

****BEGINNING OF EXAMINATION****
HEALTH, GROUP LIFE & MANAGED CARE
MORNING SESSION

- 1.** (4 points) You are an actuary for a reinsurance company. A business school professor at a local university has invited you to be a guest lecturer on the topic, “Reinsurance Program Management.”

Outline and describe the contents of your presentation, with respect to:

- i. information a reinsurance company should seek in order to decide whether to offer reinsurance to a customer
- ii. practices a reinsurer should follow to maintain a profitable reinsurance portfolio.

- 2.** (5 points) You have been asked by your local Chamber of Commerce to speak on the topic of patient-directed healthcare benefit programs (PDHBs).

- (a) Describe key features of the principal types of PDHBs.
- (b) Contrast variations between types of PDHBs with respect to:
 - i. extent to which consumers perceive money spent as their own when making healthcare cost and value judgments,
 - ii. consumer flexibility in directing the use of employer-provided and personal healthcare funds,
 - iii. extent of employer involvement in plan design and administration.
- (c) Identify possible changes in the U.S. tax rules that could encourage the use of PDHBs.

Questions 3 – 6 pertain to the Case Study

- 3.** (8 points) You are the pricing actuary for Wonderful Life and have been asked by the underwriter assigned to Group 6 to help her prepare for a meeting with the group's CFO. In addition to Tables MM-2b and MM-3b, you have been given the following information:

Prior Rating Period Data: Experience period July 1, 2001 through June 30, 2002

Group 6	Composite Age/Sex Factor
Option 1	1.03
Option 2	0.85

- (a) Describe macro-economic variables that may affect health care trend rates.
- (b) Describe other trend components that may cause trends to vary.
- (c) Discuss the relationship of historical trends and rating trend assumptions.
- (d) Calculate the total percentage increase in Group 6's claims cost per employee and calculate components of their claims trend for which sufficient data are available.

Questions 3 – 6 pertain to the Case Study

- 4.** (6 points) You are an underwriter for Wonderful Life preparing a proposal for Bailey Industries to replace their current dental plan with a managed dental care plan.

Bailey Industries goals are as follows:

- limit complexity
 - avoid adverse selection
 - avoid employee dissatisfaction due to provider disruption
 - maintain current employer contributions and plan design
- (a) Describe the features for each of the general types of dental benefit delivery systems.
- (b) Develop a chart ranking the plan types along the following parameters: premium, patient access, benefit richness, cost management, utilization, quality assurance, and fraud potential.
- (c) Evaluate the possible delivery systems based on Bailey Industries goals and make a recommendation as to a delivery system. Justify your response.

Questions 3 – 6 pertain to the Case Study

- 5.** (9 points) You are an underwriter with Wonderful Life preparing the renewal for Group 4.

Assume that the retrospective formula balance in Table MM-3a is as of the end of the experience period and that pricing factors as shown in Table MM-2a and MM-2b have not changed.

- (a) Calculate Group 4's projected retrospective formula balance as of December 31, 2003 using the same assumptions as would be used for rating. Show your work.
- (b) Calculate the EE only and EE and Dependents monthly renewal premiums for 2004. Show your work.
- (c) Discuss the pros and cons of various funding arrangements, both from an employer's point of view and specifically for Group 4,
 - i. prospective experience rating,
 - ii. retrospective experience rating,
 - iii. self-insurance, and
 - iv. minimum premium plans.

- 6.** (5 points) You are evaluating Wonderful Life's reserves using Non-Hospital claims paid in Tables MM-4c and MM-4d. Assume that the July 2002 completion pattern is representative of all months.

- (a) Calculate the incurred claims for incurred months July 2003 through December 2003 using age-ultimate development factors. Show your work.
- (b) Calculate the IBNR as of December 31, 2003 for incurred months July 2003 through December 2003. Show your work.
- (c) Recommend adjustments to this approach which might produce reasonable IBNR results.

7. (7 points) You are the health actuary reviewing the pricing assumptions and the first three years of experience for a given product. The following information is given:

Classical Pricing Assumptions

Product Duration:	5 Years
interest rates:	0.0%
annual lapse rate:	20.0%
target loss ratio:	60.0%
tabular claims cost	

Duration	Tabular Claims Cost	Selection Adjustment
0	10.0	.05
1	11.0	1.1
2	12.0	1.1
3	13.0	1.1
4	14.0	1.1

Experience Data

Duration	Mbrs	Actual Claims
0	1,000	6,000
1	770	10,000
2	650	11,000
3	500	-
4	350	-

Cumulative Antiselection Theory Assumptions

K1 =	-
K2 =	4
u	0.10

- (a) (1 point) Describe how CAST differs from classical (select and ultimate) theory.
- (b) (2 points) Calculate the gross premium using the classical pricing assumptions. Show your work
- (c) (4 points) Calculate the gross premium using CAST assumptions. Show your work.

