November 2001- Course 8G
Society of Actuaries

****BEGINNING OF EXAMINATION****
MORNING SESSION

Questions 1 – 6 pertain to the Case Study

1. *(6 points)* You have been provided the claims department statistics for Wonderful Life as shown in Tables MM – 5a and MM – 5b.

(a) Explain why keeping claims inventory records is important for Wonderful Life.

(b) Assess the strengths and weaknesses of Wonderful Life's claim status reports.

(c) Describe potential e-commerce functions and technologies that Wonderful Life might implement to increase claims processing efficiency.

(d) Describe critical factors for the successful implementation of an e-commerce strategy.

Questions 1 – 6 pertain to the Case Study

2. *(8 points)* You were recently hired as the financial actuary for Wonderful Life. Your first project with the company involves a 3-year financial forecast.

In addition to information in the case study, you are given the following:

Annual Claims Trend = 15.4%

Monthly Claims Trend = 1.2%

July Seasonal Factor = .90

Seasonal Normalization Factor = 1.000

Projected Premium for January 2001 =	$165,000,000
Projected Members for January 2001 =	980,000

Assumed Loss Ratio = .78

(a) Discuss phases of a sound financial management process.

(b) Describe methods commonly used to project claims costs and the conditions under which each method may be appropriate.

(c) Calculate the Per Member Per Month (PMPM) claims cost for January 2001 under each of the four commonly used methods.

(d) Recommend one of the four methods for Wonderful Life to develop their financial forecasts. Justify your recommendation.

Questions 1 – 6 pertain to the Case Study

3. *(13 points)* You are a group underwriter for Wonderful Life in the Major Medical Division. You have obtained the following data for Groups 2 and 3 in addition to the information already included in Table MM – 2 and MM – 3:

Additional Data for Experience Period July 1, 1999 through June 30, 2000

	Annual Exposure Total EEs	Total Claims
Group 2	120	$216,000
Group 3	225	$518,000

Total claims have not been reduced for large claims greater than $50,000.

(a) Describe various methods of pooling claims experience data that could be used in developing experience rates.

(b) Discuss considerations involved in determining the credibility of a group's experience in the rate setting process.

(c) Calculate the composite renewal premium rate per employee for each of Group 2 and Group 3 using only the data in the case study. Show your work.

(d) Recalculate the composite renewal premium rate for each of Group 2 and Group 3 using a multi-year approach. Use the additional claims data provided above and assume an equal weighting for each year of data. Show your work.

(e) Describe other considerations applicable when underwriting a particular employer group that could affect the accuracy of your rate calculations.

Questions 1 – 6 pertain to the Case Study

4. *(7 points)* You are the Valuation Actuary for the Major Medical Division of Wonderful Life.

(a) Describe common methods you might apply to estimate medical claim reserves.

(b) Calculate the outstanding liability as of December 31, 2000, for hospital claims incurred from October 2000 through December 2000. Assume the claims payment pattern for hospital claims incurred in January 1998 is representative of future payment patterns. Show your work.

(c) Calculate the portion of the above outstanding liability expected to be paid by March 31, 2001. Use the same assumptions as in (b) above. Show your work.

5. *(6 points)* For the past few years, Wonderful Life has seen its claim expenses grow at a faster rate than its premium revenue, leading to a decreasing operating margin. In this competitive environment, measuring claim cost trends and forecasting future trends in the health insurance industry is crucial to accurate pricing.

You have been asked by the President of Wonderful Life to provide additional information on medical expense trend to help him understand the situation.

(a) Define trend, its use, and its components.

(b) Discuss various techniques which can be used to analyze trend and common problems encountered in trend analysis.

(c) Calculate the component of total trend attributable to deductible leveraging given that total projected 2001 medical trend is 12%. Assume that the mix of business by plan in Table MM – 3 and base manual claim rate in Table MM – 2a are representative of all of Wonderful Life's major medical business and are not expected to change. Show your work.

Questions 1 – 6 pertain to the Case Study

6. *(5 points)* The Chief Operations Officer at Wonderful Life has returned from a seminar where she attended a session on C-2, Insurance Risk. She is concerned about the impact risk-based capital can have on growth. As the Chief Actuary at Wonderful Life you have been asked to discuss these issues with the COO.

(a) Discuss characteristics used to determine the level of required surplus for insurance risk

(i) for insurance companies in general, and

(ii) specifically for the four primary business divisions of Wonderful Life

(b) Discuss the relationships among growth, profit, and required surplus for C-2 Insurance Risk.

7. *(4 points)* As a consulting actuary, you have been hired by a managed care organization to measure its medical effectiveness.

(a) Describe the challenges of using data to produce management information and how they relate to Actuarial Standards of Practice.

