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

1. *(4 points)* Your CEO is departing for a meeting to discuss the marketing strategy for a new managed care product. He has asked you to brief him on the following topics:

(a) With regard to distribution models
   (i) Describe traditional and alternative distribution models.
   (ii) Describe considerations relative to the major constituent groups that influence the distribution process.

(b) Describe market segments commonly used for managed care products.

Questions 2 – 8 pertain to the Case Study

2. *(9 points)* You have been asked to analyze the claim experience for Wonderful Life in Tables MM-6a and MM-6b of the case study.

(a) Describe the impact on trend of company-specific care management initiatives.

(b) Calculate the year-over-year quarterly rolling trend for 3Q02 and 4Q02.

(c) Recommend baseline trends for Hospital, Non-Hospital and Total Medical Costs. Assume the last half of 2002 is predictive of future trends. Justify your answer.

(d) Based on the following assumptions:
- On January 1, 2003, 50% of the hospitals will accept 10% discount off the 2003 Hospital contracted rate.
- These hospitals deliver 1/3 of your facility care.
- The remaining hospital contract costs will increase as expected.
- Utilization does not change.

Calculate a revised estimate of Hospital and Total Medical Trend. Show your work.

(e) Marketing has just sold a large group with 5,000 employees (12,000 members). All of the group members will only use hospitals that accept the 10% discount.

Calculate a revised estimate of Total Medical Trend. Show your work.

Questions 2 – 8 pertain to the Case Study

3. *(13 points)* You are a consultant for Bailey Industries. Bailey has been struggling to balance increased medical costs against employee demand for more choice in coverage. Bailey is considering the adoption of a new medical plan with patient-directed benefits. In addition to Table B-1, you are given the following claims probability distribution and proposed benefit options:

Claims Range	Percentage of Employees with claims cost in range	Average claims cost per employee in range
$0	15%	0
$1 - $1,000	40%	$400
$1,000 - $2,000	15%	$1,500
$2,000 - $5,000	15%	$3,500
$5,000+	15%	$25,000

	Option A	Option B
Deductible	$1,000	$2,000
Coinsurance	10%	20%
Annual Employee Premium	$0	$0
Employer funds placed in Employees PHA	$500	$1,250

(a) *(1 point)* Describe problematic aspects of the current employer-sponsored system for employers and employees.

(b) *(3 points)* Describe key implementation considerations for an employer adopting a PDHB approach and how they would apply to Bailey Industries.

(c) *(3 points)* Describe models used to predict selection costs for the medical options. Identify and explain why certain models are not appropriate for evaluating costs for Bailey Industries.

(d) *(6 points)* Assume a group of all single employees who, absent choice, would be equally distributed between the two options. Assume PHA (Personal Health Account) funds are expenses to Bailey Industries.

(i) Construct a choice model for Options A&B and calculate maximum adverse selection cost.

(ii) Explain why adverse selection will be less than the amount calculated by a choice model.

(iii) Describe methods to manage adverse selection in PDHB models.

4. *(5 points)* You are the chief actuary for Wonderful Life. You must determine whether Wonderful Life needs to hold any premium deficiency reserves (PDR).

(a) *(1 point)* Outline assumptions to be considered when calculating a PDR.

(b) *(1 point)* Recommend the groupings Wonderful Life should use to assess the need for a PDR. Support your recommendation.

(c) *(3 points)* In addition to Tables MM-1, MM-7, and MM-2a you are given the following information:

- The overall 2003 rate increase is limited to 12% due to small employer rating requirements.
- This rate increase limit only applies to 2003.
- Member termination from 2002 to 2003 will be at the same rate as has been experienced in the past.
- Expenses are calculated assuming an average of 1.75 members per employee.
- Ignore interest and income taxes.

Determine if a PDR should be held as of 12/31/2002 for the closed block of business in Wonderful Life's Small Group Department.

Questions 2 – 8 pertain to the Case Study

5. *(7 points)* Your manager at Wonderful Life Insurance Company has asked you to calculate renewal rates for Group 6 for a March 1, 2003, renewal date using a combination of multi-year loss ratio and catastrophic pooling methods.

