RET 301 Model Solutions
November 2025

1. Learning Objectives:

The candidate will understand how to analyze/synthesize the factors that go into selection of actuarial assumptions for funding purposes of retirement plans under Canadian pension legislation, regulatory policies, and tax legislation.

Learning Outcomes:

The Candidate will be able to:

a) Describe and apply appropriate techniques used in the development of assumptions for funding purposes
b) Evaluate and recommend appropriate assumptions for funding purposes

Sources:

Task Force Report on Mortality Improvement, CIA Final Report, Sep 2017 [all outcomes]

Mortality Improvements Research, CIA Educational Note Supplement, May 2024 [a. and b.]

Assumptions for Hypothetical Wind-Up and Solvency Valuations with Effective Dates on or after June 30, 2024, and no later than June 29, 2025, CIA Educational Note, Sep 2024 [a. and b.]

Commentary on Question:

This question tested candidates' ability to comment on mortality when setting assumptions.
The model solution below is an example of an answer that would receive full credit; it does not include all possible answers. Other reasonable answers also received credi

Solution:

(a) Describe considerations when selecting a base mortality table in accordance with the Canadian Institute of Actuaries ("CIA") Educational Note on Assumptions for Hypothetical Wind-up and Solvency Valuations for liabilities that are assumed to be settled by:

(i) Commuted value

(ii) Annuity purchase

1. Continued

- Commuted Value
    - Reflecting most up-to-date standard required base mortality table. CPM2014 is used in Canada and provides a standardized base table required for all commuted value calculations.
    - Takes in to account published mortality studies
- Annuity Proxy
    - Adjustment to regular annuity purchase assumptions would be expected where there is demonstrated sub- or super-standard mortality versus a typical group annuity purchase, or where an insurer might be expected to assume significantly shorter- or longer-than-average pension plan longevity based on the above factors
    - Credibility experience: If the plan has credible mortality experience the published tables can be adjusted. Usually smaller plans with limited data use a published table with no modifications since they are not large enough to have credible experience
    - Experience of similar plans
    - Published mortality studies: Reflecting most up-to-date standard base mortality table. Consider selecting a base mortality table consistent with industry standards to ensure comparability and transparency. CPM2014 is widely used in Canada and provides a standardized approach
    - Plan provisions that expose the group to anti-selection or tail risk: Certain provisions in the plan may affect longevity of population and could impact mortality assumptions
    - Adjustments based on characteristics (ex: collar type, industry and pension size)

Commentary on Question part (a):
A candidate who received full points was able to identify all key considerations and most additional considerations for both CV and AP assumptions.

Candidates generally answered this question successfully. Certain candidates didn't give enough details on considerations and only listed key considerations.

(b) Describe the considerations when selecting a mortality improvement scale in accordance with CIA guidance.

1. Continued

- Commuted Value
    - Reflecting most up-to-date standard required base mortality table. CPM2014 is used in Canada and provides a standardized base table required for all commuted value calculations.
    - Takes in to account published mortality studies
- Annuity Proxy
    - Adjustment to regular annuity purchase assumptions would be expected where there is demonstrated sub- or super-standard mortality versus a typical group annuity purchase, or where an insurer might be expected to assume significantly shorter- or longer-than-average pension plan longevity based on the above factors
    - Credibility experience: If the plan has credible mortality experience the published tables can be adjusted. Usually smaller plans with limited data use a published table with no modifications since they are not large enough to have credible experience
    - Experience of similar plans
    - Published mortality studies: Reflecting most up-to-date standard base mortality table. Consider selecting a base mortality table consistent with industry standards to ensure comparability and transparency. CPM2014 is widely used in Canada and provides a standardized approach
    - Plan provisions that expose the group to anti-selection or tail risk: Certain provisions in the plan may affect longevity of population and could impact mortality assumptions
    - Adjustments based on characteristics (ex: collar type, industry and pension size)

Commentary on Question part (a):
A candidate who received full points was able to identify all key considerations and most additional considerations for both CV and AP assumptions.

Candidates generally answered this question successfully. Certain candidates didn't give enough details on considerations and only listed key considerations.

1. Continued

(c) Assess the appropriateness of using the 2014 CPM mortality table ("CPM2014") as the base table for this plan's solvency mortality rates.