(b) Describe your considerations for evaluating health plan performance measurement criteria with regard to:

(i) data sources; and

(ii) measurement process.

8. *(7 points)* ABC Life insurance company plans to enter the long term care market. You have been asked to develop pricing for a new long term care product.

(a) Identify general sources of data available to actuaries when pricing any new product line and explain the cautions which should be taken in using them.

(b) Describe assumptions necessary to price the long term care product, and how the Actuarial Standards of Practice will influence your development of those assumptions.

(c) When developing financial reporting related to the long term care product,

(i) Describe the various financial statement liabilities you need to consider; and

(ii) Describe the methods that maybe used to estimate each.

9. *(4 points)* You have been asked to draft a report which details the various ways that profit and growth may be measured at your company.

(a) Discuss methods of measuring growth.

(b) Discuss methods of measuring profit.

(c) Calculate the pre-tax underwriting gain required to achieve an 18% Return on Equity given the following assumptions:

- capital + surplus = 20% of premiums
- reserves + capital + surplus = 30% of premium
- investments earn 5% after tax
- your company is in the 37% tax bracket

Show your work.

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

****BEGINNING OF EXAMINATION****
AFTERNOON SESSION
Beginning With Question 10

10. *(3 points)* You have been asked to review claims operations at a health insurance carrier.

(a) Describe basic information requirements necessary for the proper handling of health claims.

(b) Describe the health claim adjudication process.

11. *(6 points)* You are the consulting actuary for Smith Corporation. Due to increasing claims costs, your client wants to review the current noncontributory dental program offered to its employees which includes:

Benefits	
Deductible	$25 individual /$50 family
Coinsurance	
• preventive	100%
• basic	100%
• major	80%
• orthodontics	60%

The Corporation is thinking of incorporating dental coverage into a flexible benefits program currently under development.

(a) Outline design changes for the current free-standing dental plan that can be used to reduce costs and explain how the changes would apply to the current plan.

(b) Describe cost and anti-selection issues in the design of a flexible benefits program, including design features that could be used to alleviate these issues if dental is included in the flexible benefit program.

12. *(6 points)* You are an actuary for a large reinsurer. You have been asked to provide Company ABC with a reinsurance quote. Company ABC is a medium size disability company which has recently developed a new LTC product and recently acquired a group major medical block of business. In recent years, Company ABC has been unable to achieve its corporate profit objectives.

(a) Identify the reinsurer's underwriting considerations in evaluating whether to offer a reinsurance program to Company ABC.

(b) Describe the sources of risk inherent in each of Company ABC's product lines.

(c) Design a reinsurance program for Company ABC that will address the sources of risk for each of Company ABC's product lines. Justify each recommendation.

13. *(5 points)* You are the group benefit consultant for a U.S. company that offers different managed care plans to its employees. Over the last few years, the employer has noticed that costs have increased rapidly and that employee dissatisfaction is growing. You have to prepare a report to explain a substantial increase in premium rates.

(a) Describe the major drivers of consumerism in the health care industry.

(b) Describe other current managed care trends and indicate which of these might contribute to the cost increase.

(c) Describe approaches the employer could use to mitigate this rate increase.

Question 14 pertains to the Case Study

14. *(13 points)* You are a pricing actuary in the GLTD division of Wonderful Life. As a result of Wonderful Life's recent marketing campaign, an employer, KGS Industries, has requested a quote on both group LTD and group life coverage. KGS is interested in coverage for employees in both its local home office and its large manufacturing subsidiary in the country of Koganistan.

Group Long Term Disability

- Non-contributory plan;
- Benefits equal to 60% of salary;
- Six month elimination period;
- Five year benefit period;
- No benefit offsets.

Group Life

- Two-times-salary benefit;
- Noncontributory plan.

Information on KGS's home office employees is shown below:

Number of Employees	Employee Age	Annual Salary per Employee
100	32	\$30,000
200	42	\$40,000
100	52	\$50,000

The Koganistan subsidiary has 15,000 employees with an average age of 35. Koganistan has no insurance regulations. Inflation has been approximately 25% per year and the unemployment rate is currently 15%.

14. Continued

Using information from the case study,

(a) *(7 points)* Assuming all KGS's home office employees are male and that KGS's industry and all other applicable rating factors equal 1.00;

(i) Calculate the annual GLTD base premium using Wonderful Life's GLTD rating manual. Assume 0% interest and assume you can use annualized termination rates.

(ii) Recalculate the annual GLTD base premium under the assumption that each employee receives $500 of other monthly disability income which is directly offset from the Group LTD benefit.

(iii) Calculate KGS's aggregate group life premium using Wonderful Life's manual rate structure. Assume 2001 expense levels remain at the year 2000 levels.

