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**SOCIETY OF ACTUARIES**  
**Group and Health – Design & Pricing**

**Exam DP-GH**

**AFTERNOON SESSION**

**Date:** Thursday, October 29, 2009

**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 11 through 21 for a total of 60 points. The points for each question are indicated at the beginning of the question.
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 DP-GH.

**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.
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.

**\*\*BEGINNING OF EXAMINATION\*\***

**Afternoon Session**

***Beginning with Question 11***

**11.** (4 points) You are responsible for launching an individual disability income product for a U.S. insurance company. Describe various options for each of the following policy form provisions and explain how they impact the insurer's risk exposure:

- (i) Renewability
- (ii) Definition of occupation
- (iii) Benefit period
- (iv) Elimination period
- (v) Integration with other plans

**12.** (4 points) You are the actuary of the individual line of business for a U.S. health insurance company. The state has adopted a Minimum Anticipated Loss Ratio (MALR) of 60% under the NAIC recommended approach.

Anticipated Results at Initial Product Launch

Year	Earned Premium	Incurred Claims
2008	\$1,000,000	\$450,000
2009	\$902,000	\$475,000
2010	\$800,000	\$525,000
2011	\$702,000	\$525,000
2012	\$595,000	\$525,000

Discount rate = 4%

You are reviewing results on June 15, 2009. Actual results in 2008 met your earned premium and member expectations, but incurred claims came in 10% higher than expected. You now expect that premiums will continue as anticipated but claims from 2009 onwards will be 10% higher than initially anticipated.

- (a) Calculate the initial Anticipated Loss Ratio (ALR) when the product first started. Show your work.
- (b) Calculate the maximum allowable rate increase effective January 1, 2010. Show your work.

- 13.** (6 points) You are the pricing actuary at Disability Insurance Co. The group long term disability (LTD) line of business has experienced significant losses over the last four years. You have been asked to review the pricing for this product.

You are given the following information for the LTD block of business written four years ago:

Duration	Claim Reserve at December 31, 2008	Claim Reserve at December 31, 2009	2009 Payments
Year 1	\$500,000	\$475,000	\$30,000
Year 2	\$275,000	\$260,000	\$10,000
Year 3	\$400,000	\$390,000	\$30,000
Year 4	\$525,000	\$500,000	\$50,000
Total	\$1,700,000	\$1,625,000	\$120,000

Interest rate: 4%

Payments are assumed to be made in the middle of the year.

- (a) (1 point) Describe group characteristics that influence LTD claims cost.
- (b) (2 points) Assess the adequacy of the reserves and identify any implications on pricing. Show your work.
- (c) (3 points) Recommend additional experience analyses that could be done and explain how each might assist you in your pricing review.

- 14.** (9 points) FUN Inc. is a large North American corporation offering a traditional benefits plan to its employees and retirees in Canada and in the U.S. The president of FUN has asked you to provide a report on the merits of offering a flexible benefits plan.
- (a) (2 points) Describe the advantages and disadvantages of introducing a flexible benefits plan in Canada and the U.S. for:
    - (i) FUN's employees
    - (ii) FUN Inc.
  - (b) (3 points) Compare flexible benefit plans in Canada and the U.S. for the following:
    - (i) Legal requirements
    - (ii) Sources of funds
    - (iii) Benefits that can be offered
  - (c) (3 points) Identify accounts that could be offered as part of a FUN flexible benefits program in Canada and the U.S. and compare the following for each account:
    - (i) Description of the account
    - (ii) Sources of funds
    - (iii) Eligible expenses
    - (iv) Tax and forfeiture rules
  - (d) (1 point) Describe considerations in offering a flexible benefits plan program to retirees in Canada and the U.S.

- 15.** (8 points) You are an actuary for AMABO Insurance Company. AMABO currently accepts or declines applications for individual health insurance based on a review of health questionnaires. The state in which AMABO operates is proposing health care reforms modeled on the Massachusetts law.

You are given the following information:

Base Rate	
\$250	Small Group
\$300	Individual

		Age/Gender Factors	Enrollment			
			Small Group	Individual	Total	
M	< 25	0.40	M < 25	120	20	140
	25-44	0.90	25-44	150	35	185
	45-64	1.50	45-64	180	60	240
F	< 25	0.30	F < 25	120	25	145
	25-44	1.00	25-44	150	34	184
	45-64	1.40	45-64	180	60	240
				900	234	1,134

- (a) (4 points) Describe the prospective cost patterns of the following classes of high cost medical conditions that could be encountered while underwriting an individual application, and recommend potential underwriting actions for each in the absence of regulatory restrictions. Justify your recommendations.
- (i) Acute
  - (ii) Chronic
  - (iii) Relapsing
  - (iv) Progressive
- (b) (3 points) Describe the Massachusetts health care reforms and their potential impacts on AMABO.
- (c) (1 point) Calculate the total required premium and describe changes needed to make the rate structure compliant under the proposed reforms. Show your work.

