Group & Health Finance and Valuation Exam
(2 hour segment)

Exam GHFVA

Date: Thursday, October 29, 2020

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This examination has 7 questions numbered 1 through 7 with a total of 40 points.

   The points for each question are indicated at the beginning of the question. Question 7 pertains to the Case Study.

2. 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 provided in this document.

Written-Answer Instructions

1. Each question part or subpart should be answered either in the Word document or the Excel file as directed. Graders will only look at work in the indicated file.

   a) In the Word document, answers should be entered in the box marked ANSWER. The box will expand as lines of text are added. There is no need to use special characters or subscripts (though they may be used). For example, β_1 can be typed as beta_1 (and ^ used to indicate a superscript).

   b) In the Excel document formulas should be entered. Performing calculations on scratch paper or with a calculator and then entering the answer in the cell will not earn full credit. Formatting of cells or rounding is not required for credit.

   c) Individual exams may provide additional directions that apply throughout the exam or to individual items.

2. The answer should be confined to the question as set.

3. The Word and Excel files that contain your answers must be uploaded before time expires.

Recognized by the Canadian Institute of Actuaries.

CASE STUDY INSTRUCTIONS

The case study will be used as a basis for some examination questions. Be sure to answer the question asked by referring to the case study. For example, when asked for advantages of a particular plan design to a company referenced in the case study, your response should be limited to that company. Other advantages should not be listed, as they are extraneous to the question and will result in no additional credit. Further, if they conflict with the applicable advantages, no credit will be given.

1. (*6 points*) You are a consulting actuary specializing in calculating claim reserves for comprehensive medical benefit plans.

(a) (*2 points*) Describe considerations for establishing claim reserves for short-term benefits.

ANSWER:

(b) (*1 point*) Describe ways you can check the reasonability of your claim reserve calculation.

ANSWER:

A client expressed interest in increasing its medical plan's deductible from $100 to $2,000.

(c) (*1 point*) Explain the effects this change could have on your client's year-end claim reserves.

ANSWER:

Another client inquired about the use of stochastic reserve methods.

(d) (*2 points*)

(i) List and describe four stochastic modeling techniques.

(ii) List considerations for applying stochastic modeling to estimating reserves.

ANSWER:

2. (*5 points*) You are a Long-Term Care (LTC) actuary for an insurance company.

(a) (*1 point*) Describe data sources and considerations for creating an LTC claim continuance table.

ANSWER:

In a discussion with your claim operations department you learn the following:

- Policyholders are required to periodically recertify benefit eligibility.
- Your company periodically uses other data sources to search for deaths of policyholders.
- Your Chief Administration Officer proposes to provide a listing of policyholders with the dates they first became eligible for benefits and the dates they last recertified as eligible.
- Deceased policyholders will not appear on the listing.
- You intend to rely on the accuracy and completeness of this listing.

(b) (*1 point*) Describe potential concerns regarding your use of this data.

ANSWER:

(c) (*1 point*) Describe your ASOP 23 responsibilities regarding the review of data.

ANSWER:

2. Continued

You will develop claim reserves for an LTC policy consisting of the following benefits:

- $103,000 payable after 1 year of benefit eligibility
- $103,000 payable after 2 years of benefit eligibility
- $103,000 payable after 3 years of benefit eligibility

As of 12/31/2019:

- 100 policyholders first became eligible for benefits.
- You held a reserve of $10,043,736 for these policyholders.
- The interest rate assumption was 3% per annum.
- The probability that a policyholder newly eligible for benefits would still be eligible for benefits after one year was 60%.

On 12/31/2020, 50 policyholders were still eligible for benefits.

(d) (*2 points*) Calculate the claim reserve at 12/31/2020 after the first benefit payment. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

3. (*5 points*) You are a valuation actuary for Ridge Run Consulting and have been asked to calculate the year-end reserves for your clients using the development method.

(a) (*2 points*) Describe characteristics of coverage for which the development method is appropriate.

ANSWER:

Skyline Health, Canyon Health, and Stagecoach Health are three insurance companies offering various types of healthcare coverage. Each company has provided claim patterns for their most recent twelve months of incurred claims.

