

Exam GHVRC

Date: Wednesday, May 1, 2024

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This examination has 9 questions numbered 1 through 9 with a total of 70 points.

The points for each question are indicated at the beginning of the question.

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.

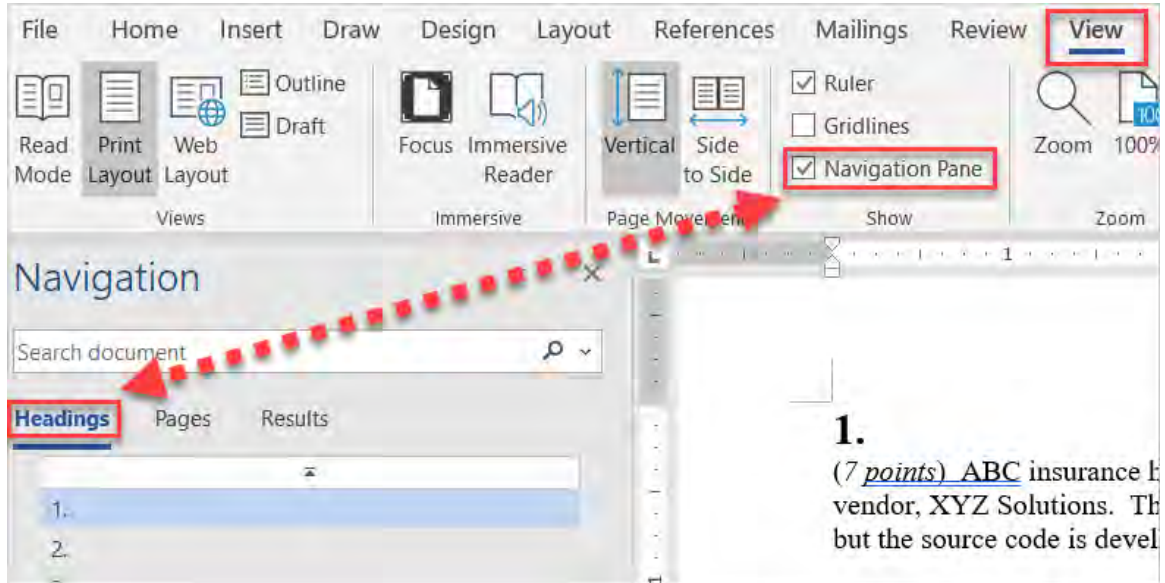
Written-Answer Instructions

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. Prior to uploading your Word and Excel files, each file should be saved and renamed with your five-digit candidate number in the filename.
4. The Word and Excel files that contain your answers must be uploaded before time expires.

Navigation Instructions

Open the Navigation Pane to jump to questions.

Press Ctrl+F, or click View > Navigation Pane:



The Excel spreadsheet has additional data and information applicable to this question

1.

(10 points) You work for a company that added small group commercial health business six months ago, and you are responsible for coming up with the hospital claims reserve. You have three years of detailed hospital claim information for large group commercial health business in the same market. You only have total admits and paid hospital claims by month for the small group business.

(a) (3 points)

- (i) Describe four ways you could set a monthly Incurred But Not Reported (IBNR) reserve estimate for small group hospital claims, including the data needed to use each approach.

ANSWER:

- (ii) Propose a ranking of the four methodologies listed in part (a) (i), with #1 being the best and #4 being the worst in terms of methodologies to use when setting the small group IBNR reserve for hospital claims. Justify your answer.

ANSWER:

In the Excel spreadsheet, you are provided information on the hospital claims as well as your intern's IBNR reserve estimate of \$29,330,000 as of 6/30/20X2.

(b) (3 points)

- (i) Critique the intern's IBNR reserve estimate.
- (ii) Recommend the hospital IBNR reserve that you would record at 6/30/20X2. Justify your answer and show your work.

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

1. Continued

In the Excel spreadsheet, Exhibits 1 and 2 provide enrollment and a history of paid claims by month for a block of small group dental business that has been declining in enrollment over the last few years. Assume claims are fully complete by 18 months from incurred date.

- (c) (3 points) Calculate the unpaid claim liabilities as of 8/1/20X2 using a development method that addresses the enrollment decline for the following completion ratios. Show your work.
- (i) 3-month average completion ratios
 - (ii) 6-month average completion ratios
 - (iii) 9-month average completion ratios

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

- (d) (1 point) Recommend which completion ratios to use in your final estimate. Justify your answer.

ANSWER:

The Excel spreadsheet has additional data and information applicable to this question.

2.

