013. Show your work.

(iv) Explain any additional information you would request to make the PMPM approach more actionable.

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

4. (*13 points*) You are an actuary at Skyfall Actuarial Consulting firm (Skyfall) assisting with the valuation of Another Day, Inc.'s (Another Day) post retirement plan for the 2015 year-end financial accounting disclosures under International Accounting Standard 19 (IAS 19).

The valuation you are performing includes only the post retirement extended health care (EHC) benefits. All other benefits, including retiree life insurance, are being valued by another actuary.

A full valuation with updated census data has been used to determine the 2015 results. The December 31, 2015 liability has been determined using a discount rate of 4.1%. Your team provides you with draft accounting results for 2015 as follows:

Reconciliation of defined benefit obligation ("DBO")	**1/1/2015 to 12/31/2015**		**Breakdown of actuarial (gain)/loss**	**12/31/2015**
DBO at 1/1/2015:	20,000,000		New census data	1,650,000
Service cost	1,700,000		Administration expense assumption	(250,000)
Interest cost	790,000		Claims costs assumption	3,214,000
Benefit payments	(900,000)		Mortality assumption	525,000
Actuarial (gain)/loss	3,160,000		Termination assumption	(352,000)
DBO at 12/31/2015:	24,750,000		EHC trend assumption	723,000
- Actives not fully eligible	14,250,000		Discount rate	(2,750,000)
- Actives fully eligible	1,150,000		Actual benefit payments greater than expected	400,000
- Retirees	9,350,000		Total actuarial (gain)/loss	3,160,000

The 2016 defined benefit cost has been estimated as follows:

Estimated defined benefit cost	**1/1/2016 to 12/31/2016**
Service cost	1,900,000
Interest cost	1,003,000
Actuarial (gain)/loss	TBD
Total defined benefit cost	2,903,000

4. Continued

(a) (*2 points*)

(i) Describe the classifications for actuarial gains and losses under IAS 19.

(ii) Calculate the actuarial gains and losses from the 2015 valuation based on your classifications in part (i).

(b) (*1 point*) Another Day's new Director of Finance wants to recognize only the annual cash cost of the post retirement plan in the financial statements. Outline an email refuting this position.

(c) (*5 points*) The Director of Finance would like to reduce the cost of the post retirement EHC plan. He suggests reducing the prescription drug coverage beginning January 1, 2017.

(i) Describe the key drivers of prescription drug costs in recent years.

(ii) Describe legal and financial considerations related to the director's proposal.

(iii) Describe alternate cost containment strategies available to reduce the cost of the post retirement EHC plan.

(d) (*5 points*) Another Day decides to replace the current post retirement EHC plan with a $1,000 annual health spending account (HSA) for all employees retiring on or after January 1, 2017. This change is announced on January 1, 2016. Assume that all active employees currently eligible to retire will do so before January 1, 2017.

(i) Calculate the reduction in per capita claims costs as a result of this change. Assume that the current valuation results are based on actual claims experience over the past three years.

State your assumptions and show your work.

(ii) Estimate the revised 2016 defined benefit cost using the reduced claims cost calculated in part (i). Assume the annual HSA allocation will increase based on the current EHC trend rate assumption and there are no other changes to the valuation assumptions.

State your assumptions and show your work.

5. (*7 points*) Jack and Jill were married with one child, John. In 2012, both Jack and Jill had group benefits coverage through their respective Canadian employers. Both elected family coverage under their plans.

2012 Group Benefits Dental Coverage	**Jack**	**Jill**
Per claim deductible	$10	None
Coinsurance	80%	85%
Annual maximum	$1,000	$1,250

Dates of birth are as follows:

- Jack: May 28, 1977
- Jill: August 11, 1975
- John: November 14, 2008

Assume all plans include a coordination of benefits provision and the same plan provisions are applicable for all types of dental benefits.

(a) (*2 points*) John went to the dentist for a filling in 2012, with a total claim amount of $225. This was the family's first claim for 2012.

(i) Calculate the amount reimbursed for John's filling under each plan. Show your work.

(ii) The insurer for Jill's plan is considering a change in policy that would only cover the amount up to the reasonable and customary (R&C) charge. The R&C charge for fillings is set at $175.

Calculate the change, if any, in the amount from part (i) that would be reimbursed under each plan. Show your work.

5. Continued

(b) (*2 points*) Jack and Jill got divorced in 2013. In 2014, Jack got remarried to Ruth and Jill got remarried to Chris. Jill maintained custody of John. While Jack's dental plan hasn't changed, Jill left her job in 2014 and no longer has dental coverage.

You are given the following benefits coverage information for 2015:

2015 Group Benefits Dental Coverage	**Jack**	**Jill**	**Ruth**	**Chris**
Per claim deductible	$10	N/A	None	$25
Coinsurance	80%	N/A	100%	75%
Annual maximum	$1,000	N/A	$1,500	$1,000

John requires $2,500 in orthodontics work in 2015. Assume John is listed as a covered dependent under each plan and this is the first claim for either family in 2015.

