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**SOCIETY OF ACTUARIES**  
**Group and Health – Company/Sponsor Perspective**

# Exam CSP-GH

## AFTERNOON SESSION

**Date:** Friday, April 29, 2011

**Time:** 1:30 p.m. – 4:45 p.m.

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### INSTRUCTIONS TO CANDIDATES

#### General Instructions

1. This afternoon session consists of 11 questions numbered 10 through 20 for a total of 60 points. The points for each question are indicated at the beginning of the question. There are no questions in the afternoon session that 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.
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 since 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 CSP-GH.
6. Be sure your written-answer envelope is signed because if it is not, your examination will not be graded.

#### 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.

Tournez le cahier d'examen pour la version française.



**\*\*BEGINNING OF EXAMINATION\*\***  
**Afternoon Session**  
***Beginning with Question 10***

- 10.** (3 points) Describe the following components for injured and disabled workers and dependents under Canada's government insurance and benefit programs for income replacement:
- (a) (1 point) The benefits available
  - (b) (1 point) The qualifications to receive such benefits
  - (c) (1 point) The integration of benefits with an employer's own group short and long term disability plans

**11.** (7 points) The Watch Hill Company (WHC) is considering ways to expand its disability business. It has two proposals:

1. Joint venture with the South Beach Company (SBC) as the disability reinsurer
2. Traditional reinsurance treaty with Reinsurer XYZ

The initial information memorandum shared between SBC and WHC mentions that:

- SBC has more in-depth expertise in disability insurance.
- WHC desires to expand its disability line while managing risks.
- Disability business for both companies is substantially group Long-term Disability (LTD).

The summary of the reinsurance options are:

	<u>SBC</u>	<u>Reinsurer XYZ</u>
Rating	AAA	BBB
Reinsurance terms	lowest rates	rates guaranteed for 30 months
Services	negotiable	turn key
Offering	automatic excess	automatic quota share, 75% ceded to Reinsurer

Additional information about WHC:

Total Risk Capital = \$20.148 billion

Health Risk Based Capital (HRBC) Category	Amount (\$ millions)
Business	\$650
Affiliate assets	\$1,073
Underwriting	\$4,564
Credit	\$350
Other assets	\$1,409

- (a) (3 points) Assume WHC desires to hold at least 600% of the authorized control level of risk-based capital. Calculate the risk based capital that WHC should hold to meet their target. Show your work.

## 11. Continued

- (b) (2 points) For both regulatory agency capital and economic capital:
  - (i) Provide definitions
  - (ii) Define risks included or measured, identifying material differences between life and health writing companies
  
- (c) (2 points) Describe how HRBC components are affected under:
  - (i) The SBC joint venture
  - (ii) The Reinsurer XYZ reinsurance treaty

- 12.** (5 points) Teenage Dream (TD) is a company that develops and sells disease management programs. TD has developed a program to assist participants in managing their hypertension. TD believes the appropriate regression discontinuity model for this program is:

$$Y_i = 30 + 0.91 X_i - 15 Z_i$$

Skin Tight Jeans (STJ) is a small manufacturing company that would like to use this plan to manage their employees with hypertension. The cost of the hypertensive disease management plan is \$30 per member per month (pmpm). STJ would need to pay this fee for all members in their health plan. Data for members enrolled in STJ's plan are as follows:

Total Members	5
Hypertensive Members	3
Annual trend	8.0%

Selected data for members:

<u>Member</u>	<u>2010 Claim PMPM</u>	<u>Is the member hypertensive?</u>
A	\$360	Yes
B	\$375	Yes
C	\$390	Yes
D	\$185	No
E	\$195	No

- (a) (2 points) Determine the expected 2011/2010 trend if STJ used TD's Disease Management program. Assume TD's program is used by all hypertensive members. Show your work.
- (b) (1 point) Determine the Return on Investment (ROI) for this program. Show your work.
- (c) (2 points) Based on the ROI you have calculated, explain whether STJ should buy this program. Defend your answer.

- 13.** (3 points) You have just returned from a conference presented by the Canadian Institute for Health Information and need to prepare a presentation for your CEO on what you have learned.
- (a) (2 points) Describe how Canadian Health Indicators are used to monitor and improve the quality of health care.
- (b) (1 point) Identify the limitations of using such indicators.

- 14.** (10 points) You are a reinsurance broker and have been asked by carrier XYZ to recommend a reinsurance program for their medical line of business for their next fiscal year.

The company's projected financials for the next fiscal year are projected as follows:

Total company premium of \$10 million  
Expected Medical Loss Ratio (MLR) is 80%  
Expected High Dollar Claims are as follows:  
Claim #1            300K  
Claim #2            500K  
Claim #3            \$1.1 million

The company has \$2 million of capital including regulatory capital that is calculated as 10% of premium after reinsurance.

The company is concerned about the effect that recent unfavorable large claims volatility has had on its capital available net of regulatory capital.

- (a) (1 point) Describe the uses of reinsurance.
- (b) (1 point) Describe the types of reinsurers.
- (c) (2 points) Describe key considerations a health insurance company or health plan should think about in selecting a reinsurer.
- (d) (1 point) Describe the various reinsurance options available to a health insurance company or health plan.

Reinsurer ABC has offered two reinsurance quotes to carrier XYZ:

Quote #1:        50/50 Quota Share with 10% expense allowance

Quote #2:        Reinsurer takes 80% of risk on all claims for an individual from \$250K up to \$1 million

Reinsurance Premium = \$1 million

- (e) (3 points) Calculate the effect of the proposed reinsurance on carrier XYZ's income statement and regulatory capital assuming that claims come in as projected. Show your work.
- (f) (2 points) Recommend a quote to carrier XYZ. Justify your recommendation.

