GH VRC Model Solutions
Spring 2023

1.

Learning Objectives:
1. The candidate will understand and apply valuation principles for insurance contracts.

Learning Outcomes:
(1a) Describe the types of claim reserves (e.g., due and unpaid, ICOS, IBNR, LAE, PVANYD).

(1b) Explain the limitations and biases of the traditional valuation methods.

(1c) Calculate appropriate claim reserves given data.

(1e) Evaluate data resources and appropriateness for calculating reserves.

Sources:
Group Insurance, Skwire, Daniel D., 8th Edition, 2021
- Ch. 39: Claim Reserves for Short-Term Benefits
- Ch. 40: Claim Reserves for Long-Term Benefits

GHFV-103-16: Health Reserves

Commentary on Question:
Generally, candidates performed well on this question, especially the first three sections.

Solution:
(a) List and describe the types of claim reserves and claim liabilities required in regulatory statements.

Commentary on Question:
Candidates generally performed very well on this question. Some candidates listed other types of reserves, but were generally able to get part marks if these reserves contained concepts related to claim reserves or liabilities.

1. Continued

Points were awarded based on providing the list and describing each type of reserve, up to the maximum points allocated for the question.

Due and unpaid (D&U)
Liabilities for claims that have been reported, adjudicated and processed but final payment has not been recorded as of the valuation date.
D&U are typically fairly small in relation to overall reserves. They may be estimated using historical averages.
In Course of Settlement (ICOS)
Liabilities for claims reported, received but not yet adjudicated or paid as of the valuation date.
Incurred but not reported (IBNR)
Liabilities for claims that are anticipated but have not been reported as of the valuation date.
This is typically a very large accrual for health insurance. A wide range of estimation techniques can be applied to estimate this liability.
Loss Adjustment Expenses (LAE)
Liabilities for the administrative costs associated with the adjudication of unpaid claims.
Usually developed as a percentage of the unpaid claims liability.
Present value of amounts not yet due, or Unaccrued
This reserve covers claims that were incurred on or before the valuation date which have not accrued as of the valuation date.
These are most commonly done on a seriatim basis.
Resisted Claims
May vary from carrier to carrier, however, generally include claims for which known litigation situation exists
Outstanding Accounting Feed
Amounts acknowledged as payments, but for which no check has been cut as at the valuation date. Overlaps with Due and Unpaid definitions
Other extended benefits
May include deferred maternity benefits where claim payments after the valuation date are known but not yet due.

(b)

     (i)   List and describe basic techniques to estimate claim reserves.

     (ii)   Recommend reserve methods for each of XYZ's products. Justify your answer.

Commentary on Question:
Generally candidates performed well on this part.

1. Continued

Factor method
• This method is generally used for reserves that are easily estimated due to a short lag or run off period.
Lag method (or development method)
This method assumes the historical lag pattern can predict the payment patterns for claims that have been incurred but not yet paid. The method provides an estimate of the ultimate aggregate fully incurred payment for all claims in a time period.
Tabular method
For products such as group long term disability (LTD) insurance, where benefits can be paid for many years on a single claim, industry practice and regulatory standards require the use of a tabular method to compute reserves.
Average Size Claim method
The claim reserve for reported claims is estimated by reviewing claim sizes for previously closed claims. The total reported reserve is then calculated as the estimated average size multiplied by the number of reported claims, less any payments made on these claims prior to the valuation date.
Loss Ratio method
The reserve under this method is based on earned premium times an estimated loss ratio minus paid claims.
Projection Methods
1 Develop projected incurred claims cost per unit of exposure. 2. Multiply this value times the exposure base for each period being estimated. 3. Subtract known paid claims. Can assume the claims cost used in pricing as an estimate.
Examiner's method or Case reserves
Generally, these estimates are based on doctors' statements and past history for such claims. This method is often used to estimate the liability arising from claims subject to lawsuits. In that case, the legal department should be involved in the process.

Life
• Factor method is appropriate given the company has sufficient historical experience to establish a credible factor • Waiver of Premium reserves can leverage the Tabular method
AD&D
• Given the relatively minimal historic experience, the Loss Ratio method would be most suitable
STD
• Given the relatively minimal historic experience, the Loss Ratio method would be most suitable
LTD
• The Tabular method is best suited for long term reserves associated with Long Term Disability
Supplemental Health Plan
• Given the relatively minimal historic experience, the Loss Ratio method would be most suitable • While potentially not fully credible, the lag method can also be reviewed and potentially credibility weighted

(c) Calculate the total incurred health claims from January 20X2 to June 20X2 using an average of the most recent six months' age-to-age factors. Show your work.

Commentary on Question:
Candidates whom were able to calculate the correct incurred claims were able to get full marks even if they did not specifically calculate all steps in the model solution (i.e. calculate incurred claims from age to ultimate factors as opposed to completion factors). Candidates were also not required to perform all of the calculations below, as long as they performed enough calculation to derive the response. Some areas that candidates generally lost marks were not leveraging the most recent period and six months' of age-to-age factors for averaging.

1. **Continued**

Step 1 Calculate Cumulative claims
Cumulative Claims by payment months

		Prior	Jun 20X1	Jul 20X1	Aug 20X1	Sep 20X1	Oct 20X1	Nov 20X1	Dec 20X1	Jan 20X2	Feb 20X2	Mar 20X2	Apr 20X2	May 20X2	Jun 20X2
Incurral month	Jan 20X1	97	97	97	97	97	97	97	97	97	97	97	97	97	97
	Feb 20X1	231	243	243	243	243	243	243	243	243	243	243	243	243	243
	Mar 20X1	384	491	532	534	534	534	534	534	534	534	534	534	534	534
	Apr 20X1	97	407	737	916	969	969	969	969	969	969	969	969	969	969
	May 20X1	49	366	703	832	948	989	989	989	989	989	989	989	989	989
	Jun 20X1	0	112	668	820	952	1005	1010	1010	1010	1010	1010	1010	1010	1010
	Jul 20X1	0	0	124	691	815	919	995	1015	1030	1030	1030	1030	1030	1030
	Aug 20X1	0	0	0	106	746	892	989	1042	1051	1051	1051	1051	1051	1051
	Sep 20X1	0	0	0	0	161	751	880	966	1031	1072	1072	1072	1072	1072
	Oct 20X1	0	0	0	0	0	99	733	1026	1089	1093	1093	1093	1093	1093
	Nov 20X1	0	0	0	0	0	0	101	636	957	1035	1101	1115	1115	1115
	Dec 20X1	0	0	0	0	0	0	0	103	726	920	1036	1114	1137	1137
	Jan 20X2	0	0	0	0	0	0	0	0	105	686	979	1071	1128	1147
	Feb 20X2	0	0	0	0	0	0	0	0	0	117	669	900	1072	1137
	Mar 20X2	0	0	0	0	0	0	0	0	0	0	135	719	1021	1116
	Apr 20X2	0	0	0	0	0	0	0	0	0	0	0	163	739	934
	May 20X2	0	0	0	0	0	0	0	0	0	0	0	0	131	734
	Jun 20X2	0	0	0	0	0	0	0	0	0	0	0	0	0	165

1. Continued

Development factors by payment month

		Prior	Jun 20X1	Jul 20X1	Aug 20X1	Sep 20X1	Oct 20X1	Nov 20X1	Dec 20X1	Jan 20X2	Feb 20X2	Mar 20X2	Apr 20X2	May 20X2	Jun 20X2
Incurral month	Jan 20X1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Feb 20X1	1.00	1.05	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Mar 20X1	1.00	1.28	1.08	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Apr 20X1	1.00	4.20	1.81	1.24	1.06	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	May 20X1	1.00	7.47	1.92	1.18	1.14	1.04	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Jun 20X1			5.96	1.23	1.16	1.06	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Jul 20X1				5.57	1.18	1.13	1.08	1.02	1.01	1.00	1.00	1.00	1.00	1.00
	Aug 20X1					7.04	1.20	1.11	1.05	1.01	1.00	1.00	1.00	1.00	1.00
	Sep 20X1						4.66	1.17	1.10	1.07	1.04	1.00	1.00	1.00	1.00
	Oct 20X1							7.40	1.40	1.06	1.00	1.00	1.00	1.00	1.00
	Nov 20X1								6.30	1.50	1.08	1.06	1.01	1.00	1.00
	Dec 20X1									7.05	1.27	1.13	1.08	1.02	1.00
	Jan 20X2										6.53	1.43	1.09	1.05	1.02
	Feb 20X2											5.72	1.35	1.19	1.06
	Mar 20X2												5.33	1.42	1.09
	Apr 20X2													4.53	1.26
	May 20X2														5.60
	Jun 20X2														NA

1. **Continued**

Completion Factors

Lag Mth	Development factor	Completion factor
8	1.000	1.000
7	1.000	1.000
6	1.002	1.000
5	1.016	0.998
4	1.054	0.981
3	1.108	0.931
2	1.371	0.840
1	5.794	0.613
0	NA	0.106

Incurred Claim by Month

		Paid to Date	Lag Mth	Completion Factor	Total Incurred
	Jan 20X2	1147	5	0.998	1150
	Feb 20X2	1137	4	0.981	1159
Incurral	Mar 20X2	1116	3	0.931	1199
months	Apr 20X2	934	2	0.840	1111
	May 20X2	734	1	0.613	1198
	Jun 20X2	165	0	0.106	1560
20X2 Total					7376

(d)   Critique the use of the development method in part (c).