- Aligns with CIA guidance. However, with the plan characteristics (higher than expected mortality rates in certain age brackets) the actuary should consider whether adjustments to annuity proxy mortality assumption are necessary to reflect the plan's mortality experience study.
- Considerations can be given to getting more up-to-date mortality experience data after 2020 and determining if recent experience is in line with past experience
- This population is in the mining industry and may have different mortality patterns due to occupational hazards, which usually supports adjustment to both base table and improvement scale
- The CIA is currently conducting a review and update of the Canadian Pensioners' Mortality tables, with revised tables expected to be published in near future. When updating the improvement scale, the actuary may wish to consider the interaction of the base mortality assumption and the mortality improvement assumption, in the selection of these assumptions for a valuation

Commentary on Question:
A candidate that received full points was able to comment on appropriateness of using the 2014 CPM mortality table ("CPM2014") as the base table for this plan's solvency mortality rates and elaborated on all points why the table was appropriate or inappropriate.

Success of this question was varied. Very few candidates mentioned aligning with CIA guidance or the CIA's current review and update of mortality tables. Candidates often mentioned deviations from age 75-85 and super-standard mortality of plan's industry. Candidates who didn't succeed in this question failed to make a comment about the appropriateness of the table and only listed considerations.

(d) Assess the appropriateness of using mortality improvement scale MI-2017 for this plan's going concern valuation, taking into consideration CIA guidance including the 2024 Educational Note Supplement on Mortality Improvements Research.

1. Continued

- With respect to the generational mortality improvement scales CIA MI-2017 (MI-2017), CPM Improvement Scale B (CPM-B) or the new improvement scale in the 2024 research, it may be appropriate to use any one of the improvement scales as a starting point
- The Standards of Practice state: "There is a reasonable range of assumptions that may be selected by the actuary for particular work and that might produce materially different results." In particular, future mortality improvement rates are highly uncertain.
- The CIA guidance emphasizes importance of considering emerging mortality trends and plan specific experience
- If recent experience study indicates that any of the above improvement scales does not properly reflect plan experience then the actuary might need to adjust the improvement scale or consider alternative options for the annuity proxy mortality assumption.

Commentary on Question:
A candidate that received full points was able to mention that MI-2017 and CPM-B may be appropriate to use as a starting point and that mortality rates are highly uncertain. They will have mentioned the importance of considering emerging mortality trends and plan specific experience and if this indicates doesn't reflect plan experience, actuary should adjust improvement scale or consider alternatives.

Candidates' answers were generally sufficient for this question but answers were very varied for each student. Few students mentioned considering emerging tables and the uncertainty related to mortality rates.

2. Learning Objectives:

The candidate will understand how to apply the Canadian pension legislation, regulatory policies, and tax legislation in the context of pension plan funding.

Learning Outcomes:

The Candidate will be able to:

a) Evaluate retirement funding alternatives for the plan sponsor, shareholders and participants
b) Evaluate funding restrictions imposed by regulations

Sources:

Canadian Pensions and Retirement Income Planning, Willis Towers Watson, 6th Edition, 2017 Ch. 15

RET301-103-25: R.R.O. 1990, Reg 909: General Regulations under Ontario Pension Benefits Act

RET301-104-25: R.S.O. 1990, Ch. P.8 under Ontario Pension Benefits Act

Commentary on Question:

This question asked Candidates to calculate the minimum and maximum funding rules for a valuation and perform an extrapolation of liabilities, which was designed to test their knowledge on provincial legislation and income tax restrictions.

Solution:

(a) Calculate the minimum required and maximum permissible employer contributions for 2025 and the amortization payment schedule.

Commentary on Question

In order to calculate the minimum and maximum contributions it was necessary to calculate the funding position on a going concern, solvency, and hypothetical wind-up basis. Some candidates did not recognize that the funding shortfall on the going concern basis would be deferred one year and then amortized over ten years.

Most candidates correctly applied PfAD on the non-indexed NC and going concern liability. They also demonstrated understanding of the calculation of the going concern special payments using the 10-year amortization method and recognized that no solvency special payments were required when the solvency funded ratio is greater than 85%.

Please see Excel for the solution.

2. Continued

(b) Calculate the extrapolated going concern and solvency funded positions as at December 31, 2025.