8. (5 points) LMN Company employees currently utilize two different networks. Both networks use the same pharmacy benefits manager, and detailed pharmacy claims data are available. Network A has additional detailed health claims information. The per capita claims cost for Network A is twice as high as in Network B. You have been asked to determine if the higher costs are caused by differences in the enrollee health status.

- (a) Describe criteria used for health risk classification.
- (b) Describe risk assessment models currently available.
- (c) Recommend a risk assessment method for LMN Company.

9. (7 points) You are an actuary who recently accepted a non-traditional role as claims manager for a health carrier. You are concerned about the new inventory standards, as measured by turn-around time (TAT) and their impact on quality. Additionally, you are concerned about common claims problems and the lack of documented procedures and guideline for working with other departments.

- (a) Regarding TAT:
 - i. Define TAT.
 - ii. Describe considerations used when establishing TAT goals.
 - iii. Describe the tools used for tracking and monitoring TATs.
- (b) Regarding quality:
 - i. Define the measures of claim quality.
 - ii. List the steps of claim quality review process.
 - iii. Describe the major issues to consider when performing a quality audit.
- (c) Describe common claims and benefit administration problems.
- (d) List the items requiring procedures and guidelines for coordination of the claim department with the following departments:
 - i. Enrollment and billing
 - ii. Provider relations
 - iii. Utilization management
 - iv. Member services
 - v. Finance

10. (4 points) As a result of the new Medicare Prescription Drug Improvement and Modernization Act of 2003 it may be necessary for a plan sponsor to perform an actuarial valuation to determine actuarial equivalence between the sponsor's plan with the basic Medicare benefit.

Assume that costs over age 65 for the sponsor's plan are \$1,500 per year and plan costs, on the average, increase by 3% per year above 65. Assume that the demographics are as follows:

Demographics	
Age Group	Number
65 to 69	200
70 to 74	400
75 to 79	300
80 to 84	100
Total	<hr/> 1,000

- (a) Outline the assumptions needed to perform an actuarial valuation of the sponsor's plans.
- (b) Develop the sponsor's plan costs by age group.
- (c) Describe the financial impact to the plan sponsor of the three possible outcomes when determining actuarial equivalence.

****END OF EXAMINATION****
MORNING SESSION

****BEGINNING OF EXAMINATION****
HEALTH AND GROUP LIFE SEGMENT
AFTERNOON SESSION
Beginning With Question 11

11. (4 points)

- (a) Describe the types of claim liabilities and reserves. For each, provide an example of an event which would require such a liability or reserves to be established.
- (b) Describe common methods used to estimate claim reserves.

12. (6 points) Company XYZ management has decided it is time to invest resources into developing better reporting and analytical systems.

- (a) (2 points) Describe ways data compiled in the claim adjudication process can be used for reporting and analysis.
- (b) (3 points) Compare and contrast types of data structures and physical media used to store data in computer systems.
- (c) (1 point) Describe considerations when choosing a data structure and storage media.

13. (5 points) You are the CFO of a start-up insurance company. You are in the process of determining your minimum required surplus and designing a system for measuring capital, profit, and growth.

- (a) Describe the insurance risks that should be considered when setting minimum surplus requirements.
- (b) Discuss the necessary considerations when designing a system for measuring capital, profit, and growth.
- (c) Discuss and illustrate with formulas how capital, profit, and growth inter-relate.

- 14.** (5 points) Paul and Leslie, who are both in their 30's, were recently married and are meeting with an agent to discuss their financial plans.

Paul works on contract as a motivational speaker and has no employee benefits. He earns \$50,000 a year. Leslie works for a financial institution which has a flexible benefits plan including STD and LTD. Leslie earns a base salary of \$50,000 per year and earned a bonus of \$5,000 last year.

Paul is considering the following disability plan:

Type:	Individual Disability Income
Waiting Period:	30 days
Definition of Disability:	Own occupation to 65
Benefit Amount:	\$2500 per month
Benefit Term:	5 years

Leslie is currently enrolled in the following option in the flex plan:

Type:	LTD	STD
Elimination Period:	4 months	
Definition of Disability:	2 Year Own Occupation, then Any Occupation to 65	
Benefit Amount:	60% of salary	100% of salary for 2 months, 75% of salary thereafter
Funded:	100% Employee paid	
Indexing:	3% per annum on disability anniversary	

- (a) Compare and contrast the underwriting criteria used for individual and group disability policies.
- (b) Describe how these criteria would apply specifically to Paul and Leslie.
- (c) Describe how benefits would be determined and calculate Paul and Leslie's cashflow if they were both injured in a car accident and were unable to work for 5 years. Show your work.