Commentary on Question:
In order to receive full marks, candidates were required to confirm all the necessary requirements for development method to be suitable, critique how that applies in this situation, and recommend some potential alternatives to improve.

i) Development method works best if the following conditions are met:
1. Ability to record incurred date and payment date of each claim.
2. Consistent lag patterns.
3. Incurred periods should have a relatively short duration.
4. Sufficient volume of business
5. Requires either earned premium or exposed contract counts to assist in the calculation

1. **Continued**

ii) XYZ's health block does not meet criteria 2. 4. And unclear on 5. Significant business growth is observed in 2021 and 2022. The runoff pattern is not stable.

iii) Estimates for ultimate claims for months below the threshold are often based on an alternative estimate of the average incurred claim cost per contract or member. Two common methods of developing the alternative estimates are
    1. an estimate based on the trend in claim cost (claim dollars per unit of exposure, such as PMPM), or
       an estimate based on applying an assumed loss ratio (ratio of incurred claims to earned premium) to earned premium.

(e)   Calculate the Incurred But Not Paid (IBNP) reserve as of June 30, 20X2 by applying both credibility weights and an alternative method. State your assumptions and show your work.

    Commentary on Question:
    Some candidates did not consider an alternative method for this part of the question and considered alternative smooth techniques within the development method. Points were awarded for either Loss Ratio or Projection Method alternatives, although Loss Ratio method is described below. In order to get full marks, candidates were required to provide a reason for their determination of the credibility formula.

Calculate Loss Ratio

		Paid to Date	Earned Premium	Loss Ratio
Incurral months	Jan 20X1	97	150	65%
	Feb 20X1	243	350	69%
	Mar 20X1	534	750	71%
	Apr 20X1	969	900	108%
	May 20X1	989	1200	82%
	Jun 20X1	1010	1300	78%
	Jul 20X1	1030	1400	74%
	Aug 20X1	1051	1400	75%
	Sep 20X1	1072	1500	71%
	Oct 20X1	1093	1500	73%
	Nov 20X1	1115	1700	66%
	Dec 20X1	1137	1800	63%

Loss Ratio = Sum of Paid to Date / Sum of Earned Premium = 74%

1. Continued

Calculate Incurred Claims based on LR Method

		Paid to Date	Earned Premium	Expected Incurred
Incurral months	Jan 20X1	1147	1750	1297
	Feb 20X2	1137	1700	1260
	Mar 20X2	1116	1750	1297
	Apr 20X2	934	1750	1297
	May 20X2	734	1800	1334
	Jun 20X2	165	1800	1334

Credibility-Blended Estimate

		Paid to Date	Completion Factor	Incurred (Development)	Incurred (Loss Ratio)	Incurred (Blended with Completion Factor)
Incurral months	Jan 20X1	1147	0.998	1150	1297	1150
	Feb 20X2	1137	0.981	1159	1260	1160
	Mar 20X2	1116	0.931	1199	1297	1205
	Apr 20X2	934	0.840	1111	1297	1141
	May 20X2	734	0.613	1198	1334	1250
	Jun 20X2	165	0.106	1560	1334	1358

IBNP

Total Paid = 15573
Total Incurred = 17605
IBNP = 2032

2. **Learning Objectives:**
5. The candidate will understand how to describe and evaluate government programs providing health and disability benefits in Canada.

Learning Outcomes:
(5a) Describe eligibility requirements for social programs in Canada and the benefits provided.

(5b) Describe how private group insurance plans work within the framework of social programs in Canada.

Sources:
Morneau Shepell Handbook of Canadian Pension Benefit Plans, 17th Edition, 2020
- Ch. 2: Government Pension Programs
- Ch. 17: Provincial Hospital and Medical Insurance Plans

GHFV-694-19: Guide to Canada Benefits Legislation

GHFV-695-19: A Joint Statement From the pan-Canadian Pharmaceutical Alliance and the Canadian Generic Pharmaceutical Association

Biosimilars in Canada: building momentum in the wake of recent switching policies

Commentary on Question:
This question tested the candidates on their knowledge of public insurance coverage in Canada, the benefits that they provide, and how they integrate with private coverage.

Solution:
(a) Compare and contrast how the provincial health insurance plans are financed in Ontario and in British Columbia (BC).

Commentary on Question:
Candidates generally received partial credits, but very few had full credits. Most candidates were able to mention provinces financing through general revenues and employer health tax, but few wrote about the federal transfer payments. Many candidates had difficulty identifying which province charged a health premium or not.

Similarities
- In both BC and Ontario, provincial hospitals and medical plans that meet the criteria of the Canada Health Act are financed in part from the federal government through transfer payments.
- Each province has established a method of financing the balance of the costs that are not covered by federal funding.
- In both provinces, the plan is financed through general revenues of the province and an Employer Health Tax (EHT)

2. **Continued**

Differences
- In addition to the general revenues of the province and an EHT, Ontario also funds its health plan with health premiums, while BC removed the individual premiums for their Medical Service Plan (MSP) and replaced it with an employer health tax

(b)   List and describe the main updates contained in the 2018 Joint Statement of the pan-Canadian Pharmaceutical Alliance (pCPA) and the Canadian Generic Pharmaceutical Association (CGPA).

Commentary on Question:
Naming at least four of the items below with an accurate description of each was enough to obtain full credits, which some candidates were able to accomplish. Other candidates wrote about general actions to take to reduce costs unrelated to the specified joint statement and then scored lower with partial credits.

Inclusion of most Canadians
- 5- year initiative that would apply for all Canadians who use prescription generic drugs, participating public drug plans, and employee drug plans.

Stabilize Supply
- Generic drugs covered in the initiative are manufactured by multiple generic companies, helping to ensure a stable supply.

Improve Costs
- As of April 1, 2018, the prices of nearly 70 of the most commonly prescribed drugs in Canada will be reduced by 25%-40%. Applies to generic drug only.
- Savings estimated to be $3 billion over the next 5 years, through a combination of price reductions and launch of new generic drugs.

Target Highly Utilized Drugs
- Includes drugs used to treat high cholesterol, high blood pressure and depression.

Improve Canada's position in relation to international generic drug prices.
- Building on previous pCPA and CGPA efforts, Canada's generic drug prices decreased by an average of 48% between 2010 and 2015.

Unify Tendering
- Brings provinces, territories, and federal drug plans together to negotiate prices for publicly covered drugs.
- Tendering will not be pursued by the participating drug plans.

2. **Continued**

(c)

    (i)   Assess if Nancy's family is eligible for reimbursement under any of the public plans in Ontario. Justify your answer.

    (ii)   Calculate the claim amounts paid by ABC, the Ontario public plans and Nancy's family from August 2022 to July 2023. State any assumptions and show your work.

Commentary on Question:
Several candidates correctly identified that Nancy's family was eligible for TDP, but not OHIP+. However, very few candidates correctly adjudicated claims using a quarterly deductible. Some candidates did not understand that $4,000 was a plan maximum, and not an OOP max. Note that there was no point deduction for considering that the January 15 claim was either incurred in 2021 or 2023.

    (i)   Nancy's family is eligible for Trillium Drug Plan (TDP).

- The plan was designed to assist Ontario Residents who have high prescription drug cost in relation to their net household income.
- Those who don't have private insurance, or their private insurance doesn't cover 100% of their drug costs, may register in the program. The annual drug cost is above the 4% of the family's net income.
- OHIP+ only apply to children and youth who do not have a private plan.