In addition to information from Tables MM-2a and MM-2b:

- Assume case characteristics for Option 1 and Option 2 are the same for both years as shown in Table MM-3b.
- The gross premium for Group 6 for July 1, 2000 to June 30, 2001 was $5,800,000.
- Weights for averaging are 75% for current rating period and 25% for prior rating period.

Calculate the annual gross premium for an employee with dependents selecting Option 1. Show your work.

6. *(3 points)* You have been asked to develop materials for a meeting to discuss Wonderful Life's 5-year plan.

(a) Describe possible strategies a group insurance company could use to gain a competitive advantage.

(b) Describe how Wonderful Life Insurance Company has demonstrated these strategies in their four primary business divisions. Give an example of such a strategy for each division.

Questions 2 – 8 pertain to the Case Study

7. *(8 points)* In addition to the information provided in Tables C-1, C-2, MM-1, MM-4a to MM-6b, you have been given the following:

- Investment income and taxes are based on 2002 corporate levels
- Corporate after-tax Return on Equity (ROE) objective for 2003 = 15%
- Cost of Capital = 10%
- Risk-based surplus for Major Medical division is 18% of premium.
- Recast of Major Medical Division's IBNR as of 12/31/99 is $50,000 more than originally booked.

Total of MM-6a & 6b

Year	Incurred and Paid ($1,000s)	Incurred Estimate ($1,000s)	IBNR Estimate ($1,000s)
2000	$1,004,700	$1,004,700	$0
2001	$1,125,200	$1,126,224	$1,024
2002	$1,121,300	$1,378,977	$257,677

(a) *(1 point)* Describe the importance of using recast data in financial management.

(b) *(3 points)* Convert the corporate ROE objective into the equivalent:

(ii) corporate underwriting gain objective

(iii) corporate loss ratio objective

(c) *(4 points)* Using recast claims data, calculate the Economic Value Added as a percentage of capital invested for the Major Medical Division for 2000, 2001 and 2002. Show your work.

Questions 2 – 8 pertain to the Case Study

8. *(6 points)* You are evaluating Wonderful Life's reserves and believe the claim lag pattern may have recently changed.

(a) Calculate the age-to-age development factors based on 9/2001 to 12/2002 emerging experience using claims paid in the most recent two months on Table MM-4b.

(b) Estimate incurred claims for December 2002 assuming all claims are complete after 15 months.

(c) Describe considerations involved in using age-to-age development factors to estimate incurred claims.

9. *(5 points)* You are the pricing actuary for the division of LTDC Life Insurance selling group long term disability and group long term care products. Given the recent fluctuations in the experience, you are considering implementing a reinsurance agreement but must convince your Vice-President that it is needed.

(a) Explain the different approaches LTDC Life can use to reinsure its Group LTD and LTC products.

(b) Explain risk characteristics of each product line that make the use of reinsurance attractive.

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

****BEGINNING OF EXAMINATION****
HEALTH AND GROUP LIFE SEGMENT
AFTERNOON SESSION
Beginning With Question 10

10. *(3 points)* You have been asked to summarize the report of the SOA Medical Effectiveness Task Force.

(a) Explain the importance of measuring medical effectiveness.

(b) Explain the main health plan performance evaluation categories.

11. *(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	25%	75% 25%	1,000 500
2	50%	50% 50%	1,000 500
3	75%	10% 90%	1,000 500

You are also given the following additional information:

- 7 years of claims history for one individual

Year	Claims
1	-
2	500
3	-
4	-
5	1,000
6	1,000
7	-

- Expected Value of the Process Variance = 133,581
- Target Loss Ratio = 80%
- Ignore the impact of trend

(a) Calculate the expected gross premium for this product. Show your work.

(b) Calculate the credibility. Show your work.

(c) Calculate the credibility weighted total premium for this individual. Show your work.

12. *(4 points)* ABC Company is considering acquiring ITSA, a managed care organization that services a number of major cities. You are the head of the claims department in the Major Medical division and you've been asked to evaluate claims operations at ITSA, including systems used to process the claims.