Skyline Health
Paid Claims by Incurred Month (000's)
Month Incurred

Lag	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
0	$2,000	$3,200	$3,300	$3,100	$2,600	$3,000	$2,300	$2,700	$3,400	$2,800	$2,300	$1,800
1	$510	$30	$1,810	$1,520	$110	$1,000	$660	$1,630	$1,440	$130	$1,980	
2	$1,280	$650	$20	$1,820	$1,470	$630	$1,890	$120	$1,230	$160		
3	$990	$450	$850	$1,940	$1,500	$1,500	$1,720	$1,180	$290			
4	$290	$1,480	$1,680	$1,260	$50	$1,520	$820	$980				
5	$710	$430	$170	$10	$160	$1,010	$70					
6	$170	$50	$110	$360	$250	$360						
7	$1,770	$920	$420	$1,800	$1,080							
8	$190	$440	$300	$30								
9	$110	$420	$440									
10	$170	$210										
11	-											

Canyon Health
Paid Claims by Incurred Month (000's)
Month Incurred

Lag	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
0	$2,000	$3,200	$3,300	$3,100	$2,600	$3,000	$2,300	$2,700	$3,400	$2,800	$2,300	$1,800
1	$1,450	$900	$950	$650	$1,100	$900	$1,150	$1,000	$800	$1,300	$1,000	
2	$550	$900	$950	$900	$850	$800	$900	$950	$850	$900		
3	$350	$450	$400	$450	$400	$400	$450	$400	$450			
4	$70	$60	$80	$40	$40	$60	$60	$70				
5	$40	$50	$30	$30	$40	$40	$40					
6	$20	$20	$20	$30	$30	$20						
7	$20	$10	$30	$10	$10							
8	$10	$20	$10	$10								
9	$20	$20	$10									
10	$5	$3										
11	-											

3. Continued

Stagecoach Health
Paid Claims by Incurred Month (000's)
Month Incurred

Lag	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
0	$2,000	$3,200	$3,300	$3,100	$2,600	$3,000	$2,300	$2,700	$3,400	$2,800	$2,300	$1,800
1	$1,860	$2,980	$3,070	$2,880	$2,420	$2,790	$2,140	$2,510	$3,160	$2,600	$2,140	
2	$1,730	$2,770	$2,860	$2,680	$2,250	$2,590	$1,990	$2,330	$2,940	$2,420		
3	$1,610	$2,580	$2,660	$2,490	$2,090	$2,410	$1,850	$2,170	$2,730			
4	$1,500	$2,400	$2,470	$2,320	$1,940	$2,240	$1,720	$2,020				
5	$1,400	$2,230	$2,300	$2,160	$1,800	$2,080	$1,600					
6	$1,300	$2,070	$2,140	$2,010	$1,670	$1,930						
7	$1,210	$1,930	$1,990	$1,870	$1,550							
8	$1,130	$1,790	$1,850	$1,740								
9	$1,050	$1,660	$1,720									
10	$980	$1,540										
11	$910											

(b) (*2 points*) Recommend whether or not the development method is appropriate for each company. Justify your answer.

ANSWER:

3. Continued

Comet Health is another health insurance company that has provided its paid claims pattern for claims incurred in January as well as the total paid claims for incurred months January through December. It was determined that the development method is appropriate to use.

Lag	January Incurred Claims
0	$2,000
1	$2,900
2	$1,100
3	$700
4	$130
5	$70
6	$40
7	$30
8	$20
9	$30
10	$5
11	-
Total	$7,025

Incurred Month	Total Paid Claims
January	$7,025
February	$8,026
March	$8,220
April	$7,320
May	$7,510
June	$7,430
July	$7,480
August	$7,530
September	$7,600
October	$7,200
November	$4,300
December	$1,800

(c) (*1 point*)

(i) Calculate the completion factor for each lag using January's completion pattern. Show your work.

(ii) Calculate the total year-end reserve using the completion factors developed in part (i). Show your work.

The response for this part is to be provided in the Excel spreadsheet.