Questions 15 – 17 pertain to the Case Study

15. (6 points) On January 1, 2003, Dengo Software added a non-discriminatory Section 79 group term life insurance plan from Wonderful Life to its employee benefit plan. Dengo pays the premium, and the benefit is equal to one times the employee’s annual salary. Employees of Dengo may purchase additional group term life insurance through salary deduction. Dengo also provides accidental death and dismemberment coverage (AD&D) equal to two times annual salary.

Wonderful Life will apply 10% credibility to its own experience as shown in table GLD-2, and develop unisex rates to the nearest penny using 50% female content.

The 1999 IRS Table I rates are as follows:

From age:	To age:	IRS Table I Rate
0	24	\$0.05
25	29	\$0.06
30	34	\$0.08
35	39	\$0.09
40	44	\$0.10
45	49	\$0.15
50	54	\$0.23

Information regarding employee coverage is shown in the table below:

Employee	Age	Sex	Annual Salary	Additional Coverage (multiple of salary)
1	32	F	34,000	0
2	37	F	96,000	3
3	47	F	77,000	1
4	37	M	78,000	0
5	42	M	72,000	0

Note: Employee 5 is permanently disabled and terminated employment on 12/31/02.

- (a) (4 points) Calculate the 2003 monthly imputed income for each employee for life insurance and AD&D. Show your work.
- (b) (2 points) Discuss the impact on the employee and employer of the 1999 change in Table I rates.

Questions 15 – 17 pertain to the Case Study

- 16.** (4 points) You are the reserving actuary for Wonderful Life. One of your actuarial students has observed that the reserve for one claimant has a different reserve/benefit ratio compared to the other claimants. In addition to Table GLD-8b you have been given the following information about the claimant:

Date of Birth	03/01/44
Gender	Male
COLA	0%
Date of Disability	03/01/03
Valuation Interest Rate	5%
Elimination Period	3 months
Benefit Period	to age 65
Benefit Percentage	66.67% of salary
Social Security Benefit	\$1,300 monthly (Frozen)
Salary	\$72,000 annually

Assume all benefits are paid at the end of the time period for which there are termination rates.

- (a) (3 points) Calculate the disabled life reserve as of 12/31/04 for this claimant. Show your work.
- (b) (1 point) Discuss factors which would make the reserve/benefit ratio for this claimant different.

Questions 15 – 17 pertain to the Case Study

17. (4 points) You are the pricing actuary for Wonderful Life's LTC product.

- (a) Describe factors used to price a LTC product.
- (b) List data sources available to assist with reviewing the current pricing.
- (c) Compare the LTC product line to Wonderful Life's other products with respect to the following:
 - i. Sales force
 - ii. Rating practices
 - iii. Underwriting practices
 - iv. Reserving practices

18. (4 points) You are the pricing actuary for an insurer that sells a substantial amount of Medicare Supplement business. Highlights of the recent Medicare legislation are as follows:

- Medicare will begin offering a voluntary prescription drug benefit (Part D).
 - New Medicare Supplement policies with prescription drug coverage may no longer be sold.
 - Existing policies with prescription drug coverage for persons that enroll in Part D must:
 - (a) Renew the policy with a lower premium that excludes prescription drugs; or
 - (b) Enroll in a different policy (guaranteed issue).
 - Existing policies with prescription drug coverage may be renewed if the person does not enroll in Part D.
- New standardized plans “K” and “L” will be created and include higher cost-sharing than existing products.
- The Part B deductible is increasing to \$110.

As a result of the legislation, you expect increased competition from HMO’s.

- (a) (3 points) Discuss the pricing considerations for your company’s Medicare Supplement policies and how your assumptions are impacted by the new legislation.
- (c) (1 point) List the data sources that might be used to assess the pricing changes.

- 19.** (8 points) You are the new consulting actuary for Slide Rule Inc., a company with a flexible benefits plan. Prior to adopting a flexible benefits plan in 2003, Slide Rule Inc. provided all employees dental coverage with Option 2 benefits. The flex plan was originally priced with the help of an Elbonian consultant, who was not an actuary. Actual claims have been higher than expected, partly due to adverse selection.

At the kick-off meeting with the Slide Rule Inc. management team, you learned the following about the team members' pricing objectives:

- Benefits Administrator wants realistic prices, equal credits, and no losers.
- CFO wants realistic prices, no losers, and no company cost increase over 2003 actual.
- Vice President of Human Resources wants equal credits, no losers, and no company cost increase over 2003 actual.