    (ii)

- The annual deduction is $4,800 = ($55,000 + $65,000) * 4%.
  - The deductible is paid quarterly throughout the benefit year, August to July.
- ABC health plan is the first payer, and it pays until Nick reaches the plan maximum: $4,000
- Nancy's Family pays until they reach the deductible of the Trillium Drug Plan.
  - In addition to the $1,200 quarterly deductible, there is a $2.00 per prescription deductible: $4,828
- Trillium drug plan pays the rest: $10,692

2. **Continued**

Quarter	Claim amounts	Rx count	ABC payments	Nancy pays up to quarterly ded.	Nancy pays Rx Copay	TDP pays
Q1: Aug-Oct	$5,700	4	$4,000	$1,200	$8	$492
Q2: Nov-Jan	$4,820	4	-	$1,200	$8	$3,612
Q3: Feb-Apr	$4,500	3	-	$1,200	$6	$3,294
Q4: May-Jul	$4,500	3	-	$1,200	$6	$3,294
Total	$19,520	14	$4,000	$4,828		$10,692

(d) Calculate the difference in paid amount in 2023 by BC Pharmacare, ABC and John if John uses Remicade or Inflectra for all of 2023. State any assumptions and show your work.

Commentary on Question:
This part tested the knowledge of candidates on BC biosimilar switching policies and very few correctly calculated that BC would not cover Remicade at all. Candidates usually scored better on the calculation for the Inflectra payment amounts. However, no candidates calculated the correct deductible and OOP max by using the salary from two years ago and many candidates did not calculate the difference in the payment amounts.

Fair Pharmacare used income tax data from two years prior.
- Therefore, the net income in year 2021 is used to determine 2023's family deductible.
- John's 2021 net income: $100,081.32 = $120,000 / (1.095^2)
- Deductible is $3,000 and OOP maximum is $4,000 for 2023

Since May 2019, BC has launched non-medical biosimilar switching policies requiring patients to use biosimilars of approved indications.
- Remicade is not paid by the public plan, but it will pay for the biosimilar Inflectra.

Option 1: using the originator Biologic Remicade costing $37,330
- Pharmacare pays nothing.
- BC Pays $36,930 = ($2,000 x 0.8) + (($37,330 - $2,000) x 100%)
- John pays $400 = $37,330 – $36,930

Option 2: using the biosimilar Inflectra
- Pharmacare is first payer and will pay once John meets the deductible of $3,000.
- The OOP maximum will be reached when drug cost is above $6,333.33 = ($4,000 - $3,000) / 0.3 + $3,000.
- Inflectra cost: $19,859.56 = $37,330 x (1 - 0.468)

2. **Continued**

- Pharmacare pays $15,859.56 = (0.7 x ($6,333.33 - $3,000)) + (100% x ($19,859.56 - $6,333.33))
- ABC and John will pay the remaining $4,000 = $19,859.56 - $15,859.56
- ABC Pays $3,600 = ($2,000 x 0.8) + (($4,000 - $2,000) x 100%)
- John Pays $400 = $4,000 - $3,600

Differences between options 1 and 2
- Pharmacare pays $15,859.56 more with Inflectra ($15,859.56 - 0)
- ABC pays $33,330 less with Inflectra ($3,600 - $36,930)
- John pays the same amount with Inflectra ($400 - $400)

(e)

(i)   Describe the qualifying conditions for CPP disability benefits.

(ii) Calculate the net monthly disability benefit that Kevin will receive from ABC if he is approved for CPP. State any assumptions and show your work.

Commentary on Question:
This part of the question tested knowledge on the calculation of retirement and disability benefits under CPP. Candidates generally did well on this part. Many candidates lost points for not weighing adjusted monthly earnings by contributory months.

Step 1: Calculating the adjusted average pensionable earnings (2019-2023)

- Average YMPE $62,149 = (57,400+58,700+61,600+64,900+68,145)/5

Step 2: For each month in the contributory period, the adjusted pensionable earnings are calculated by multiplying the actual pensionable earnings for the month by the ratio of the average YMPE for the retirement year to the YMPE for the year in which the earnings were paid.

Candidates need to adjust 2023 earning by the contributory months.

Year	Adjusted Ratio	Adjusted Monthly Earnings	Contributory Months
2017	1,12 = 62,149/55,300	3,746 = 1.12*40,000/12	12
2018	1,11 = 62,149/55,900	3,938 = 1.11*42,500/12	12
2019	1,08 = 62,149/57,400	4,060 = 1.08*45,000/12	12
2020	1,06 = 62,149/58,700	4,191 = 1.06*47,500/12	12
2021	1,01 = 62,149/61,600	4,204 = 1.01*50,000/12	12
2022	0,96 = 62,149/64,900	4,389 = 0.96*55,000/12	12
2023	0,91 = 62,149/68,145	4,940 = 0.91*65,000/12	4

2. **Continued**

Step 3: Sum the adjusted monthly pensionable earnings for the whole contributory period and then divide the total by the number of months in the period to give the average adjusted monthly pensionable earnings.

- $4,132.81 = SUMPRODUCT (Adjusted Monthly Earnings, Contributory Months) / SUM (Contributory Months)

Step 4: The monthly CPP retirement pension is 33.33% (was 25% before the CPP enhancement) of the average monthly adjusted pensionable earnings.

- $1,377.47 = $4,132.81 x 33.33%

Step 5: CPP for Kevin is equal to a flat-rate pension plus an earnings-related component equal to 75% of the contributor's retirement pension up to the maximum of $1,464.83

- $1,464.83 = Min ($1,464.83 ; $524.64 + (75% x $1,377.47))

Step 6: Calculate ABC's net monthly disability benefit.

- $2,146.46 = Min ($5,000 ; 66.67% x $65,000 / 12) - CPP disability benefit of $1,464.83.

3.   **Learning Objectives:**
4.   The candidate will understand and evaluate post-retirement and post-employment benefits in Canada.

Learning Outcomes:
(4b)   Determine appropriate baseline assumptions for benefits and population.

(4c)   Determine employer liabilities, service cost and expense for post-retirement and post-employment benefits for financial reporting purposes under IFRS and understand differences compared to US GAAP.

(4f)   Apply actuarial standards of practice to post-retirement and post-employment benefit plans.

Sources:
GHFV-632-13: IAS19

GHFV-650-15: Supplement Calculation Note for IAS 19

Commentary on Question:
This question tested the candidates on their knowledge of post-retirement and post-employment benefit plans including how to value them and how to do the accounting for them.

Solution:

(a)   Describe to Sabrina, in detail, the following steps under IAS 19 that are applicable to the benefits being offered.

 (i)   Determining the deficit or surplus at year end

 (ii)   Determining the amounts to be recognized in profit or loss

 (iii)   Determining the remeasurements of the defined benefit liability to be recognized in Other Comprehensive Income

Commentary on Question:
Candidates generally did very well on this part of the question. Some candidates needed to demonstrate a better understanding by explaining how the current service cost, past service cost and interest cost were calculated in part (ii).

3. **Continued**

(i)
- Using an actuarial technique, the projected unit credit method, to make a reliable estimate of the ultimate cost to the entity of the benefit that employees have earned in return for their service in the current and prior periods.
- This requires an entity to determine how much benefit is attributable to the current and prior periods and to make estimates (actuarial assumptions) about demographic variables (such as employee turnover and mortality) and financial variables (such as future increases in salaries and medical costs) that will affect the cost of the benefit.
- Discounting that benefit in order to determine the present value of the defined benefit obligation and the current service cost. The rate used to discount post-employment benefit obligations (both funded and unfunded) shall be determined by reference to market yields at the end of the reporting period on high quality corporate bonds.
- Deducting the fair value of any plan assets from the present value of the defined benefit obligation. Since Company XYZ's plan is unfunded, the entire obligation for the plan would be recognized as a deficit.

(ii)
- Components recognized in profit or loss include current service cost, any past service cost and gain or loss on settlement, and net interest on the net defined benefit liability (asset). Details of each item is provided:

- **Current Service Cost:** In determining the present value of its defined benefit obligations and the related current service cost and, where applicable, past service cost, an entity shall attribute benefit to periods of service under the plan's benefit formula. However, if an employee's service in later years will lead to a materially higher level of benefit than in earlier years, an entity shall attribute benefit on a straight-line basis from:
    o the date when service by the employee first leads to benefits under the plan (whether or not the benefits are conditional on further service) until
    o the date when further service by the employee will lead to no material amount of further benefits under the plan, other than from further salary increases.