(b) *(3 points)* With regard to KGS's requested rate quote for its employees in Koganistan:

(i) Assess whether the benefit plans requested are appropriate for the Koganistan employees;

(ii) Outline changes to plan design and plan provisions that can be implemented to limit Wonderful Life's risk exposure in Koganistan; and

(iii) Describe possible sources of mortality and morbidity information you might consider using in pricing this case.

(c) *(3 points)* You have been asked to calculate statistics to help market the Group LTD product to KGS's home office employees.

(i) Compute the probability that a 27-year-old male will be disabled for more than 6 months at some point prior to age 65. Assume that the rates at central quinquennial ages apply throughout the quinquennial age bracket (i.e., the rate for age 27 applies to all ages 25-29, etc.); and

(ii) Calculate the duration from date of disability at which half of newly disabled 27-year-old males will have recovered. Assume a six-month elimination period.

15. *(6 points)* You are the group actuary for MNO Life. MNO management wants to increase production of the Group LTC business to achieve higher expected profit margins compared to MNO's other product lines (group LTD and group medical). MNO plans to offer institutional care benefits as part of their GLTC product line.

(a) Outline pricing considerations for developing morbidity assumptions and underwriting methods in order to minimize anti-selection for the GLTC product line.

(b) Identify the sources and limitations of data available from which to estimate claim costs for institutional care benefits.

(c) Identify any concerns or needed modifications when using the 1985 NNHS, as interpreted by the SOA's LTC Experience Committee, as a reserving basis for institutional care benefits.

16. *(6 points)* You are the product development manager in charge of direct marketing initiatives focused on association groups. You have developed the following assumptions for an upcoming direct marketing campaign:

- Product Package – Life, AD & D, and LTD with Declaration of Health Underwriting
- Annual Gross Premium per package = $50
- Solicitation cost per 1000 solicitations = $200
- Maximum Policy duration = 5 years
- Annuity Factor (interest and lapse) = 2.70
- Target Loss Ratio = 30% of premium
- Expenses = 20% of premium

(a) Calculate the required response rate to meet a target profit of 10% of premium. Show your work.

(b) Determine the maximum solicitation cost as a ratio to first year premium to generate a 10% profit margin. Assume no lapses occur in the first year. Show your work.

(c) The profit center manager is not satisfied with the projected response rates and persistency. Outline possible action steps to improve response rates and persistency.

17. *(4 points)* You have just been hired as the group disability pricing actuary for Acquisition Life Insurance Company (ALIC). A year ago, ALIC purchased actively sold blocks of long-term disability and short-term disability products. ALIC continued to sell both the LTD and the STD products without modification to the original plans. Experience over the past year has not been favorable.

Plan Descriptions:

Long-Term Disability

- 70% of salary with no maximum
- 30 Day elimination period
- to age 65 benefits
- Cost-of-living adjustments

Short-Term Disability

- 100% of weekly salary with no maximum
- 0/7 Day elimination period plan
- 52 week benefit period

Recommend design changes to the current plans for each product that would improve experience.

18. *(4 points)* You are the underwriter for the medical stop loss line of business and have been supplied the following information in order to prepare a quote for the DEF Corporation:

Proposed Effective Date	January 1, 2002
Lines of coverage	Medical and Dental
Specific stop loss deductible per person	$25,000
Aggregate deductible	120% of Expected Claims
Paid claims from July 2000 – June 2001	$1,250,000
Average Employee Count from July 2000 – June 2001	300
Average Age of Employees	42

(a) Identify additional information you would need in order to provide a specific and aggregate stop loss quote.

(b) Explain steps required to develop the annual aggregate deductible.

19. *(7 points)* You are the consulting actuary for RST Enterprises, which currently provides medical and dental coverage to its employees. Employees currently pay 20% of the premium for these benefits with after tax dollars. Each RST employee is provided $500 per year which may be allocated to a health care expense account or taken in cash. Unused account balances are forfeited at the end of the year.

Significantly rising costs and a slowing economy have led RST to question the current benefits program. RST is also concerned about employee complaints regarding the loss of unused account balances for the health care expense account benefit.

(a) Identify the range of flexible benefits program structures, and the degree to which each structure may help to contain benefit costs for RST.

(b) Explain the different roll-over approaches that may be used for health care expense accounts.

(c) The table below provides expenses for Employee X provided under his current health expense account for items not covered by the RST medical plans. Calculate the differences in reimbursement and forfeitures under each of the allowable roll-over approaches for each year had they been in effect at that time.

Year 1		**Year 2**	
Credit Allocation	$500	Credit Allocation	$500
Physical Therapy	$225	Vision Care	$200
Vision Care	$300	Massage Therapy	$100
Massage Therapy	$150		

(d) Determine the amount Employee X should allocate to his health care expense account if RST decides to change its policy regarding the rollover of unused health care expense account balances in the coming year.

****END OF EXAMINATION****