(a) Describe measures of claims quality.

(b) Outline basic steps you would expect to find in the ITSA claims adjudication process.

(c) Describe specific internal data sources you should include as part of your claims review.

(d) Describe issues that should be considered in performing an audit.

13. *(4 points)* You have been asked by your client at BEST HMO to create a presentation that will enable her to convince management to establish new methods for physician compensation.

(a) Describe traditional and new, alternative forms of capitation and their suitability for specific types of physicians.

(b) Describe traditional and new, alternative forms of incentive plans.

14. *(5 points)* You are a consultant hired by TeethFerry.com, a company hoping to use the Internet to market dental plans. They have created a marketing communication to be sent to companies that do not currently have a benefits program.

From: TeethFerry.com
Subject: Quality Dental Coverage with 3 Months at No Charge

Affordable Dental Coverage

- save up to 60% on all your dental needs
- choose from 15 of the finest nationwide and regional plans
- pay premiums, submit claims, get the latest information, all on your desktop!

(a) List the general types of delivery systems for dental plans and their major features.

(b) Outline plan provisions and claim practices that dental insurers can use to limit cost and anti-selection.

(c) Describe challenges that e-commerce companies must overcome to be successful.

15. *(4 points)* You are the health actuary for XYZ Life Insurance Company. XYZ has been marketing Individual Long Term Care insurance (ILTCI) for several years, but the product has not performed well.

A large national employer has approached XYZ, expressing a desire to offer its employees a Group Long Term Care insurance (GLTCI) product which XYZ does not currently offer.

XYZ's executive management has expressed concern about developing a GLTCI product given the company's poor experience with their ILTCI product. You have been asked to:

(a) Explain difficulties experienced by the industry in pricing and reserving early versions of long term care products.

(b) Describe differences in plan design and pricing considerations between GLTCI and ILTCI.

Question 16 pertains to the Case Study

16. *(5 points)* You are the Chief Actuary of Wonderful Life, which offers Individual Disability Insurance (IDI) on a Noncancellable and Guaranteed Renewable basis. Wonderful Life has not dramatically changed the IDI product since the 80's. Your President is concerned about the volatility of the product and recent IDI experience in particular. He has asked you to provide recommendations to improve the performance of the IDI block.

In addition to the information provided in Tables GLD-3b, GLD-6b, and GLD-8b, the following assumptions are provided:

- Benefit period is 3 years
- All qualified benefits are paid at end of year
- The interest rate is 5.0%, and it is the same rate used in developing original manual rates
- Annualized termination rates can be used
- The IDI block experience is fully credible
- All policies were rated based on manual rates developed from the above table assumptions.

(a) Outline general actions which might be taken to improve profit and/or reduce volatility, in light of historical changes in the IDI industry.

(b) Recent performance indicators show actual-to-expected incidence rate is 120% across all age bands, and actual-to-expected termination is 110% in annualized claim termination rates. Calculate the manual rate for a male age 42 becoming disabled at age 42. Show your work.

17. *(8 points)* You are the consulting actuary for Company XYZ, which implemented a flexible benefits plan two years ago. Expenses and taxes are 15% of claim costs and are paid by Company XYZ.

You are provided the following data for the most recent plan year:

Option	Dependent Status	Participation	Price	Average Claims Cost	Credits
A	No Dependents	175	$290	$175	$400
A	With Dependents	75	$575	$350	$700
B	No Dependents	150	$465	$420	$400
B	With Dependents	200	$1,045	$945	$700
Total		600			

(a) Calculate the employer and employee cost for each combination of option and dependent status, and in total for the medical benefits. Show your work.

(b) Company XYZ is considering a change to its credit structure for the upcoming year so that all employees receive the same credit amount. Assume a trend rate of 10% for claim costs, employee costs, and employee prices. Calculate the resulting credits for next year for the family credit and the average credit approaches. Show your work.

(c) Determine winners and losers under each option and dependent status for the family credit and average credit approaches. Show your work.

(d) Outline considerations you would present to Company XYZ to help them make a decision regarding which credit structure to implement.