You have also been given the following dental plan design and pricing information:

Option	Design Relative Value	2003 Expected Incurred Claims	2003 and 2004 Price Tags	2003 and 2004 Flex Credits	Actual Enrollment	2003 Actual Incurred Claims
1	50%	S: \$250 F: \$750	S: \$150 F: \$150	\$300	S: 50 F: 100	\$35,000
2	80%	S: \$400 F: \$1,200	S: \$250 F: \$250	\$300	S: 50 F: 50	\$80,000
3	100%	S: \$500 F: \$1,500	S: \$300 F: \$300	\$300	S: 100 F: 150	\$550,000

Dental inflation is expected to be 5% per year, and the expected and actual claim figures include expenses and taxes. Plan design and enrollment are not expected to change.

- (a) (1 point) Compare the current pricing design against the various pricing objectives.
- (b) (1 point) Determine the 2003 expected and actual employer cost. Show your work.
- (c) (4 points) Determine three different pricing approaches for 2005 that might address the objectives of each of the three team members. In your analysis, include 2005 price tags and credits and indicate the advantages and disadvantages of each approach.
- (d) (2 points) Describe the design and pricing mechanisms that could be added to a flex plan to minimize adverse selection.

- 20.** (5 points) Company XYZ has 500 full-time employees, and 100 part-time employees. XYZ has adopted the following severance policy for its employees as of 1/1/2004:

Years of Service	Severance benefit (multiple of base monthly salary)	Distribution by full-time Employee count
< 2 years	0	25%
2 but < 6 years	1	40%
6 but < 10	3	25%
10 or more	6	10%

Severance is paid regardless of cause of employee termination. Benefits paid in 2004 were \$375,000.

The benefit obligation as of 12/31/04 is based on:

Long-term discount rate	5%
Benefit Obligation	\$4,000,000
2004 Benefits Earned	\$500,000
Average remaining years of service	8 years

- Discuss when FAS 112 does and does not apply and the accrual rules for FAS 112 accounting.
- Determine whether FAS 112 applies to XYZ and justify your response.
- Compare the income and balance sheet items if Company XYZ is to (i) recognize the full liability, or (ii) defer recognition of the liability. Show your work.

- 21.** (6 points) You are the actuary for Company XYZ, a Canadian company implementing a Health Care Expense Account (HCEA). XYZ currently has a modular flexible benefits plan, with the following employee cost sharing:

Plan Description	Module 1	Module 2
Annual Deductible	\$100 single \$200 family	\$0
Medical (including Drugs, Vision Care)	30%	10%
Dental – Basic	20%	0%
– Major and Ortho	100%	50%
Price Tag – Single	\$300	\$600
– Family	\$700	\$1,600

Each employee receives \$1500 in credits. Excess credits can be taken as cash or allocated to the HCEA.

In preparation for the upcoming enrollment, John Doe has estimated his eligible claims for next year as follows:

- Drugs: \$300 for the spouse
- Physiotherapy: \$150 for the employee
- Vision care: Eyeglasses of \$300 for the spouse
- Dental exam: \$90 for each of the employee and the spouse
- Dental bridgework: \$900 for the spouse

John Doe's marginal tax rate is 30%.

- (a) (2 points) Describe the advantages and disadvantages to Company XYZ of offering an HCEA to its employees.
- (b) (1 point) Outline the legal requirements for setting up an HCEA.
- (c) (3 points) Recommend the best choice for John Doe assuming he retains family coverage. Show your work.

- 22.** (3 points) You are the product development manager in charge of a direct marketing initiative for a new special accident product. The basic product benefits will include proceeds payable upon death or hospital confinement, as well as coverage for emergency medical treatment. You have test marketed eight variations of the product with the following response rates:

<u>Test Product</u>	<u>Benefit Level (High/Low)</u>	<u>Market at Worksite (Yes/No)</u>	<u>Include Waiver of Premium (Yes/No)</u>	<u>Response Rate</u>
1	High	Yes	Yes	1.2%
2	High	Yes	No	1.0%
3	High	No	Yes	0.9%
4	High	No	No	0.9%
5	Low	Yes	Yes	1.2%
6	Low	Yes	No	1.1%
7	Low	No	Yes	0.9%
8	Low	No	No	0.7%

You are also provided the following additional information for Test Product 2:

Annual Gross Premium per policy = \$30

Solicitation cost per policy = \$0.30

Annuity Factor = 2.5

Target loss ratio = 50% of premium

Expenses = 15% of premium

- Calculate the impact worksite marketing has on the overall response rate. Show your work.
- Calculate the required response rate to meet a target profit of 15% of premium for Test Product 2. Show your work.
- Outline your response to concerns that the special accident policy is not suited to a direct marketing approach.

****END OF EXAMINATION****
AFTERNOON SESSION