3. **Continued**

- **Past service cost and gain or loss on settlement:** When determining past service cost, or a gain or loss on settlement, an entity shall remeasure the net defined benefit liability (asset) using the current fair value of plan assets and current actuarial assumptions, including current market interest rates and other current market prices, reflecting:
  - the benefits offered under the plan and the plan assets before the plan amendment, curtailment or settlement; and
  - the Before determining past service cost, or a gain or loss on settlement, an entity shall remeasure the net defined benefit liability (asset) using the current actuarial assumptions reflecting the benefits offered under the plan before the plan amendment, curtailment, or settlement

- **Net interest on the net defined benefit liability (asset):** An entity shall determine net interest on the net defined benefit liability (asset) by multiplying the net defined benefit liability (asset) by the discount rate

(iii)
- The component applicable to this plan to be recognized in OCI are actuarial gains and losses
- Actuarial gains and losses result from increases or decreases in the present value of the defined benefit obligation because of changes in actuarial assumptions and experience adjustments. Causes of actuarial gains and losses include, for example:
  - unexpectedly high or low rates of employee turnover, early retirement or mortality or of increases in salaries, benefits (if the formal or constructive terms of a plan provide for inflationary benefit increases) or medical costs
  - the effect of changes to assumptions concerning benefit payment options
  - the effect of changes in estimates of future employee turnover, early retirement or mortality or of increases in salaries, benefits (if the formal or constructive terms of a plan provide for inflationary benefit increases) or medical costs
  - the effect of changes in the discount rate.
- Actuarial gains and losses do not include changes in the present value of the defined benefit obligation because of the introduction, amendment, curtailment or settlement of the defined benefit plan, or changes to the benefits payable under the defined benefit plan. Such changes result in past service cost or gains or losses on settlement.

3. Continued

(b) Calculate the following metrics for each benefit being offered:

(i) the present value of future benefits

(ii) the benefit obligation

(iii) the service cost

Commentary on Question:
Candidates did well if they realized that the health spending account benefits started at age 65 and continued until death while the long service benefit was paid up to retirement. Some candidates did not understand that the long service award was a one time payment upon death, withdrawal or retirement. Many candidates did not use the proper attribution period for long service awards. Note that there was no point deduction in what candidates determined as the accrued service of Sabrina given that the month/day of hire and birth were not given in the question.

(i)

Health Spending Account

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)
Year	Svc	Age (x)	q_x	p_x	s_x	v_t	Trend	HSA	Ret
2023	4	57	0.0028	0.9972	0.9972	0.96899	8.00%	1296	0%
2024	5	58	0.0032	0.9968	0.9940	0.93894	7.75%	1396	0%
2025	6	59	0.0035	0.9965	0.9905	0.90983	7.50%	1501	0%
2026	7	60	0.0039	0.9962	0.9867	0.88162	7.25%	1610	0%
2027	8	61	0.0042	0.9958	0.9826	0.85428	7.00%	1723	0%
2028	9	62	0.0046	0.9954	0.9780	0.82779	6.75%	1839	0%
2029	10	63	0.0051	0.9949	0.9730	0.80213	6.50%	1959	0%
2030	11	64	0.0056	0.9944	0.9676	0.77725	6.25%	2081	0%
2031	12	65	0.0062	0.9938	0.9616	0.75315	6.00%	2206	100%
2032	13	66	0.0068	0.9932	0.9551	0.72980	5.75%	2333	100%
2033	14	67	0.0074	0.9926	0.9480	0.70717	5.50%	2461	100%
2034	15	68	0.0081	0.9919	0.9403	0.68524	5.25%	2590	100%

Table to be continued to age 115

HSA PV (expected benefits) = sumproduct{ Columns (C),(F),(I),(J) }
HSA PV (expected benefits) = $39,574

3. Continued

Long Service Gratuity

(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)
Svc	Age (x)	q_x	p_x	s_x	v_t	Inflation	Week Pay	Ret or Death	LSG Pay
4	57	0.0028	0.9972	0.9972	0.96899	4.5%	2,512	0.0028	0
5	58	0.0032	0.9968	0.9940	0.93894	4.5%	2,625	0.0032	41
6	59	0.0035	0.9965	0.9905	0.90983	4.0%	2,730	0.0035	57
7	60	0.0039	0.9962	0.9867	0.88162	3.5%	2,826	0.0039	75
8	61	0.0042	0.9958	0.9826	0.85428	3.0%	2,910	0.0042	97
9	62	0.0046	0.9954	0.9780	0.82779	2.0%	2,969	0.0046	122
10	63	0.0051	0.9949	0.9730	0.80213	2.0%	3,028	0.0051	151
11	64	0.0056	0.9944	0.9676	0.77725	2.0%	3,089	0.0056	169
12	65	0.0062	0.9938	0.9616	0.75315	2.0%	3,150	1	30,481
13	66	0.0068	0.9932	0.9551	0.72980	2.0%	3,213	n/a	-

(K) = LSG Pay$_x$ = (B) x (I) x (J) x s_{x-1}
*Note that Sabrina does not have 5 years of service when she is age 57.
Long Service PV (expected benefits) = sumproduct { Columns (G), (K) }
Long Service PV (expected benefits) = $23,550

(ii)

HSA Benefit Obligation = service/attribution period x $39,574
HSA Benefit Obligation = 3/10 x $39,574 = $11,872

Long Service Benefit Obligation = sumproduct {service/attribution period, Columns (G), (K)}
*Attribution period is to each decrement age so attribution at age 58 for example is 5 while attribution period at age 60 is 7.
Long Service Benefit Obligation = $5,954

(iii)

HSA Service Cost = HSA Benefit Obligation / service = $3,957

Long Service Gratuity Service Cost = Long Service Benefit Obligation / service = $1,985

3. Continued

(c)   With rising interest rates, Sabrina is interested in the impact to the valuation results. Using her own demographic, she estimates that a 1% increase in the discount rate assumption would result in approximately a 15% decrease in XYZ's overall benefit obligation and a 15% decrease in the amounts to be recognized in profit or loss.

Critique Sabrina's statement on:

(i)   the interest rate's impact to XYZ's benefit obligation

(ii)   the interest rate's impact to the amounts to be recognized in profit or loss

Commentary on Question:
Many candidates did not realize that Sabrina's demographics would not necessarily be representative of the entire group.

(i)   Sabrina's 15% estimate on the benefit obligation is reasonable when looking at the results for her individual calculation (candidate can verify this by updating the discount rate in the tool to 4.25%)

This is not reasonable for the company's obligation as a whole, as the interest rate sensitivity may vary by individual. In other words, Sabrina's estimate on the impact to the company is only true if everyone else at the company had a similar gender, birthday, hire date, and salary and Sabrina.

(ii)

Similar to the argument for the benefit obligation, using Sabrina as a proxy for Company XYZ is only reasonable if everyone else at the company had a similar gender, birthday, hire date, and salary and Sabrina.

We can see from question (a)ii, that the amounts to be recognized in profit or loss is made of the service cost and net interest on the defined benefit liability (unfunded plan). So, although the service cost may go the same direction as the benefits obligation (decreasing from the increase in discount rate), the increase in discount rate would also increase the net interest component, offsetting the decrease in service cost. In other words, the 15% decrease is not an appropriate estimate to the impact to the amounts to be recognized in profit or loss.

4.

Learning Objectives:

1.   The candidate will understand and apply valuation principles for insurance contracts.

2.   The candidate will understand how to prepare and be able to interpret insurance company financial statements in accordance with IFRS & IAS.

Learning Outcomes:

(1a)   Describe the types of claim reserves (e.g., due and unpaid, ICOS, IBNR, LAE, PVANYD).

(1c)   Calculate appropriate claim reserves given data.

(1e)   Evaluate data resources and appropriateness for calculating reserves.

(2c)   Project financial outcomes and recommend strategy to senior management to achieve financial goals.

(2g)   Explain fair value accounting principles and describe International Accounting Standards (IAS).

(2h)   Construct basic financial statements and associated actuarial entries for a life and health insurance company.

Sources:
Group Insurance, Skwire, Daniel D., 8th Edition, 2021 Ch. 40: Claim Reserves for Long-Term Benefits

GHFV-103-16: Health Reserves

GHFV-698-21: Comparison of IFRS 17 to Current CIA Standards of Practice, Nov 2020 (excluding sections 3.3, 7.2.1, 7.2.2, 7.2.3, 7.2.5 & 8.1.1)

GHFV-704-20: CIA Draft Educational Note – IFRS 17 Coverage Units for Life and Health Insurance Contracts (excluding sections 3.1.2, 3.1.3, 3.2, 3.4)

Commentary on Question:
This question tested candidates' knowledge on insurance reserving. Overall, candidates did well on part (a) and (b), but had difficulties with subsequent sections. Partial credit was awarded if the LRC or LIC calculation was not fully complete, or simplifying assumptions were made to continue to subsequent sections.

4. **Continued**

Solution:

(a)   Identify the types of liabilities that XYZ would need to hold for the acquired block from ABC. Justify your response.

Commentary on Question:
Partial credit was awarded to identify the type of liabilities, but justifications were required for full credit. Only items pertaining to disabled or in payment claims were applicable. No credit was awarded for other reserves, such as incurred but not reported reserve, policy reserve or unearned premium reserve.