Commentary on Question:
To extrapolate the solvency liabilities, it was necessary to calculate a blended rate. The solvency transfer ratio was calculated using the market value of assets, not the solvency asset value after adjustment for expenses.
Very few candidates calculated the going concern and solvency liabilities correctly at December 31, 2025. Common errors included using the normal cost after PfAD to roll forward the going concern liability, and applying an incorrect discount rate when rolling forward the solvency liability.

Please see Excel for the solution.

(c) Calculate the minimum required employer contributions for 2026 and the amortization payment schedule. Show all work.

Commentary on Question:
Most candidates recognized that there was a funding shortfall on both a going concern and a solvency basis and checked the funded ratio on a solvency basis to determine that no solvency special payments were required. Successful candidates recognized that the funding shortfall on a going concern basis should be amortized over eight years and that there was no deferral.

Few candidates stated that if the plan is funded below 80%, immediate funding through a top-up contribution is required. When calculating the 2026 employer current service cost contributions, common mistakes included incorrectly rolling forward the normal cost and omitting expenses in calculating PfAD.

Please see Excel for the solution.

3. Learning Objectives:

The candidate will understand how to prepare valuation results, including required contributions, for various purposes under Canadian pension legislation, regulatory policies, and tax legislation.

Learning Outcomes:

The Candidate will be able to:

a) Differentiate between various purposes for valuing pension plans, including:
   i. Going concern funding
   ii. Solvency and hypothetical wind-up
   iii. Termination/wind-up

b) Analyze a variety of asset valuation methods appropriate for regulatory purposes

c) Prepare valuation results for ongoing plans appropriate for regulatory purposes

d) Prepare valuation results for special purposes, including plan terminations, plan mergers or spin-off, actuarial equivalence calculations and asset transfers

Sources:

Guidance on Selection and Disclosure of Plausible Adverse Scenarios, CIA Educational Note, Apr 2023 [all outcomes]

CIA Consolidated Standards of Practice, sections 3100-3500 [all outcomes] – Section 3260

Commentary on Question:

The purpose of the question is to test candidates' understanding of funding valuation requirements related to the assessment and disclosure requirements for plausible adverse scenarios determined in accordance with the Canadian Institute of Actuaries Standards of Practice.

Solution:

(a) Identify the risk that is assessed in each of the plausible adverse scenarios as outlined in the above table. Justify your answer.

Commentary on Question:
Candidates all performed well on this part.

3. Continued

Scenario i : Longevity Risk

- An increase in longevity will have an increase on the liabilities and normal cost. There is no impact on the market value of assets.
- The purpose of this scenario is to provide appropriate information on the sensitivity of the funded status and service cost of plan to changes in the mortality assumption used in the valuation.

Scenario ii: Interest Rate Risk

- A decrease in the interest rate risk will have an increase on the liabilities and normal cost; and an opposite impact on the fixed income portion of the fund assets.
- The purpose of this scenario is to illustrate the sensitivity of the funded status of the pension plan and service cost to an immediate change in market interest rates underlying fixed income investments. Both plan assets (sensitive to change in market interest rates) and plan liabilities (sensitive to change in discount rate) would be impacted.

Scenario iii: Deterioration of asset values

- Apply a shock at the valuation date to the market value of assets with no impact to the liabilities or service cost.
- The purpose is to illustrate the sensitivity of the funded status of the pension plan to changes in the asset values only. No change to the plan liabilities would need to be considered.

(b) Describe the additional plausible adverse scenario disclosure requirements assuming that the XYZ pension plan is a defined benefit pension plan where contributions are fixed.

If XYZ is a pension plan where contributions are fixed

- there is a potential that the contribution base will be lower than expected in the going concern valuation
- contribution base risk should also be in included in the PAS reporting
- contribution base risk is to show the impacts on the ability of the expected contributions to meet the plan's funding requirements.
- This scenario should reflect an immediate reduction in the aggregate expected contributions to be received in the future
- In addition to the current disclosure in the above table, the total expected contributions, total deficit funding, contribution excess should also be included in the table; in order to show the ability of the expected contributions to meet the plan's funding requirements.

3. Continued

(c) Describe the conditions under which an adverse scenario would be characterized as a plausible adverse scenario.

Commentary on Question:
Many candidates performed well on this part. Some candidates struggled with correctly describing the characteristic and threshold for an adverse scenario to be characterized as a plausible adverse scenario.