(5 points)

(a) *(1 point)*

(i) Describe the Gordon Constant Growth Model (GCGM).

ANSWER:

(ii) Describe why the GCGM assumes the price-to-earnings (P/E) ratio of companies with high growth rates will be expected to drop in a context of rising interest rates.

ANSWER:

(b) *(1 point)* Describe why stock prices are imperfect metrics for the financial analysis of health plans.

ANSWER:

Portwater Health is considering a merger with Carabelle Insurance Company.

In the Excel spreadsheet, you are provided with the financial information for both companies in Exhibit 1.

(c) *(1 point)* Calculate the following performance metrics for Portwater and Carabelle separately. Show your work.

(i) Total Asset Turnover

(ii) Return on Assets

(iii) Total Leverage Ratio

(iv) Return on Equity

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

2. Continued

- (d) (1 point) Calculate the two annual profit margin ratios most commonly used by financial analysts for Carabelle and Portwater separately. Show your work.

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

Your intern made the following statements:

- GAAP profit margins for insured businesses are overstated relative to statutory profit margins.
 - "Same-size" analyses are done on a per capita basis to reflect the impact of size on operating measures.
- (e) (1 point) Critique the accuracy of the intern's statements. Justify your answer.

ANSWER:

3.

(4 points) Company X, a regional, publicly-traded insurer, entered the health insurance market in State A two years ago.

(a) (2 points)

- (i) State reasons why Company X would want to compare its financial ratios to its competitors.

ANSWER:

- (ii) List characteristics that, when similar, improve comparisons of financial ratios between Company X and competitors.

ANSWER:

Megacorp is a national, publicly-traded health insurer and is the largest competitor in State A. You have been asked to focus your comparison on Megacorp and its subsidiaries:

- Juniorcorp, operating in State A
- RegionalCare, a regional HMO health insurer that Megacorp has recently acquired

(b) (2 points)

- (i) Identify sources of data you could use to prepare your comparison.

ANSWER:

- (ii) Describe factors you should consider when evaluating the data sources identified in part (b)(i).

ANSWER:

4.

(9 points) You are the group benefits consulting actuary for ABC, a company operating in Manitoba.

You have been engaged by company ABC to conduct a benefits review. ABC is considering adding the following Short-Term Disability (STD) plan on a fully insured basis for which ABC will pay 100% of the premiums:

Provisions	Monthly premium rate	Basis
75% of weekly salary up to \$1,000 3-day elimination period 26-week benefit period	\$0.660	Per \$10 of weekly benefit

(a) (2 points)

- (i) List the criteria that a STD plan needs to meet in order to qualify for the Employment Insurance (EI) Premium Reduction Program (PRP).

ANSWER:

- (ii) Evaluate whether or not the proposed STD plan qualifies for the EI PRP. Justify your answer.

ANSWER:

4. Continued

You are given the following:

- ABC is proceeding under the presumption that the plan qualifies for the EI PRP
- Employees pay EI premiums at a rate of 1.58% of salary to a maximum of \$952.74 annually
- The employer currently pays 1.400 times total employee EI premiums, but this would reduce to 1.163 under the EI PRP if the proposed STD plan were implemented
- Employee salaries and headcounts are as follows:

Annual Salary	ABC's Employee Headcount
\$35,000	75
\$50,000	100
\$60,000	120
\$90,000	5
\$105,000	20
\$120,000	5

- (b) (3 points) Calculate the additional cost to ABC to provide the proposed STD plan. State any assumptions and show your work.

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

- (c) (2 points)

- (i) Calculate the minimum amount of EI savings that need to be returned to employees. State any assumptions and show your work.

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

- (ii) Describe considerations and available options for returning the EI savings to employees.

ANSWER:

4. Continued

ABC considers returning the employee's portion of the EI PRP savings as a cash rebate. The rebate will be the same for all employees before taxes. You are provided with the following assumptions:

- Marginal income tax rate for all employees: 30%
- CPP information:

Contribution rate	5.95%
Yearly Basic Exemption (YBE)	\$3,500
Yearly Maximum Pensionable Earnings (YMPE)	\$66,600

- (d) (2 points) Calculate the total cash rebate on a net basis for all employees. State any assumptions and show your work.

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

The Excel spreadsheet has additional data and information applicable to this question.

5.

(9 points) You are an actuary at ABC Consulting. One of your clients has engaged you to design and implement a new post-retirement benefits plan.

- (a) (1 point) Describe the competing priorities in offering retiree benefits to employees.

ANSWER:

- (b) (1 point) Describe plan design components that can help reduce current and future post-retirement benefit plan costs.