- Due & Unpaid (D&U) Liabilities – liabilities for claims that have been reported, adjudicated and processed, but for which final payment has not been recorded as of the valuation date.
- Loss Adjustment Expense (LAE) – liability for admin costs associated with the adjudicated of unpaid claims.
- Outstanding Accounting Feeds – amounts which have been acknowledged as payments, but for which no check has yet been cut as of the valuation date.
- Present Value of Amounts Net Yet Due – covers claims that were incurred on or before the valuation date which have not accrued as of valuation date.

(b)   Calculate a best estimate tabular claim reserve for Policyholder A as of the valuation date. State any assumptions and show your work.

Commentary on Question:
Candidates did fairly well on this section. Stating the formula and/or a properly labelled table was required for full credit as part of showing work. An assumption on which interest to use was required. Candidates needed to provide a reasonable explanation for their assumption selection.

Formula for tabular reserve: sum payment (benefit*continuance*interestdiscount)

Assumptions made:
- Given this is a best estimate reserve, actual asset earned rate should be used to reflect market rates. Without indicating rationale for why actual terminations are different from expected, we assume expected terminations (current assumptions) hold.

4. Continued

Date of Payment			30/06/2016	31/12/2017	31/12/2018	31/12/2019	31/12/2020	31/12/2021	31/12/2022				
Age				50	51	52	53	54	55				
Annual Benefit				$ 30,000	$ 30,600	$ 31,212	$ 31,836	$ 32,473	$ 33,122				
Expected Termination per 1,000 lives				500	150	75	200	200	200				
Actual Termination per 1,000 lives				350	200	100	150	150	150				
Calculate Reserve:		Claim Duration	6	7	8	9	10	11	12	13	14	15
			12/31/2022	12/31/2023	12/31/2024	12/31/2025	12/31/2026	12/31/2027	12/31/2028	12/31/2029	12/31/2030	12/31/2031	12/31/2032
Age of claimant			55	56	57	58	59	60	61	62	63	64	65
Benefit	2.00%	$	33,122	$ 33,785	$ 34,461	$ 35,150	$ 35,853	$ 36,570	$ 37,301	$ 38,047	$ 38,808	$ 39,584	$ 40,376
Asset Earn rate	4.50%		1.0000	0.9569	0.9157	0.8763	0.8386	0.8025	0.7679	0.7348	0.7032	0.6729	0.6439
Continuance	0.20		1.0000	0.8000	0.6400	0.5120	0.4096	0.3277	0.2621	0.2097	0.1678	0.1342	0.1074
Discounted & Prob weighted cash flows		$	-	$ 25,864	$ 20,196	$ 15,770	$ 12,315	$ 9,616	$ 7,509	$ 5,863	$ 4,578	$ 3,575	$ 2,792
Best Estimate Reserve		$ 108,078											

(c) Compare and contrast the following approaches for revenue recognition under IFRS 17:

   (i) Liability for Incurred Claims (LIC) approach

   (ii) Liability for Remaining Coverage (LRC) approach

Commentary on Question:
In general, candidates did not score well on this section. Most candidates did not mention any similarities between the two approaches. Not all points listed below was required for full credit.

Unique for LIC approach:
- Coverage units would be the same regardless of whether the contract holder was in active life status or in disabled life status
- Views the insured event as the uncertain event that a policyholder becomes disabled, and the annuity payments are simply settlement of the claim
- Faster amortization pattern than the LIC approach
- CMS amortization based on PV of future payments
- Coverage unit calculated as:

$$CU_t = PV(Annuity\ Payments)_t * (\,_tp_x)$$

Unique for LRC approach
- No coverage for contract holders while in disabled life status
- Actuary would consider how recoveries from disability and return to active life status would affect the projection of coverage units
- Considers the insured events as both the uncertain event of the policyholder becoming disabled, and also remaining disabled and eligible to claim.
- Slower amortization pattern than the LIC approach
- Coverage unit calculated as:

$$CU_t = (Annualized\ Annuity\ Payment)_t * (\,_tp_x)$$

4. Continued

Similarities between LIC and LRC approaches:
- These approaches are applied to health products that have annuity payments, such as individual disability, GLTD or LTC.
- The approach is used for determining amortization pattern of CSM
- Both approaches deemed valid interpretations of IFRS 17
- Judgement is involved by the actuary in determining which approach is used

(d) Construct the CSM amortization schedule as of the valuation date under the following approaches, using Policyholder A as a representative point for the acquired block of business:

   (i) LIC approach

   (ii) LRC approach

State any assumptions and show your work.

Commentary on Question:
Candidates did not score well on this question and had difficulties with the practical application of LIC and LRC in calculations.

							*** LIC APPROACH ***				
Year beginning		12/31/2022	12/31/2023	12/31/2024	12/31/2025	12/31/2026	12/31/2027	12/31/2028	12/31/2029	12/31/2030	12/31/2031	12/31/2032
Benefit Payments			$ 33,785	$ 34,461	$ 35,150	$ 35,853	$ 36,570	$ 37,301	$ 38,047	$ 38,808	$ 39,584	$ 40,376
PV of Future Benefits			$ 109,991	$ 84,003	$ 63,612	$ 47,613	$ 35,060	$ 25,210	$ 17,483	$ 11,419	$ 6,662	$ 2,929
Probabilty of Survival		1.0000	0.8000	0.6400	0.5120	0.4096	0.3277	0.2621	0.2097	0.1678	0.1342	0.1074
discounting @ locked-in discounting rate	4.00%	1.0000	0.9615	0.9246	0.8890	0.8548	0.8219	0.7903	0.7599	0.7307	0.7026	0.6756
Current service			87,993	53,762	32,569	19,502	11,488	6,609	3,666	1,916	894	314
current + future service			218,714	130,721	76,959	44,390	24,888	13,400	6,791	3,124	1,209	314
CSM amortization factor			40.2%	41.1%	42.3%	43.9%	46.2%	49.3%	54.0%	61.3%	74.0%	100.0%
BoY CSM			25,000.00	15,390.28	9,332.53	5,544.49	3,201.85	1,775.57	926.84	439.23	175.00	46.90
Interest accretion	3.00%	-	750.00	461.71	279.98	166.33	96.06	53.27	27.81	13.18	5.25	1.41
CSM with interest accretion			25,750.00	15,851.98	9,612.51	5,710.82	3,297.90	1,828.84	954.64	452.40	180.25	48.31
CSM Amortization		-	10,359.72	6,519.45	4,068.02	2,508.98	1,522.33	902.00	515.42	277.40	133.35	48.31
EoY CSM		25,000.00	15,390.28	9,332.53	5,544.49	3,201.85	1,775.57	926.84	439.23	175.00	46.90	-

							*** LRC APPROACH ***				
Year beginning		12/31/2022	12/31/2023	12/31/2024	12/31/2025	12/31/2026	12/31/2027	12/31/2028	12/31/2029	12/31/2030	12/31/2031	12/31/2032
Benefit Payments			$ 33,785	$ 34,461	$ 35,150	$ 35,853	$ 36,570	$ 37,301	$ 38,047	$ 38,808	$ 39,584	$ 40,376
Probabilty of Survival		1.0000	0.8000	0.6400	0.5120	0.4096	0.3277	0.2621	0.2097	0.1678	0.1342	0.1074
Current service			27,028	22,055	17,997	14,685	11,983	9,778	7,979	6,511	5,313	4,335
current + future service			127,664	100,637	78,582	60,585	45,900	33,917	24,138	16,159	9,648	4,335
CSM amortization factor			21.2%	21.9%	22.9%	24.2%	26.1%	28.8%	33.1%	40.3%	55.1%	100.0%
BoY CSM			25,000.00	20,298.46	16,325.49	12,964.25	10,116.49	7,699.60	5,644.17	3,891.80	2,393.41	1,107.72
Interest accretion	3.00%	-	750.00	608.95	489.76	388.93	303.49	230.99	169.33	116.75	71.80	33.23
CSM with interest accretion			25,750.00	20,907.41	16,815.26	13,353.18	10,419.98	7,930.59	5,813.49	4,008.55	2,465.21	1,140.95
CSM Amortization		-	5,451.54	4,581.91	3,851.01	3,236.69	2,720.38	2,286.42	1,921.69	1,615.14	1,357.50	1,140.95
EoY CSM		25,000.00	20,298.46	16,325.49	12,964.25	10,116.49	7,699.60	5,644.17	3,891.80	2,393.41	1,107.72	-

4. Continued

(e) Recommend an approach for XYZ for revenue recognition of the acquired block of business. Justify your answer.