Solution:

An adverse scenario would be characterized as a plausible adverse scenario if it has a non-trivial probability of occurring within the short term. To meet this threshold, the adverse scenario would generally be consistent with the likelihood of between 1 in 10 and 1 in 20, based on the opinion of the actuary.

(d) Describe two situations where the disclosure of plausible adverse scenarios is not required to be included in an external user report.

Commentary on Question:
Candidates in general did not perform well on this part. Many candidates were able to provide at least one example, but many provided examples that were unrelated to an external user report.

The Plausible adverse scenario disclosures are not required to be included within an external user report if:

- The pension plan is a "designated plan" which has, as of the calculation date, as members, only persons "connected" with the employer as those terms are defined in the Income Tax Regulations (Canada); or
- The valuation is for a pension plan which is not registered under a pension benefits standards act of a province or the federal government of Canada; or
- The valuation is based on an extrapolation of results disclosed in a previous external user report.

Potential responses could also include examples of the situations listed above.

(Example: a designated plan, a pension plan registered outside of Canada or Asset transfer cost certificate based on extrapolation results.)

4. Learning Objectives:

The candidate will understand how to evaluate and apply Canadian pension legislation, regulatory policies, and tax legislation for registered retirement plans.

The candidate will understand how to apply the Canadian pension legislation, regulatory policies, and tax legislation in the context of pension plan funding.

Learning Outcomes:

The Candidate will be able to:

a) Describe sources and framework of government regulation
b) Describe and apply Canadian pension legislation, regulatory policies and tax regulation pertaining to:
   i. Plan design
   ii. Plan establishment
   iii. Members' rights
   iv. Contributions and benefits
   v. Plan amendment
   vi. Plan termination/wind-up
   vii. Plan merger or spin-off
   viii. Reporting requirements
   ix. Individual savings plans

The Candidate will be able to:

a) Evaluate retirement funding alternatives for the plan sponsor, shareholders and participants
b) Evaluate funding restrictions imposed by regulations

Sources:

Morneau Shepell Handbook of Canadian Pension and Benefit Plans, 17th Edition, 2020 - Ch. 13
RET301-111-25: Personal Tax Planning – A Fresh Look at Retirement Compensation Arrangements: A Flexible Vehicle for Retirement Planning

Commentary on Question:

This question tested candidates' ability to evaluate and apply Canadian pension and tax regulation in the context of establishing and funding a Supplemental Executive Retirement Plan (SERP).

The model solution below is an example of an answer that would receive full credit; it does not include all possible answers. Other reasonable answers also received credit

4. Continued

Solution:

(a) Describe the considerations in establishing a SERP with respect to the following:

(i) Eligibility and benefit level

(ii) Governance

Commentary on Question:
Most candidates performed reasonably well on the eligibility and benefit design considerations. The governance portion was less well answered, with many responses offering only generic comments. Stronger responses addressed both parts with specific, relevant considerations.

(i) Eligibility and benefit level

- Define which employees are eligible to participate in the SERP.
- Typically two categories of SERPs:
  - Top-up plans: usually same formula as the RPP, but provide for benefits in excess of ITA maximum, eligibility is automatic if benefits exceed ITA limit
  - Selected enrolment arrangements: based on job title, salary or board discretion. May consider customized accruals which may include high accrual rates, additional service credits or fixed benefit percentages.
- Consider what earnings are eligible, may include base pay only or include bonuses and other compensation
- Need to balance cost containment with competitive offerings.
- Determine vesting conditions (immediate or based on age or service – golden handcuffs)
- Decide whether the plan will be contributory or non-contributory.
- Consider tax implications of employee vs employer contributions.

(ii) Governance

- Consider establishing a plan document for SERP provisions
- Include provisions for plan governance, including who has the authority to make changes or amendments to the arrangement.
- Ensure arrangement complies with tax regulations to avoid tax penalties or negative tax implications for the company or member
- Decide whether the supplementary arrangement will be funded or unfunded.
- Consider the financial stability of the employer and its ability to secure promised benefits.

4. Continued

(b) Compare and contrast the following approaches to securing SERP benefits.

(i) Pay-as-you-go

(ii) Funded Retirement Compensation Arrangements

(iii) Letter of Credit

(iv) Terminal Funding

Commentary on Question:
Most candidates demonstrated a basic understanding of the four SERP security approaches. Stronger responses compared the methods across key themes such as funding requirements, benefit security, tax treatment, and administrative complexity. Weaker responses described approaches in isolation without contrasting them, or omitted one or more approaches entirely.