**15.** (3 points) With respect to appointed actuaries using Canadian Standards of Practice:

- (a) (2 points) List and explain the elements that must be included in the Report of Valuation of Policy Liabilities.
- (b) (1 point) Identify factors for consideration when developing a best estimate morbidity assumption.

- 16.** (8 points) Third Avenue Pops (TAP) is a retail popcorn distributor that offers a cafeteria plan with health benefits to its employees. You have been called in as an outside consultant by the Internal Revenue Service (IRS) to perform nondiscrimination testing on the plan.

You are given the following data for the TAP's health plan:

<u>Employee</u>	<u>Position</u>	<u>Annual earnings</u>	<u>Percentage ownership of TAP</u>	<u>Value of nontaxable benefits</u>
Ralph A	Officer	\$150,000	0.0%	\$2,000
Susan K	Officer	\$100,000	4.0%	\$3,500
John C	Analyst	\$43,000	0.0%	\$500
Michael P	Associate	\$74,000	0.0%	\$750
Albert R	Officer	\$145,000	0.5%	\$1,000
George F	Officer	\$0	95.5%	\$7,500

- (a) (1 point) Identify qualified benefit options for cafeteria plans, indicating for each whether it is pre-tax qualified or after-tax qualified.
- (b) (1 point) Identify benefit options that are explicitly excluded from cafeteria plans.
- (c) (2 points) For the purpose of determining whether a cafeteria plan is nondiscriminatory, describe the conditions necessary for passing the eligibility, contributions & benefits, and key employee concentration tests.
- (d) (4 points) Assuming the plan passes the eligibility and contributions & benefits tests:
- Demonstrate that the plan is discriminatory. Show your work.
  - Demonstrate two changes that could be made to the plan that would enable it to be non-discriminatory. Show your work.

- 17.** (7 points) You are the consulting actuary for the pension plan of Motor Engines (ME), a large US based automobile manufacturing company subject to Financial Accounting Standard Number 106 (FAS 106). Due to financial problems resulting directly from the credit crisis, you have been asked by the senior management of ME to peer review the work of the internal actuary pertaining to a large settlement affecting employee benefits.

You have been given the following about the settlement:

- The plan has an unrecognized loss of \$60,000,000 prior to the settlement.
  - The plan does not have any unrecognized transition obligation.
  - The unrecognized loss is amortized over a 20 year period.
  - As a result of the purchase of individual annuities:
    - ◊ Half of the plan's Defined Benefit Obligation is settled.
    - ◊ The plan incurs an additional \$15,000,000 loss due to the annuity purchase.
- (a) (2 points) Differentiate settlements from curtailments.
- (b) (2 points) Calculate the settlement loss recognized immediately into earnings along with the remaining unrecognized loss. Show your work.
- (c) (2 points)
- (i) List the actuarial assumptions for Life and Health post-retirement plans.
  - (ii) Describe the considerations in selecting the assumptions in part (i) above.
- (d) (1 point) Identify the problems associated with using the premium rates or claim costs for valuations.

- 18.** (4 points) Gosselin Healthcare (Gosselin) has submitted a cash dividend request to the State Department of Insurance. The request will be approved only if Gosselin's ratio of Total Adjusted Capital (TAC) to Authorized Control Level (ACL) remains above 500% after the dividend.

Health Risk Based Capital (HRBC) Risks	
$H_0$	\$20,000,000
$H_1$	\$20,000,000
$H_2$	\$100,000,000
$H_3$	\$20,000,000
$H_4$	\$20,000,000
TAC <sub>(before dividend)</sub>	\$400,000,000

- (a) (1 point) The HRBC formula has evolved over time. Briefly describe some of the significant changes made to the Academy's initial HRBC formula recommendations by the National Association of Insurance Commissioners (NAIC).
- (b) (3 points) Calculate the maximum cash dividend that would be approved. Show your work.

- 19.** (7 points) You are a valuation actuary working for Lean Reserves Health Insurance. You are given the following paid claim runout information. Assume claims are 100% complete after six months.

Cumulative Paid Claims (in thousands):

		Month of Incurral					
		Jan	Feb	Mar	Apr	May	Jun
Month of Payment	Jan	1,300					
	Feb	1,900	2,000				
	Mar	2,200	3,000	900			
	Apr	2,300	3,500	1,100	1,500		
	May	2,350	4,200	1,250	2,700	1,400	
	Jun	2,400	4,200	1,350	3,500	3,500	1,100

- (1 point) List and briefly describe various methods for calculating health claim reserves.
- (2 points) Calculate completion factors for each of the six monthly lags using the mean factor method. Show your work.
- (2 points) Calculate a reserve as of June 30<sup>th</sup> based on your work in part (b). Show your work.
- (1 point) Describe adjustments that might improve the reliability of the completion factors developed in part (b).
- (1 point) Identify reasons why the development factor approach might misrepresent emerging experience.

- 20.** (3 points) You work for an insurance company that provides group benefits in life insurance, health insurance, and long term disability. You need to allocate staffing resources among the three product lines to support fraud investigations. Describe what you would consider in allocating resources among the product lines assuming equal risk and profit potential across all three lines.

**\*\*END OF EXAMINATION\*\***  
**Afternoon Session**

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