ANSWER:

You design a post-retirement benefits plan, and you are in the process of determining the Defined Benefit Obligation (DBO) that your client would need to recognize on its balance sheet as of December 31, 20X1.

You are provided with the following information:

Plan provisions:

Eligibility criteria	Age 65 (no minimum service requirement)
Dependent coverage	Coverage extends to spouses
Benefit period	Benefits cease at the earlier of the retiree's death or age 80. Benefits do not continue to surviving spouses.

- The Excel spreadsheet provides the valuation assumptions as of December 31, 20X1.

5. Continued

(c) (5 points) Calculate the following metrics under IAS 19 for an employee age 45 with 15 years of service as of December 31, 20X1:

(i) Defined Benefit Obligation (DBO) as of December 31, 20X1

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

(ii) Current service cost for 20X2

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

(iii) Interest expense for 20X2

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

State any assumptions and show your work.

You determined the following financials for the entire employee population:

DBO as of December 31, 20X1	\$2,500,000
Current service cost (excluding interest) for 20X2	\$200,000
Expected benefit payments for 20X2	\$10,000

At December 31, 20X2, some of the actuarial assumptions have changed. Their impact on the DBO as of December 31, 20X2 is as follows:

	Impact	Gain or Loss
Update to claims cost assumption	\$300,000	Loss
Update to health care cost trend rates	\$150,000	Loss
Update to mortality assumption	\$50,000	Gain
Update to discount rate assumption	\$200,000	Gain

(d) (2 points) Construct a reconciliation of the DBO under IAS 19 for 20X2. State any assumptions and show your work.

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

6.

(10 points) You are the group pricing actuary at ABC Insurance Company. You are responsible for the reporting of industry pooling programs and for establishing EP3 pooling mechanisms for ABC.

You are given the latest information on internal and industry pooling mechanisms:

EP3 Thresholds (per certificate)			
	20X1	20X2	20X3
EP3 Pooling Threshold	\$10,000	\$10,000	\$10,000

Canadian Drug Insurance Pooling Corporation (CDIPC)			
	20X1	20X2	20X3
Initial Threshold	\$65,000	\$65,000	\$65,000
Ongoing Threshold	\$32,500	\$32,500	\$32,500
Coinsurance (amount pooled)	85%	85%	85%
Maximum Pooled Amount	\$500,000	\$500,000	\$500,000

Quebec Drug Insurance Pooling Corporation (QDIPC) – 20X3			
Size of Group (number of certificates)	Pooling threshold	Annual factor - Without dependants	Annual factor - With dependants
Fewer than 25	\$10,000	\$276	\$771
Between 25 and 49	\$18,000	\$188	\$527
Between 50 and 124	\$32,500	\$100	\$339
Between 125 and 249	\$55,000	\$66	\$224
Between 250 and 499	\$80,000	\$50	\$169
Between 500 and 999	\$105,000	\$36	\$142
Between 1,000 and 3,999	\$130,000	\$31	\$123
Between 4,000 and 5,999	\$300,000	\$15	\$60
6,000 and over	n/a	n/a	n/a

- (a) (1 point) Describe the three different forms of pooling in group insurance.

ANSWER:

6. Continued

(b) (2 points) Describe the rationale for the creation of the following industry pooling programs:

(i) QDIPC

ANSWER:

(ii) CDIPC

ANSWER:

(c) (3 points) Summarize QDIPC and CDIPC with respect to:

(i) Participation of insurers

ANSWER:

(ii) Covered plans

ANSWER:

(iii) Pooling thresholds

ANSWER:

(iv) Sharing of pooled claims among participating insurers

ANSWER:

(v) Pricing of groups within a participating insurer

ANSWER:

6. Continued

You are given the following drug claim amounts for XYZ, a small client of ABC, having 6 employees all located in Nova Scotia:

Certificate	Member	20X1	20X2	20X3
1	Employee	\$22,000	\$25,000	\$19,000
2	Spouse	\$35,000	\$750	\$1,000
3	Employee	\$15,000	\$12,000	\$14,000
3	Spouse	\$15,000	\$20,000	\$25,000
4	Employee	\$550,000	\$575,000	\$600,000
5	Employee	\$9,000	\$10,000	\$8,000
5	Spouse	\$60,000	\$75,000	\$80,000
5	Child	\$400	\$200	\$500
6	Employee	\$125,000	\$130,000	\$0

(d) (2 points) Calculate the claim amounts for 20X3 assumed by:

(i) Industry pooling mechanisms

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

(ii) XYZ

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

(iii) ABC

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

State any assumptions and show your work.