Commentary on Question:
A recommendation was required for full mark. Alternative answers were accepted if they were justified.

I would recommend using the LRC approach due to the following reasons:
- This block has disabled life only, so LIC would be difficult to implement (uncertain event that the policyholder becomes disabled has already passed)
- LRC is more reasonable since the insured event is on the eligibility of the remaining disabled
- LRC has a slower amortization pattern of the CSM than the LIC approach, which may be favorable to XYZ.

Also, XYZ is looking to acquire this business.
- Under IFRS 17, liability for settlement of a claim is to be established as a LRC rather than an LIC. On acquisition of obligations in the claim settlement period, the liability established by the acquirer would be LRC rather than LIC, regardless of how the entity from which the obligations were acquired accounted for the obligations. So, if acquired, XYZ would be required to set this up under LRC eventually under IFRS17 accounting policy.

(f) Critique the 2022 claims termination rate study based on actual-to-expected (A/E) ratios. State any assumptions and show your work.

Commentary on Question:
Only partial credit was awarded for calculating the A/E ratios. For full credit, a critique or conclusion was needed to be provided based on the information derived.

Claims Duration	1.00	2.00	3.00	4+
Expected Termination (Rate per 1,000 lives)	500	150	75	200
Actual Terminations (Rate per 1,000 lives)	350	200	100	150
Calculate A/E	0.70	1.33	1.33	0.75

4. Continued

Assuming the inforce block is similar to model point provided, the block is running at a 0.75 A/E ratio. Overall, there are less terminations than expected. For disability, this means that termination experience was worse than expected. The expected terminations may need to be adjusted for future reserve calculations.

(g) Propose questions that XYZ should ask to ABC in order to get a deeper understanding of their 2022 experience study results.

Commentary on Question:
Most candidates did well on this section. Most candidates recognized that information around how the experience study results were calculated need to be reviewed. Not all the considerations listed below was required for full credit.

- How was credibility defined and was there sufficient data used for the study? If the study was supplemented by industry table, which industry table was used?
- What types of terminations were included? Is it largely recovery or deaths driving terminations?
- What are the exposure characteristics?
- Voluntary Claims Settlements - how they were treated in the study?
- How did the most recent experience study result compare to prior experience studies, such as 2019 or prior?
- What was the source of the raw data used to calculate?
- Was there a claim runoff study also completed?
- Were there any other grouping splits, other than duration, considered? Such as age, COLA indicator, diagnosis, more granular duration bucketing, etc.

5.   **Learning Objectives:**
3.   The candidate will understand how to evaluate the impact of regulation and taxation on insurance companies and plan sponsors in Canada.

Learning Outcomes:
(3b)   Describe the major applicable laws and regulations and evaluate their impact.

Sources:
GHFV-628-17: The Quebec Act Respecting Prescription Drug Insurance and Its Impacts on Private Group Insurance Plans, 2016

GHFV-648-15: Canadian Life and Health Insurance Industry Agreement to Protect Canadians' Drug Coverage

Commentary on Question:
This question is designed to test candidates' knowledge of the drug pooling mechanism available in Canada. More specifically, candidates are asked to demonstrate an understanding of the interaction between different pooling arrangements.

Solution:
(a)   Critique the CEO's statements. Justify your answer.

Commentary on Question:
Candidate needed to critique the CEO's statement and justifications were required for full credit. Not all points listed below were required for full credit.

- The CEO's statement is incorrect because ABC carries an EP3 certificate, and EP3 addresses the key principles for affordability, availably and transferability of coverage.
- Participating insurers of Canadian life and health insurance industry agreement cannot experience rate based on the number or value of pooled drug claims for ABC because ABC's current plan carries an EP3 certificate.
- Participating insurers cannot renew existing employers based on their own pooled drug claims experience, nor can they experience rate new business from another participating insurer based on that employer's own pooled drug claims.
- In Quebec, all insurers, including administrators in the case of self-insured plans, must pool the risks of groups of less than 6,000 certificates.
- In addition, the Canadian life and health insurance industry agreement addresses the CEO's concerns by:
  o Insulating eligible groups from the full financial impact of rare, but recurring, high-cost drug claims. Particularly beneficial to small and medium-sized businesses, who do not typically have the financial resources to absorb a significant increase in premiums.

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5. Continued

- o Allowing employers more ability to shop around for a new provider at reasonable prices, even if they experience a recurring high-cost drug claim.

(b) Explain how the Canadian life and health insurance industry pooling agreement protects the EP3 and Industry Pool from anti-selection under the following two scenarios:

Commentary on Question:
Candidates needed to explain the protections applicable to each scenario to get full credit.

(i) An Administrative Services Only (ASO) group with claims greater than the ongoing threshold in prior years wants to become fully-insured.

- Mandatory exclusion from both EP3 and Industry Pool.
- Exclusion must be removed if certificate subsequently falls below Ongoing Threshold for two consecutive years

(ii) A plan sponsor wants to introduce drug coverage for its employees.

- The insurer can offer EP3 coverage.
- At the end of year one, all high-cost claims must be audited by the insurer to establish if pre-existing.
- Must exclude all pre-existing claims as per rules outlines below:
  - o Claims greater than ongoing threshold in prior year: mandatory exclusion from both EP3 and Industry Pool. Exclusion must be removed if certificate subsequently falls below ongoing threshold for two consecutive years.
  - o Claims less than ongoing threshold but greater than EP3 threshold in prior year: optional exclusion from EP3 pool; pre-ex can be removed; if excluded from EP3 pool must be excluded from Industry Pool.

(c) Describe how the pooled drug claims cost is shared among participating insurers in the following pools:

(i) Canada Drug Insurance Pooling Corporation (CDIPC)

(ii) Quebec Drug Insurance Pooling Corporation (QDIPC)

5. **Continued**

    (i)   Canada Drug Insurance Pooling Corporation

- Three industry pools are proposed based on differences in provincial drug programs:
  (i) Pool 1- Residents of Alberta, Ontario, Nova Scotia, New Brunswick, Newfoundland and Labrador, Prince Edward Island, Yukon, North West Territories and Nunavut;.
  (ii) Pool 2- Residents of Quebec;
  (iii)Pool 3-Residents of British Columbia, Manitoba and Saskatchewan

- The total pooled drug claims will be shared by all participating insurers based on their market share of total paid drug claims for all insured business in applicable provinces.

    (ii)   Quebec Drug Insurance Pooling Corporation

- A formula using cumulative strata is used.
- With this formula, claims below \$16,500 (in 2022) are pooled only among groups with fewer than 50 certificates.
- Claims between \$16,500 and \$32,500 are pooled among the first strata (fewer than 50 and 50 to 124 certificates) while claims above 300,000 are pooled among all strata in 2022, except the last one (6,000 certificates or more).

(d)   Calculate the 2022 claims paid by the following:

    (i)   HealthierPlus Insurance Company

    (ii)   QDIPC

    (iii)   CDIPC

Commentary on Question:
Candidates were not required to describe their thought process as outlined in the solution below for full credit.

5. **Continued**

Quebec Drug Insurance Pooling Corporation (QDIPC)

(1) The number of certificates used to determine the QDIPC pooling threshold is based on participants from al provinces. Therefore, the pooling threshold is $55,000 because there are a total of 125 = 45 = 170 certificates.
(2) The QDIPC only recognizes the participants reside in the province of Quebec.
(3) The amount of claims pooled by QDIPC is the amount of paid claims above the QDIPC threshold.

Certificate	Province	2022 Claims	QDIPC Pooling Threshold	QDIPC Pooled Amount
Certificate 1	Quebec	150,000	$55,000	$95,000
Certificate 2	Quebec	165,000	$55,000	$110,000
Certificate 3	Quebec	34,000	$55,000	$0
Total				**$205,000**

Canada Drug Insurance Pooling Corporation (CDIPC)

(1) Pooling is at a certificate level, and to qualify for the CDIPC pool, the certificate must exceed the initial threshold for at least two consecutive years. In year two and in each subsequent year where the drug certificate exceeds the ongoing threshold will be pooled.
(2) The amount of claims pooled by CDIPC is the amount of paid claims above the ongoing threshold reduced by the coinsurance. A maximum amount of $500,000 must also be considered.