	Pay-as-you-go	**Funded RCA**	**Letter of Credit**	**Terminal Funding**
Funding requirement & timing	No prefunding; ER pays benefits as they fall due	Ongoing ER contributions to RCA Trust	No prefunding of benefits; ER pays annual LOC fee	Lump-sum contribution at retirement/termination, can be used to purchase annuity or match liabilities
Security of benefits	Low, depends on ER solvency when benefits due	High, RCA assets held in trust, separate from ER assets	Moderate to high, bank guarantee payable if specific events occur (e.g. bankruptcy, change of control)	High, benefits secured, fully funded at retirement/termination
Tax Treatment	ER deduction when benefits paid; no refundable tax	Contributions and investment income subject to 50% refundable tax; refunded when benefits paid	Similar RCA tax rules apply; if LOC is sole asset, refundable tax recoverable only on wind-up	ER deduction when lump-sum contributed; no ongoing refundable tax
Cost	Low short-term; may be high long-term if large obligations come due	High, only half of funds earn returns due to refundable tax	Lower initial cost (LOC fees) but can be costly long-term if refundable tax unrecovered	High one-time cost at funding
Investment return potential	None, no assets invested until benefits due	Limited, 50% refundable tax reduces effective returns	None, LOC itself does not generate returns	Investment returns fixed if matched portfolio or annuity purchase
Administrative complexity	Low, simple to administer	Moderate to high, trust setup, custodian, CRA filings	Moderate, LOC arrangement, annual review, actuary sets face value, CRA filings if part of RCA	Moderate, actuarial work at termination, purchase of annuity, settlement process

5. Learning Objectives:

The candidate will understand how to evaluate and apply Canadian pension legislation, regulatory policies, and tax legislation for registered retirement plans.

Learning Outcomes:

The Candidate will be able to:

a) Describe sources and framework of government regulation

b) Describe and apply Canadian pension legislation, regulatory policies and tax regulation pertaining to:
- Plan design
- Plan establishment
- Members' rights
- Contributions and benefits
- Plan amendment
- Plan termination/wind-up
- Plan merger or spin-off
- Reporting requirements
- Individual savings plans

Sources:

RET301-105-25: Regulation 310/13 Asset Transfers under Ontario Pension Benefits Act

RET301-106-25: Pension Asset Transfers made easier, Pension Benefits and Executive Compensation, February 2014

Commentary on Question:

This question assesses candidate's understanding of Ontario's pension regulations regarding asset transfers between pension plans. Specifically, it focuses on identifying and describing the regulatory requirements related to the effective date of the asset transfer and the solvency ratio requirements for different asset transfer scenarios

Solution:

(a) For each of the two asset transfer scenarios, describe the following regulatory requirements:

(i) Effective date of the asset transfer

(ii) Solvency ratio requirements

5. Continued

Commentary on Question:
Most candidates correctly noted that, for DB plans, the successor plan's solvency ratio cannot fall more than 0.05 below either the original or successor plan's pre-transfer ratios. However, some are confused with the requirement that the successor plan's ratio be at least 0.85 for transfers due to a sale of business, and at least 1.00 for transfers between same-employer plans.

Few answered the effective date accurately. Common errors include confusing the date when the superintendent approves the asset transfer with the effective date and mistaking the date the purchase agreement is signed for the effective date of sale.

No candidate stated that, for DC plans, the entire account balance must be transferred to the successor plan.

Effective date:

For transactions due to the sale of business, the effective date of the transfer is the date of the sale or other disposition of all or part of the original employer's business to the successor employer.

For transfers between plans of the same employer, the effective date is the date of the amendment that gives effect to the transfer.

Solvency ratio requirements for obtaining approval:

For DB transfers resulting from the sale of business, the solvency ratio of the successor plan must be at least 0.85 or not more than 0.05 below the solvency ratio of each of the original and successor plans before the transfer. For DC plan, the entire account balance must transfer to the successor plan.

For transfers between plans with the same employer, the solvency ratio of the successor plan must be at least 1.0 or not more than 0.05 below the solvency ratio of each of the original and successor plans before the transfer.

(b) Calculate the amount of additional company contributions required as a result of the merger. Show all work.