18. *(6 points)* You are the product development actuary for Yancanuck Insurance, a multinational insurer operating in the US and Canada. You have been asked to write a report on LTC in the US and Canada. The report should address the topics of underwriting, plan design, taxes, benefit triggers, and market receptivity.

Compare and contrast Group and Individual products in the two countries addressing the above topics.

19. *(6 points)* ABC Life Company sells a supplemental cancer product through mass mailings targeted at professional association groups. The majority of the products pay a fixed daily amount, subject to an annual limit.

You have been asked to revamp the product offerings to meet management profit targets of 10%. Profits are defined as return on total capital requirements including the use and release of free statutory surplus. The previous generations of cancer products were priced at an 8% profit target.

Actual financial results and pricing parameters, presented below, have produced different profit patterns compared to the test launch.

You are concerned about performance against several assumptions:

(i) morbidity and persistency
(ii) fixed versus variable expenses
(iii) overall profitability

Evaluate performance with regard to these assumptions and identify factors which may have contributed to these financial results.

Results of Direct Marketing Launch

	Test	Actual
Profit Target	10%	10%
PV gross premiums	$115,494	$711,552
PV incurred claims	$68,948	$430,517
PV ongoing admin expenses	$24,122	$197,731
PV commissions	$3,416	$37,517
Initial marketing expenses	$7,458	$86,569
PV profit stream of free earnings released	$4,173	($74,147)

(see next page)

19. Continued

Pricing Parameters

	Test	Actual
Total mailings	4,000	50,000
Cost per mailing	$0.75	$1.00
Response rate (from mailings)	2.25%	1.75%
Not-taken rate (from those who responded)	10.00%	15.00%
Administration expenses		
% premium	6.0%	7.5%
per policy per quarter	$13.00	$16.50
Overhead as % premium	0.0%	0.0%

Risk discount rates tested: 10% per year

	Test	Actual
Average Quarterly Premium	$85.20	$79.00
Average age (years)	39.6	36.8
Commissions, % of premium		
First year	35%	45%
Renewal	5%	7%
Lapse rates by policy year		
1	0.35	0.45
2	0.20	0.25
3	0.10	0.20
4	0.08	0.10
5+	0.03	0.05

20. *(5 points)* You are an underwriter for a stop loss carrier. You have received a request for a quote for a 12/15 plan with a $50,000 specific deductible, 125% aggregate attachment point and 95% minimum attachment point.

You have been provided the following data:

	2001	2002
Expected Losses PEPM	$380.00	$400.00
Expected Certificate Months	6,000	6,000
Actual Certificate Months	5,900	5,600
Total Losses	$2,800,000	$3,500,000

Total Covered Losses Exceeding Specific Stop Loss

	Incurred Dates	2001	2002
a) Person 1	1/1/2001-1/20/2001	$60,000	$0
b) Person 2	9/1/2001-10/15/2001	$80,000	$0
c) Person 3	12/1/2002-open	$0	$100,000
d) Person 4	12/1/2001-12/31/2001; 1/1/2002-2/15/2002	$150,000	$500,000

(a) Calculate stop loss claims for 2001 and 2002 for the requested plan. Show your work.

(b) Calculate stop loss claims for 2001 and 2002 using a $100,000 aggregating specific stop loss deductible and no aggregate stop loss. Show your work.

(c) Explain the rationale for use of aggregating specific stop loss deductibles.

(d) Evaluate the impact of each of the large claims above in developing a quote for 2003.

21. *(6 points)* You are a consultant representing RGS Industries, a large employer that is implementing a Group Long-Term Disability (GLTD) benefit for its employees. RGS Industries currently self-insures its medical benefits. The firm's management is considering the possibility of self-insuring the GLTD benefit.

(a) *(2 points)* Explain benefit provisions used to control costs in a GLTD plan.

(b) *(1 point)* List pros and cons of self-insuring the plan.

(c) *(2 points)* Describe the types of reinsurance that are available for a GLTD plan and considerations in using reinsurance for a self-funded plan.

(d) *(1 point)* Review FAS 112 implications when implementing a GLTD plan.

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