- 16.** (6 points) A U.S. life insurance company wishes to enter the long-term care (LTC) market.
- (a) (1 point) Describe steps in designing an underwriting program for specialty products.
  - (b) (3 points) Compare and contrast:
    - (i) Underwriting practices between individual and group products
    - (ii) Underwriting requirements for group life insurance and LTC products
  - (c) (1 point) Describe data sources available to assist with pricing LTC products.
  - (d) (1 point) Describe the differences between a tax-qualified and a non-tax-qualified LTC product.

- 17.** (7 points) You are a pharmacy consultant and one of your clients is concerned about the escalating cost of its prescription drug benefit plan. Your client's current plan design provides 80% coinsurance of allowed drug costs without restrictions.

You are given the following information for one therapeutic class of drugs that comprises a major portion of your client's drug costs this year:

Drug Identifier	Distribution	Allowed Cost per Drug
Drug A	10%	\$40
Drug B	20%	\$70
Drug C	25%	\$90
Drug D	30%	\$110
Drug E	15%	\$130

Your client's objective for the above drug therapeutic class is to reduce net prescription drug costs by 20% next year before inflation.

- (a) (1 point) Identify environmental factors that influence the price of prescription drugs.
- (b) (3 points) Describe alternative plan designs and cost management strategies that could help control drug costs including their advantages and disadvantages compared to the current plan.
- (c) (3 points) For each of the following, design a plan that meets your client's cost objectives for next year. Show your work.
- (i) Reverse co-pay
  - (ii) Single tier co-pay
  - (iii) Reference based pricing

- 18.** (4 points) Your company offers an insurance product with the following equally likely events.

Event	Frequency of Claim Given Event Occurs	Severity of Claim Given Event Occurs	
		Probability	Claim Size
1	20%	80%	\$1,500
		20%	\$1,000
2	40%	50%	\$1,500
		50%	\$1,000
3	80%	10%	\$1,500
		90%	\$1,000

You are also given the following additional information:

- 7 years of claims history for an employee named Jim:

Year	Claims
1	–
2	\$1,000
3	–
4	\$1,000
5	–
6	\$1,500
7	–

- Expected Value of the Process Variance = 305,333
  - Target Loss Ratio = 75%
  - Ignore the impact of trend
- (a) Calculate the expected gross premium for this product. Show your work.
- (b) Calculate the credibility applicable to Jim’s experience. Show your work.
- (c) Calculate the credibility weighted total gross premium for Jim. Show your work.



**19.** (4 points) The Vice-President of Finance of PAL INC. with operations in the U.S. wants to reduce her accounting obligation for post-retirement benefits. Plan details are as follows:

- Plan design is the same coverage as for active employees
- Benefits include medical, drugs, dental and life insurance for employees retiring at age 55 or older
- Retirees contribute \$100 per month

Identify and explain options that could be considered to reduce the post-retirement benefits obligation.

**20.** (4 points) Your employer, Creative Management Health Company (CMHC), has launched a tiered network that will reward a subset of more efficient providers within its network with higher reimbursement. CMHC also intends to create a new point of service (POS) plan with a tiered benefit to align consumer behavior with this network. One of its large group HMO customers is considering moving to the POS product at renewal. Pricing data and assumptions are provided below:

Description	Current HMO Benefit	New POS Level 1 In Network	New POS Level 2 In Network	New POS Level 3 Out of Network
Employee Cost Sharing	20%	10%	20%	Not yet determined
Assumed Pricing Trend	8%	8%	8%	10%
Best Practices Savings	0%	10%	0%	0%
Network Discount Factor	1.00	1.02	1.00	1.15
Expected Network Usage	100%	15%	75%	10%

2009 incurred HMO plan benefit costs: \$5,000,000

- (a) (3 points) Calculate the employee cost sharing for the Level 3 benefit needed to produce a cost neutral proposal for 2010. Show your work.
- (b) (1 point) Identify credentialing guidelines that might be used for inclusion in CMHC's physician network.

**21.** (4 points) You are a health actuary working for a U.S. insurance company. You have been asked to prepare a presentation on Medicaid.

- (a) Describe the Medicaid product with respect to the following:
  - (i) Financing arrangements
  - (ii) Federal and state Medicaid eligibility requirements
  - (iii) Required services states must provide
  - (iv) Optional services most states provide
  
- (b) Explain successes and shortfalls of Medicaid managed care plans.

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