Commentary on Question:
All candidates could calculate pre- and post-merger solvency ratios.
Most noted that the merger did not meet the solvency threshold and a top-up was needed, but many misapplied the 5% rule, incorrectly calculating the top-up to reach 85% or 100% rather than 90%.

Please see Excel for the solution.

5. Continued

(c) Describe the notice requirements involved in completing the asset transfer.

Commentary on Question:
Most candidates are aware that notices must be sent to affected members including former and retired members. However, while some responses mention notice requirements, they often lack completeness. Many focused primarily on the asset transfer process instead of specifically addressing the notice requirements.

Common errors include failing to distinguish between the information needed for active versus inactive statements and mixing up notice requirements with valuation requirements.

Timing: Notice must be issued within six months of the effective date of the transfer.

Recipients: Notices must be sent to: Transferred members, Former members, Retired members, Trade unions, Advisory committees

Notice requirements for active members:

- Content re original plan includes the information that would be required on annual statements
- Must also contain information about any amounts paid out under value test, and information about documentation filed with the Superintendent
- Notice re successor plan benefits must include plan name and registration number, years of service to be credited, description of any differences in benefits and in employee contributions under successor plan, and transfer ratio information
- Original and successor plan notices can be combined

Notice requirement for inactive transferred members:
Plan name and registration number for original and successor plans, effective date of transfer, information about member's benefits, transfer ratio information, and information about documentation filed with the Superintendent

Additional disclosures required if, pursuant to asset transfer under Section 80, purchase / sale agreement provides for individual member consent to transfer of benefits

6. Learning Objectives:

The candidate will understand how to apply the Canadian pension legislation, regulatory policies, and tax legislation in the context of pension plan funding.

Learning Outcomes:
The Candidate will be able to: Evaluate funding restrictions imposed by regulations

Sources:
RET301-103-25: R.R.O. 1990, Reg 909: General Regulations under Ontario Pension Benefits Act [Section 4, 7.02-7.03, 7.1]

RET301-104-25: R.S.O. 1990, Ch. P.8 under Ontario Pension Benefits Act [Section 55 and 55.1]

Canadian Pensions and Retirement Income Planning, Willis Towers Watson, 6th Edition, 2017 [Ch. 15 (excluding Section 1525)

Commentary on Question:
Few candidates were able to correctly calculate the Available Actuarial Surplus for 2026 in part (a).

Solution:
(a) Calculate the Available Actuarial Surplus for 2026. Show all work.

Commentary on Question:
In extrapolating liabilities, most candidates recognized that the going concern annual total current service cost represented the increase in going concern benefits in the year, but fewer candidates recognized that the solvency incremental cost (SIC) performed a similar function in estimating the solvency liabilities.

Available Actuarial Surplus (AAS) was the minimum of the available surplus on a going concern basis and the excess of solvency assets over 105% of the extrapolated solvency liabilities. Successful candidates recognized that for this calculation solvency assets excluded provision for wind-up expenses.

Some candidates calculated AAS for 2026 directly, without first determining the AAS at December 31, 2024 and the remaining surplus at December 31, 2025. In the liability roll-forward calculation, common errors were failing to apply the required load, including the PfAD in the normal cost when rolling forward the going concern liability, or omitting the SIC in the solvency liability roll-forward..

Please see Excel for the solution.

6. Continued

(b) Calculate the 2026 minimum required and maximum permissible employer contributions. Show all work.

Commentary on Question:
Many candidates did not recognize that the expression "going concern annual total current service cost" meant "normal cost", which resulted in various incorrect adjustments in their answers. When determining the employer normal cost contribution, common mistakes included failing to net-out employee contributions or omitting expenses.

Please see Excel for the solution.

7. Learning Objectives:

The candidate will understand how to analyze/synthesize the factors that go into selection of actuarial assumptions for funding purposes of retirement plans under Canadian pension legislation, regulatory policies, tax legislation, and actuarial standards of practice.