(e) (1 point) Calculate the claim amounts in (d) assuming that this group's employees were located in Quebec. State any assumptions and show your work.

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

(f) (1 point) Propose a change to the CDIPC pooling program that will help to further preserve the viability and affordability of employers' drug programs. Justify your answer.

ANSWER:

7.

(5 points)

(a) (2 points)

(i) Describe the purpose and structure of Assuris.

ANSWER:

(ii) Describe the funding of Assuris.

ANSWER:

(b) (1 point) Describe the benefit guarantee provided by Assuris for the following benefits:

(i) Group Life

ANSWER:

(ii) Group Disability

ANSWER:

(iii) Group Supplemental Health Expense

ANSWER:

(iv) Group Critical Illness

ANSWER:

7. Continued

You are given the following information on two group insurance members:

Member	Death Benefit	Monthly Disability Income Benefit	Health Claim Allowed Amount
1	\$300,000	N/A	\$125,000
2	N/A	\$1,800	\$70,000

- The health benefit plan has 70% coinsurance with no deductible and no annual maximum.

(c) (1 point) Calculate the Assuris guaranteed amount for each member. State any assumptions and show your work.

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

The insurance company that covers the two members filed for bankruptcy and appointed a liquidator to sell the assets and transfer the liabilities with the aim of getting the best value for policyholders.

The liquidator sold the block at a value that will allow the insured members to recover 90% of the value of their insured benefits.

(d) (1 point) Calculate the additional amount each member will receive above the Assuris guaranteed amount calculated in (c). State any assumptions and show your work.

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

8.

(11 points) You are the actuary at XYZ responsible for the valuation of Life Insurance Capital Adequacy Test (LICAT).

You are given the following information on a closed block of Group Long-Term Disability (LTD) policies as of December 31, 20X1:

Number of disabled lives in the closed block	100, all age 45
Best estimate probability of claim termination	1% per month, no morbidity improvement
Monthly benefit	\$2,000 per month, up to age 65 Payable at the end of the month No indexation and no offset
Maintenance expenses	\$75 per month, increasing 0.2% per month
Spot discount rate	5.30%

(a) (2 points)

- (i) List and describe the risk components that are considered when calculating the morbidity risk.

ANSWER:

- (ii) Explain how the risk components in (i) apply to your block of business.

ANSWER:

(b) (4 points) Calculate the value of total components for the following risks in LICAT as of December 31, 20X1:

- (i) Morbidity risk

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

- (ii) Expense risk

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

State any assumptions and show your work.

8. Continued

Under IFRS 4, you selected a margin for the termination rates that is within the range recommended from the CIA Standard of Practice. Your boss has asked if you could use the same margin for the risk adjustment for non-financial risk under IFRS 17.

(c) (4 points)

- (i) Describe the requirements for selecting Provisions for Adverse Deviation (PfADs) under IFRS 4.

ANSWER:

- (ii) Describe the requirements to determine the risk adjustment for non-financial risk under IFRS 17.

ANSWER:

- (iii) Describe the considerations for using PfADs to determine the risk adjustment for non-financial risk.

ANSWER:

- (d) (1 point) Explain how the selected risk adjustment for non-financial risk will impact your LICAT ratio.

ANSWER:

9.

(7 points) Company ABC offers employees a comprehensive group benefits package including life insurance, disability (short-term and long-term), medical coverage including prescription drugs, dental coverage, and out-of-province emergency coverage.

Prior to the COVID-19 pandemic, all employees resided in British Columbia (BC) and physically reported to Company ABC's office in Vancouver. As remote work took hold during COVID-19, two employees left the province as noted below:

Employee 1	Moved to Quebec on January 1, 20X1
Employee 2	Moved to Ontario on January 1, 20X1

- (a) (1 point) Describe concerns with respect to Company ABC's group benefits for these two employees.

ANSWER:

- (b) (2 points) Compare and contrast eligibility requirements for government health insurance plans (GHIPs) in BC, Quebec and Ontario.

ANSWER:

9. Continued

In February 20X1, two employees experience the claims outlined in the table below:

Employee	Service	Description
1	Physician	Experiences stomach pains and visits a physician who advises rest.
1	Emergency surgery	The pain worsens and an emergency surgery is required.
2	Out-of-province	Travels to the United States and has a minor accident resulting in a broken arm. Individual travel coverage was purchased prior to the trip and this provider is contacted first.

(c) (4 points) Describe how the costs of the services in the table above would be coordinated between:

- Each employee
- The Company ABC group benefits plan
- Other private coverage
- GHIPs

State any assumptions made.

ANSWER:

****END OF EXAMINATION****