Calculate the amount reimbursed under each plan and the total out of pocket cost. Show your work.

(c) (*3 points*) Sketch a decision tree outlining the order of benefit determination for a Covered Individual.

6. (*6 points*) You are a consultant at Filbert Consulting. Your client, Lombard Corporation, operates in British Columbia (BC). The CFO is adamant that an increase in Lombard's extended health care (EHC) costs is the result of changes in federal funding levels. To illustrate, he points to the following tables of historical Canada Health Transfers and gross domestic product (GDP) growth:

Historical Health Transfers					
(in millions)	**2012/13**	**2013/14**	**% Change**	**2014/15**	**% Change**
Newfoundland and Labrador	$ 468	$ 486	4%	$ 490	1%
Prince Edward Island	$ 123	$ 129	5%	$ 132	2%
Nova Scotia	$ 800	$ 838	5%	$ 852	2%
New Brunswick	$ 641	$ 672	5%	$ 682	1%
Quebec	$ 6,836	$ 7,239	6%	$ 7,420	3%
Ontario	$ 11,339	$ 12,027	6%	$ 12,353	3%
Manitoba	$ 1,057	$ 1,123	6%	$ 1,156	3%
Saskatchewan	$ 906	$ 973	7%	$ 1,013	4%
Alberta	$ 2,337	$ 2,511	7%	$ 3,718	48%
British Columbia	$ 3,972	$ 4,187	5%	$ 4,190	0%
Yukon	$ 29	$ 32	10%	$ 33	3%
Northwest Territories	$ 30	$ 32	7%	$ 40	25%
Nunavut	$ 31	$ 34	10%	$ 34	0%
Canada (Total)	$ 28,569	$ 30,283	6%	$ 32,113	6%

Historical Annual GDP Growth:

Year	**Annual GDP Growth**
2011	3.00%
2012	1.90%
2013	2.00%
2014	2.40%
2015(Forecast)	1.50%
2016(Forecast)	1.10%

6. Continued

(a) (*3 points*) Based on these tables the CFO makes the following comments:

(i) *"I find it hard to believe that overall, public program health care costs are increasing at 6% per year. I feel it is much higher!"*

Explain why the overall increase is 6% in each of 2013/14 and 2014/15.

(ii) *"For BC, there have been 5% and 0% increases in transfers for each of 2013/14 and 2014/15, respectively. I find this hard to believe given our per capita benefit costs increased at 6% and 10% over the same periods!!"*

Explain why there would be differences in cost increases under the BC public health care program versus Lombard's EHC plan.

(iii) *"In 2014/15, there is a huge increase in funding that Alberta is receiving while BC remains flat. There must be favoritism!!!"*

Explain the reason for disparity in 2014/15 percentage change in transfers to BC and Alberta.

(b) (*1 point*) Calculate the overall percentage change in Canada Health Transfers for each of 2015/16, 2016/17, and 2017/18. Show your work.

(c) (*2 points*) Outline a memo highlighting concerns about how the change in Canada Health Transfer payments will impact provinces, employers and employees across Canada using BC as an example. Your response should reference the following:

- Specific figures based on your prior responses and the information provided, and
- Various funding mechanisms available to provinces.

7. (*6 points*) You locate existing CALM reserve methodology training material for your new actuarial student. The training material includes an example with the following information:

- Invested asset cash flows
  - Year 1 = $1,000
  - Year 2 = $1,100
  - Year 3 = $1,200
- Reserve release cash flows
  - Year 1 = $1,000
  - Year 2 = $1,250
  - Year 3 = $1,500
- Best estimate short term interest rate = 2%
- Final reserve short term interest rate = 1%

The solution and the rest of the material appear to be missing.

(a) (*1 point*) Define CALM and list its general principles.

(b) (*5 points*) Calculate the interest provision for adverse deviation (PfAD). Show your work.

8. (*7 points*) Kearny Ltd. is a company registered and operating in Ontario. Kearny sponsors an LTD program for its employees on a self-insured, pay-as-you go basis and reports under IFRS.

Key plan provisions are summarized below:

- Covered employees: All salaried staff
- Benefit amount: 80% of monthly earnings
- Maximum benefit amount: Unlimited
- Definition of disability: Own occupation to age 75
- Benefit period: To age 75
- Elimination period: One month
- Benefit offsets: Primary CPP
- Tax status: Non-taxable
- Cost of living adjustments: 5% per year

With the July 1, 2014 legislation requiring plan sponsors to insure LTD benefits, the CFO is concerned with how this may affect Kearny's financial statements.

(a) (*2 points*) Describe how the change in legislation will impact Kearny's financial statements for pre and post July 1, 2014 claims. Assume post July 1, 2014 benefits are provided through an insured LTD arrangement.

(b) (*3 points*) Describe other options that were available to the Ontario government to help secure self-insured LTD claims, and any limitations of these approaches.

(c) (*2 points*) Revise the plan design to align with typical provisions in an insured LTD plan. Justify your response.

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

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