Learning Outcomes:

The Candidate will be able to:

a) Describe and apply appropriate techniques used in the development of assumptions for funding purposes
b) Evaluate and recommend appropriate assumptions for funding purposes
c) Evaluate actual experience, including comparisons to assumptions

Sources:

RET301-102-25: CAPSA Guidance Solvency or Hypothetical Wind-up Liabilities Based on Actual Life Insurance Company Annuity Quotation

Assumptions for Hypothetical Wind-Up and Solvency Valuations with Effective Dates on or after June 30, 2024, and no later than June 29, 2025, CIA Educational Note, Sep 2024

Commentary on Question:

This question was designed to test candidates' understanding of assumption setting for a solvency valuation and knowledge of the annuity market. In order to receive full marks candidates needed to explain how the readings applied to the plan specific attributes.

Solution:

(a) Calculate the annuity purchase discount rate to be used for the solvency valuation.

Commentary on Question:

Generally, candidates successfully calculated the duration, although some made minor calculation errors. Approximately half of the candidates successfully calculated the spread, resulting in the correct discount rate. The rest either did not calculate it at all or calculated it incorrectly, earning only partial credit.

Please see Excel for the full solution.

Duration = ((45,038,000/45,000,000)-1)/0.01% = 8.4444
Spread = (160*(9.7-8.4444)+150*(8.4444-7.7))/(9.7-7.7) = 156
V39062 = 3.42%
Discount rate = V39062 + Spread = 4.98%

7. Continue

(b) Propose reasons why the annuity quotation differs from the annuity proxy.

Commentary on Question:
Candidates generally did not perform well. Many candidates listed general facts about the annuity proxy assumptions but did not clearly contrast it with the insurer quote. To receive full credit, candidates needed to relate the answer back to the executive profile of the plan with the general assumption that executives may have a different longevity profile compared to the general population.

An actual quotation representing the cost of purchasing annuities for a pension plan from an organization authorized to carry on a life insurance business in Canada might reflect a more accurate estimate of the solvency or hypothetical wind-up liabilities of the plan on the valuation date than if an annuity proxy approach was used.

The mortality assumption to be used with the proxy is the CPM2014 combined table with mortality improvement scale CPM-B with no adjustments for sub- or super-standard mortality. Since the plan consists of executive employees, insurance companies may have an assumption that the members live longer than the average life expectancy which would result in a quote that differs materially from the proxy.

(c) Describe how you would reflect the annuity quotation in determining the solvency liabilities for the January 1, 2025 valuation.

Commentary on Question:
Candidates had mixed performances on this question. In order to receive full credit, the correct calculation and explanation of each component of the calculation was required. Some candidates showed a general understanding of the timing of the quotation, impact of changing market conditions, or CAPSA's expectations for a quote to be considered whether higher or lower than the valuation liabilities. However, many only mentioned one correct aspect or discussed some considerations but did not connect them back to how the quotation is reflected in the liabilities.

A X B / C

A is equal to the liabilities calculated as at the valuation date (January 1) using the annuity proxy rate based on the CIA Guidance in force at that time with no mortality adjustments

B is equal to the single premium amount at the date of the quotation resulting from the annuity quote.

7. Continue

C is equal to the liabilities calculated as at the date of the quotation (April 30) using the annuity proxy rate based on the CIA Guidance applicable at that time with no mortality adjustments

Other valid considerations：

- The quote may be used only if the quote date is within 6 months before or after the valuation date.
- CAPSA requires the actuary to consider the quotation, whether it is higher or lower than proxy-based solvency liabilities.
- Mortality and other assumptions should align with CAPSA/CIA guidance unless justified otherwise.

(d) Describe the considerations in reflecting or not reflecting the annuity quotation under CAPSA guidance.

Commentary on Question:
Candidates generally did not perform well on this part. Some candidates provided two or more major considerations but did not demonstrate a strong understanding of the concept which required mentioning the CAPSA requirement and a clear comparison of the insurer quote with the annuity quote.

Quote from the insurer:
- You only received a quote from one insurer. Depending on this insurer's appetite for this plan's demographic profile it may not be the best price if more insurers participated
- Reflects the plan's specific demographic profile
- Based on actual market conditions as of the quote date

Annuity proxy:
- Proxy is the average of the 3 best quotes from quotes over the prior quarter and therefore may not represent the best quote you could receive
- Based on the average plans' demographic profile
- Since it's based on the prior quarter quotes, there is a lag on the spread

CAPSA expects that the actuary would consider the quotation in determining the pension plan's liabilities, irrespective of whether the premium amount in the quotation is lower or higher than the solvency or hypothetical wind-up liabilities produced by CIA guidance.