Certificate	Province	2022 Claims	QDIPC Pooling Threshold	CDIPC Ongoing Threshold	CDIPC Eligible Expenses	CDIPC Pooled Amount
Certificate 1	Quebec	$150,000	$55,000	n/a	n/a	$0
Certificate 2	Quebec	$165,000	$55,000	$32,500	=$55,000 - $32,500 = $22,500	=$22,500 * 85% = $19,125
Certificate 3	Quebec	$34,000	$55,000	n/a	n/a	$0
Certificate 4	Ontario	$100,000	n/a	$32,500	=$100,000 - $32,500 = $67,500	=$67,500 * 85% = $57,375
Certificate 5	Ontario	$22,000	n/a	n/a	n/a	$0
Certificate 6	Ontario	$75,000	n/a	n/a	n/a	$0
Certificate 7	Ontario	$750,000	n/a	$32,500	$717,500	Maximum of $500,000 reached
Total						**$576,500**

HealthierPlus Insurance Company

(1) The amount of claims paid by HealthierPlus Insurance Company is the amount of claims not pooled by either QDIPC or CDIPC.
(2) Total cost to HealthierPlus includes pooled claims and non-pooled claims.

5. Continued

Certificate	Province	2022 Claims	QDIPC Pooled Claims	CDIPC Pooled Claims	HealthPlus Insurance Co.
Certificate 1	Quebec	$150,000	$95,000	$0	$55,000
Certificate 2	Quebec	$165,000	$110,000	$19,125	=$165,000 - $110,000 - $19,125
Certificate 3	Quebec	$34,000	$0	$0	$34,000
Certificate 4	Ontario	$100,000	n/a	$57,375	$42,625
Certificate 5	Ontario	$22,000	n/a	$0	$22,000
Certificate 6	Ontario	$75,000	n/a	$0	$75,000
Certificate 7	Ontario	$750,000	n/a	$500,000	$250,000
All Other Certificates					=$960*(125+45-7)
Total					$670,980

6. **Learning Objectives:**
3. The candidate will understand how to evaluate the impact of regulation and taxation on insurance companies and plan sponsors in Canada.

Learning Outcomes:
(3a) Describe the regulatory and policy making process in Canada.

(3b) Describe the major applicable laws and regulations and evaluate their impact.

Sources:
GHVR-713-22: How Will the Potential Work-from-Anywhere Boom Post-Pandemic Impact Benefit Plans?

GHFV-662-16: Firefighter Who Died of Cancer was Killed in the Line of Duty, Court Says

GHFV-663-16: West Nile Victim Wins $130,000 Insurance Payout

GHFV-672-16: CHLIA Guideline G17 – Coordination of Benefits for Out-of-Country/Out-of- Province/Territory Medical Expenses

Commentary on Question:
Commentary listed underneath question component.

Solution:
(a) Describe XYZ benefit plan considerations for employees working remotely outside of Ontario.

 Commentary on Question:
 Candidates received credit for any of the items below as long as their points were clearly articulated. The list below is not exhaustive, but includes the most common responses to receive credit.

 - Company XYZ will need to determine the payroll and taxation implications for employees that want to work within Canada but outside of Ontario.
 - Provincial health-care eligibility requirements vary by province, which would impact overall coverage as benefits plans are integrated with provincial plans
 - Provinces like Quebec would have additional challenges as the province requires employers' prescription drug plans to at least match RAMQ

6. **Continued**

- Canadian insurers often have contractual wording that says they will automatically comply with all provincial regulations. Even if an employer based outside of Quebec has a less generous plan than the RAMQ, an employee newly based in that province would automatically gain access to drug coverage that follows the provincial rule, potentially effecting total benefits cost.
- For those working outside of the country, the cost for coverage could be significantly higher if there is no government plan.
- Company XYZ will need to determine who is responsibility it is (employer or employee) to secure benefits coverage
- Some insurers have implemented fine-print around whether employees can access their out-of-country coverage if they catch the coronavirus abroad, given early government mandates for Canadians to return home.
- Long- and short-term disability insurance also have residency requirements, with employees required to return to Canada if they become disabled.

(b) Justify whether the situation described above would be considered an eligible AD&D claim by referencing any applicable court rulings.

Commentary on Question:
Candidates received credit for sharing pertinent details of the two court cases and then providing support for their conclusion that the AD&D claim was eligible or not. Candidates received credit for either opinion as long as they provided reasonable justification. The solution below includes justification for each position, although a candidate had to only select one.

Toronto Professional Firefighters' Association v. Toronto (City), (2007) 223 O.A.C. 146 (DC)
- Firefighter developed cancer, which arbitrator considered an illness, but Ontario Superior Court of Justice overturned arbitrator decision Firefighter not entitled to AD&D benefits
- Court found that the cancer was due to multiple exposures to toxic substances over the course of the Firefighter's career
- Court ruled his death was caused by unexpected events causing exposure to toxins while performing his duties as a firefighter. He did not intend or expect to expose himself to the toxins, so the court considered the circumstances accidental. This sentiment could be argued for Company XYZ's case.

6. Continued

Kolbuc v. ACE INA Insurance, 2007 ONCA 364 (CanLII)
- A Toronto man was left paralyzed by the West Nile virus after being bitten by a mosquito while working in downtown Toronto
- Ontario Court of appeal ruled that cause of illness an accidental event, and that he could not have reasonably foreseen or expected to contract the virus from the type of work he was doing
- This is relevant to Company XYZ since the employee was following all COVID-19 protocols but still contracted the virus

Examples of reasoning for why it is an eligible claim:
- Occurred while at work; no reason to expect that they would contract it while following protocols.

Examples of reasoning for why it would not be approved:
- Although they contracted COVID-19, they would have survived if didn't have pre-existing health conditions; it is a pandemic so it is expected that one could get COVID-19; employee shared an elevator with a superspreader but could have contracted it elsewhere.

(c) Pertaining to this specific situation:

(i) Explain how to determine the first carrier.

(ii) Describe the responsibilities of the first carrier.

(iii) Calculate the amount reimbursed by each plan. State any assumptions and show your work.

Commentary on Question:
For part I, candidates were expected to explain how the first carrier was determined. Full credit was given for any of the explained points below, however candidates were not required to provide all the points listed below.

Part I

- The First Carrier is the insurer or plan administrator that is first contacted in the event of a claim. The first contacted may or may not provide primary plan coverage.
- In this case, the retiree plan is the primary carrier.

6. Continued

- If the First Carrier determines that its claim assistance services, coverage(s) or benefits are not adequate to respond to the particular situation, it may negotiate with the Other Carriers to assume responsibility for the case management and payment of claims. (for example, if the First Carrier's potential liability will be $10,000 and the claim is expected to be $50,000 or more).
- As the retiree plan has a low lifetime maximum, it may want to negotiate with the individual plan to take this on.
- If the First Carrier determines it has no liability for the claim (for example, if a pre-existing condition has been clearly established), or it can clearly identify the Primary Plan, its responsibilities as First Carrier cease once it informs the Covered Individual and instructs him or her to contact the Other Carrier(s), if any, to pursue the claim.

Commentary on Question:
For part II, candidates were expected to describe the responsibilities of the first carrier. Full credit was given for any of the points described below, however candidates were not required to provide all the points listed. The list below captured the common points provided.

Part II

- Handle case management.
- Taking the initiative to involve an assistance group or service provider.
- Choosing a preferred provider organization.
- Monitoring medical care and/or repatriation.
- Establish as quickly as possible whether Other Carrier(s) exist.
- Personal information held by one insurer or plan administrator cannot be disclosed to another insurer or plan administrator without the consent of the Covered Individual.
- The First Carrier should seek such consent on its claim form or other initial contact.
- Once consent has been received, notify Other Carrier(s) as their prompt notification is critical to the coordination of benefits.
- In this case, the retiree plan should reach out to the spouse retiree plan and the individual plan.
- Provide notification for all in-patient hospitalization claims immediately. For all other claims, notification should be as soon as possible.
- Pay the claim with an amount that is equal to the coverage determined by the terms and conditions of its contract.
- Forward claims documents to the Other Carriers.

6. **Continued**

- Receive assessments from the Other Carriers and allocate liability amongst itself and the Other Carriers.
- As applicable, recover amounts owing from Other Carriers and GHIP.
- In assessing complex claims, and with express consent, the First Carrier may contact the Other Carrier(s) sharing in the claim liability.

Commentary on Question:
For part III, candidates were asked to calculate the reimbursement under each plan (i.e the spouse plan, the retiree plan and the individual plan).

Part III

- The spouse plan and the retiree plan are both primary while the individual plan is secondary since it includes a provision stating that it will pay in excess of all other plans.
- The spouse's plan does not pay since it has a lifetime maximum of $50,000.
  - Where the group retiree plan has a lifetime limit of $50,000 or less, this group retiree plan will always be secondary to other plan coverage without a lifetime limit, to avoid eroding this benefit.
- The retiree plan will pay only up to the amount remaining in excess of $50,000 ($75K - $15K - $50K = $10K)
  - Where the group retiree plan provides for a lifetime limit in excess of $50,000, COB will only be done for amounts of the lifetime limit remaining that are in excess of $50,000.
- The individual plan will repay the outstanding amount ($30K - $10K = $20K)

7. **Learning Objectives:**
2.   The candidate will understand how to prepare and be able to interpret insurance company financial statements in accordance with IFRS & IAS.