4. (*5 points*)

(a) (*2 points*) Compare and contrast European embedded value and market-consistent embedded value.

ANSWER:

Camden Insurance is interested in acquiring a Canadian group dental block. You estimate the embedded value of the dental block based on the following assumptions.

- After 10 years all remaining policies lapse.
- All remaining capital is released at the end of the tenth year.

Post-tax profit target (including interest on capital)	16%
Capital as % of MCCSR (Minimum Continuing Capital and Surplus Requirements)	150%
Pre-tax interest on capital	4%
Tax rate	35%
Year 1 premium	$15,000,000
Annual premium increase at renewal	6%
Annual lapse	8%
MCCSR factor	12%
MCCSR statistical fluctuation factor	75%
Discount Rate	10%

(b) (*3 points*) Calculate the embedded value of the group dental block of business at time 0 using the information provided above. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

5. (*6 points*)

(a) (*1 point*)

(i) Compare and contrast the purpose of premium deficiency reserves (PDRs) for statutory accounting and for Generally Accepted Accounting Principles (GAAP) accounting.

(ii) Explain how PDRs may impact statutory and GAAP accounting differently.

ANSWER:

You are the reserving actuary for an insurance company. You used the following projections to set a PDR as of 12/31/2019.

Projected Underwriting Gain/Loss by Year and Line of Business in $M			
	Year		
	2020	2021	2022
Group Dental	3	2	2
Group Long-term Disability	2	3	4
Group Major Medical	1	1	1
Group Short-term Disability	-5	-4	-3
Individual Critical Illness	-1	-1	1
Individual Major Medical	-4	-2	1

The actual 2020 results in $M before the application of any PDR were as follows:

Earned Premium	50
Incurred Claims	42
Expenses	10

The PDR as of 12/31/2020 is $3M.

(b) (*3 points*) Calculate the total net gain/loss for 2020 using the above information. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

(c) (*2 points*) List and describe ASOP 42 considerations for estimating premium deficiency reserves.

ANSWER:

6. (*7 points*) You are a consulting actuary who works with a variety of clients on valuation and financial reporting projects.

(a) (*2 points*)

(i) Define cash flow testing.

(ii) List the six risks identified by the National Association of Insurance Commissioners (NAIC) as being important to cash flow testing.

ANSWER:

You are the appointed actuary for a company that sells accident insurance. You do not have the staff to develop a full cash flow projection for this block, but you believe the conservatism in the policy reserve assumptions is more than adequate to handle moderately adverse deviations.

(b) (*1 point*) Describe asset adequacy analysis testing methods, other than cash flow testing, that you can apply.

ANSWER:

You performed a year-end gross premium valuation on a client's projected future results for the in-force book. The results were as follows (in $M):

Net Present Value (NPV) of Premiums	121
NPV of Claims	109
NPV of Premium Tax	3
NPV of Maintenance Expenses	8
NPV of Commissions	22
Current Statutory Reserves	90

(c) (*1 point*) Evaluate whether a gross premium reserve is necessary. Show your work and justify your answer.

The response for this part is to be provided in the Excel spreadsheet.

6. Continued

One of your clients sells an accident policy with the following assumptions:

- The deferrable initial costs of selling, underwriting, and issuing the policy were $1,000.
- Premium is due at the beginning of each year.
- Projected lapse is 8% at each of the first 4 anniversaries and 100% at the 5th anniversary.
- Interest is 3% annually.

(d) (*3 points*) Calculate the projected value of the deferred acquisition cost (DAC) asset per original policy after 3 years, immediately prior to recognition of the premium payment. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

Question 7 pertains to the Case Study

7. (*6 points)*

(a) (*2 points*) List and describe five major objectives of due diligence.

ANSWER:

You are an actuarial consultant assisting Royale Health on its proposed merger with Pinewood.

(b) (*4 points*)

(i) (*2 points*) Propose twelve questions to focus on during due diligence.

(ii) (*2 points*) Identify the connection of each question in (i) to specific information in the case study.

ANSWER:

****END OF EXAMINATION****