Learning Outcomes:
(2c)   Project financial outcomes and recommend strategy to senior management to achieve financial goals.

(2d)   Describe the planning process of a life and health insurance company (strategic, operational, and budgeting).

(2h)   Construct basic financial statements and associated actuarial entries for a life and health insurance company.

Sources:
CIA Educational Note - Financial Condition Testing, *Apr 2020, pp. 1-38*

GHFV-693-19: OFSI Guidelines for Life Insurance Capital Adequacy Test (LICAT)
- Chapter 1: Overview and General Requirements (All sections) (pp. 5-14)
- Chapter 2: Available Capital (sections 2.1-2.2) (pp. 15-40)
- Chapter 6: Insurance Risk: (sections 6.1-6.8, excluding 6.7) (pp. 125-143)

Commentary on Question:
In general, this question was not well answered by most candidates, except for part b (i) where most candidates did well.

Solution:
(a)   List the changes to the SOP related to the introduction of FCT.

Commentary on Question:
Candidates had to retrieve a list of changes. However, only some candidates were able to get partial credits.

1. Renaming of Dynamic Capital Adequacy Testing (DCAT) to Financial Condition Testing (FCT).
2. Revised threshold testing of the base scenario to internal target capital ratio(s) as determined by ORSA rather than regulatory supervisory level(s).
3. Testing of "satisfactory financial condition" using both going concern and solvency scenarios.
    - The threshold for "going concern" scenarios is the minimum regulatory target.
    - The threshold for "solvency" scenarios is that the statement value of assets is sufficient to cover the statement value of the liabilities.

7.   Continued

4. Three options for the opinion of the actuary:
    - Satisfactory
    - Satisfactory subject to …
    - Not satisfactory
5. Elimination of specifications on the number of years for the review of the recent financial position and forecast period.
6. Removal of the detailed listing of risk categories.
7. Distinction made between ripple effects (which may include management's routine actions) and corrective management actions.
8. Ability to harmonize with ORSA

(b)   List and describe key elements of:

(i)   FCT

(ii)   LICAT ratios

Commentary on Question:
Most candidates were able to get 75% to full marks on this part of the question. There are a few candidates who were able to identify the total and core ratio formulas, but did not explain their components.

(i)   FCT

- **Development of a base scenario:**
    o   As stated in the SOP, this would normally be consistent with the insurer's business plan.

- **Development of adverse scenarios:**
    o   Selection of scenarios for inclusion in the report from those modeled showing the greatest sensitivities, where such sensitivity is based on the type of scenario and the associated thresholds being tested.

- **Corrective management actions:**
    o   Identification and analysis of the effectiveness of corrective management actions to mitigate risks.

- **FCT Report:**
    o   Should contains the results of the analysis and recommendations to the insurer's management and the board of directors or chief agent.

7.   **Continued**

- **Opinion statement:**
  - An opinion signed by the Appointed Actuary (AA) indicating the financial condition of the insurer.

(ii)   LICAT

- **Available Capital**:
  - Available Capital comprises Tier 1 and Tier 2 capital, and involves certain deductions, limits and restrictions.

- **Risk Adjustments and Surplus Allowance:**
  - The term "risk adjustment", as used in this guideline in relation to a specific block of business, refers to the risk adjustment for non-financial risks reported in the financial statements that is associated to the block of business. The risk adjustment excludes all provisions for credit risk and counterparty default, as these are financial risks.
  - The amount of the Surplus Allowance used in the calculation of the Total and Core Ratios is equal to the net risk adjustment (i.e. the risk adjustment net of all reinsurance) reported in the financial statements in respect of all insurance contracts other than risk adjustments arising from segregated fund contracts with guarantee risks.

- **Eligible Deposit:**
  - Subject to limits, collateral and letters of credit placed by unregistered reinsurers and claims fluctuation reserves may be recognized as Eligible Deposits in the calculation of the Total Ratio and Core Ratio. Recognition of these amounts is subject to the criteria for risk.

- **Base Solvency Buffer:**
  - Insurers' capital requirements are set at a supervisory target level that, based on expert judgment, aims to align with a conditional tail expectation (CTE) of 99% over a one-year time horizon including a terminal provision.

- **Total Ratio:**
  - Focuses on policyholder and creditor protection. The formula used to calculate the Total Ratio is: (Available Capital + Surplus Allowance + Eligible Deposits) / Base Solvency Buffer.

- **Core Ratio:**
  - Focuses on policyholder and creditor protection. The Core Ratio focuses on financial strength. The formula used to calculate the Core Ratio is: (Tier 1 Capital + 70% of Surplus Allowance + 70% of Eligible Deposits) / Base Solvency Buffer.

7. Continued

(c) Describe how the Base Solvency Buffer is determined in LICAT.

Commentary on Question:
Most candidates were able to identify that the capital requirements are set at a CTE of 99%, aggregated for all geographic regions. However, all the other items were missing in the answer of most candidates.

- Insurers' capital requirements are set at a supervisory target level that, based on expert judgment, aims to align with a conditional tail expectation (CTE) of 99% over a one-year time horizon including a terminal provision.
  - The risk capital requirements in this guideline are used to compute capital requirements at the target level.

- An insurer's Base Solvency Buffer is calculated in respect of all of its assets, all written insurance business, and all other liabilities. It is equal to the sum of the aggregate capital requirement net of credits, for each of six geographic regions, multiplied by a scalar of 1.0. An aggregate capital requirement is calculated for:
  - Canada
  - United States
  - United Kingdom
  - Europe other than UK
  - Japan
  - Other locations

- The aggregate capital requirement within a geographic region comprises requirements for each of the following five risk components:
  - credit risk
  - market risk
  - insurance risk
  - segregated funds guarantee risk
  - operational risk

- Aggregate requirements are reduced by credits for qualifying in-force participating and adjustable products, and risk diversification. Additionally, it is possible to obtain credit (via a reduction of specific risk components or an amount recognized in Eligible Deposits) for the following risk mitigation arrangements:
  - reinsurance (insurance risk components, and other components where reinsurance is explicitly recognized)
  - collateral, guarantees and credit derivatives (credit risk component for fixed-income and reinsurance contracts held)
  - other derivatives serving as hedges (market risk components)
  - asset securitization (credit risk component)

7. Continued

(d) Calculate the required capital for the mortality risk component as of December 31, 2022. State any assumptions and show your work.

Commentary on Question:
This part of the question was not well answered by most candidates. Most candidates were able to identify the mortality risk formula, but were unable to calculate the individual components.

Volatility Risk		
C =		8 075
F =	$A \approx \sqrt{\dfrac{C \times \sum b^2}{F}}$	390 363
A =		368
E =		285 526
Volatility Risk = 2.7 x A X E/F		727
Level Risk		
Spot Discount Rate		5.30%
PV of BEL CFs		91 818
PV 15% Mort Shock for all years		98 584
Level Risk = Shocked - BEL		6 765
Trend Risk		
As Mortality Improvement = 0		0
Catastrophe Risk		
PV of BEL CFs		91 818
PV of the shocked CFs - 1st Year Mortality by 1 per 1,000		99 765
RC		7 947
Mortality Risk =		14 745

$$RC_{mortality} = \sqrt{RC_{vol}^2 + RC_{cat}^2 + RC_{level} + RC_{trend}}$$

(e)

    (i) Justify why the auditor statement is incorrect. State any assumptions and show your work.

    (ii) Explain how the required calculation for the mortality risk component would have been different if the auditor statement was true.

7. **Continued**

Commentary on Question:
In general, this part of the question was not well answered by most candidates, especially part e (ii).

(i)   PV (shocked cashflow at -15% mortality for all years) = $98 584
       PV (best estimate cash flows) = $91 818
       PV (shocked cashflow) - PV (best estimate cash flows) = $6 765

       Because the difference > 0, then death supported business

(ii)   Volatility Risk + Trend Risk + Catastrophe Risk ==> No change

       Level Risk ==> Yes, different calculation

       ▪ The level risk shock for life supported business is a permanent
         increase to the BEA for mortality rate at each age.
       ▪ The increased mortality rates are calculated as (1 + Factor) x Best
         Estimate Mortality Rate
         • where Factor is the Min (11% plus 20% of the ratio of the
           calculated individual life volatility component to the
           following year's net expected claims; 25%)