RET DAU Model Solutions
Spring 2023

1. **Learning Objectives:**

1. The candidate will be able to analyze different types of registered/qualified retirement plans and retiree health plans.

3. Candidate will be able to analyze the risks faced by retirees and the participants of retirement plans and retiree health plans.

Learning Outcomes:

Given a plan type, explain the relevance, risks and range of plan features including the following:

- (a) Plan eligibility requirements
- (b) Benefit eligibility requirements, accrual, vesting
- (c) Benefit/contribution formula, including the methods of integration with government-provided benefits
- (d) Payment options and associated adjustments to the amount of benefit
- (e) Ancillary benefits
- (f) Benefit subsidies and their value, vest or non-vested
- (g) Participant investment options
- (h) Required and optional employee contributions
- (i) Phased retirement and DROP plans

(3a) Identify risks faced by retirees and the elderly.

(3b) Describe and contrast the risks face by participants of:

- (i) Government sponsored retirement plans
- (ii) Single employer sponsored retirement plans
- (iii) Multiemployer retirement plans, and
- (iv) Social insurance plans

(3c) Evaluate benefit adequacy and measure replacement income for members of a particular plan given other sources of retirement income.

(3d) Propose ways in which retirement plans and retiree health plans can manage the range of risks faced by plan participants and retirees.

1. Continued

Sources:
DA-115-13: Private Pensions: Alternative Approaches Could Address Retirement Risks Faced by Workers but Pose Tradeoffs, pp.1-35

DA-164-17: Defined Contribution Plan Success Factors

Commentary on Question:
The question was testing candidates' knowledge of risks associated with converting a defined benefit plan to a defined contribution (DC) plan and plan features in a DC plan that help improve income adequacy at retirement.

Solution:
(a) Compare and contrast three risks faced by both participants.

Commentary on Question:
Most candidates were able to identify three risks with some similarities and differences. Full credit was awarded for answers that demonstrated the candidate understood how each risk provided is applicable to this scenario and provided how each sample participant faces the risk. Other valid answers not shown below also received credit.

Investment risk

- Since employer is responsible for making investment decisions, no investment risk for either participant for the DB plan. For the DC plan, employer provides participants with a range of investment options. Participants are responsible for allocating their funds and individually bear investment risks; they will have less money to provide income in retirement if make poor investment decisions or if investments do not perform as well as expected.

- Participant A might not be investment savvy given their age and may make poor investment such as high stock allocation. Unfavorable event (e.g., sharp drop in stock market) is particular concern for Participant A because he lacks enough years before retirement to recoup losses.
- Participant B bears the investment risk for a longer time and may gain greater investment knowledge over time. If he used target-date funds as an investment option, they would automatically shift investments from riskier assets (stocks) to more stable assets (bonds) as he progresses towards retirement and help mitigate his investment risk.

1. Continued

Longevity risk

- Although lump sum distributions may be allowed, DB plan retirement benefits are typically distributed as an annuity. DC plan benefits are typically distributed as a lump sum, and DC plans generally do not offer an annuity payout option. Both participants face longevity risk if DC benefits are taken as a lump sum.
- Longevity risk is contained for Participant A if DB plan benefits are distributed as annuity. However, if DB plan allows lump sum distribution, study shows that there is a higher chance that Participant A might opt to take lump sum from the DB plan and face longevity risk for both retirement benefits.
- After taking lump sum from the DC plan, Participant B must decide how to draw down the account to finance retirement. They may outlive their assets if draw down the benefits too quickly. Conversely, they may unnecessarily reduce consumption and leave more wealth than intended at death if draw down benefits too slowly.

Inflation risk

- Risk is minimal for the final pay DB plan (pension may be adjusted to reflect increase in cost of living). Participants of the DC plan are subject to inflation risk at both accumulation (career average scheme) and drawdown phase (the extent depends on how benefits are distributed in retirement).
- Given DB plan is frozen, Participant A is subject to some inflation risk, as the final average earnings will not reflect his final year of earnings (if work past 60). Less inflation risk at the accumulation phase of the DC plan for Participant A as he is fairly close to retirement.
- In contrast, Participant B's DC plan benefits will be based on average salary over virtually his entire period of service with Company XYZ (if he works until retirement).

(b) Describe provisions that can be included in a DC plan to improve post-retirement income adequacy.

Commentary on Question:
Most participants were able to identify 2-3 provisions to improve post-retirement income adequacy. 4 provisions needed to be described for full credit. Since the question asked the candidate to describe the provisions, a list of features without a description only earned partial credit. Other valid answers not shown below also received credit.

Increase employer contributions, i.e. Match employee contribution

- Employee contribution to the DC plan is optional. Employer could match employee contribution to encourage them to save for retirement.

Add required employee contribution

- Employees are more aware of the DC plan if they are required to contribute. Employer could educate employees in respect to their responsibility to save for retirement.

1. Continued

Automatic enrollment

- Auto-enroll employees at an initial employee contribution deferral percentage to establish a baseline savings rate for new participants.

Automatic contribution escalation

- Consider automatically increasing employee contribution (annually, tying increases to pay raise cycles, etc) to reach an ultimate rate (ex 10%).

2. Learning Objectives:

6. The candidate will be able to analyze/synthesize the factors that go into selection of actuarial assumptions.

8. The candidate will understand how to apply the relevant standards of practice.

Learning Outcomes:

(6a) Evaluate appropriateness of current assumptions.

(6b) Describe and explain the different perspectives on the selection of assumptions.

(8a) Apply the standards related to communications to plan sponsors and others with an interest in an actuary's results (i.e., participants, auditors, etc.)

(8b) Demonstrate compliance with requirements regarding the actuary's responsibilities to the participants, plan sponsors, etc.

(8c) Explain and apply relevant standards of practice related to valuing retirement obligations.

(8d) Recognize situations and actions that violate or compromise Standards.

Sources:

DA-139-21: ASOP 35 - Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations

DA-140-21: ASOP 27 - Selection of Economic Assumptions for Measuring Pension Obligations

Fundamentals of Retiree Group Benefits, Yamamoto, Dale H., 2nd Edition, 2015
Ch. 9 (pp. 308-339 and pp. 350-357)

DA-806-18: ASOP 21 - Responding to or Assisting Auditors or Examiners in Connection with Financial Audits, Financial Reviews and Financial Examinations

DA-824-21: Working with Auditors of Pension and OPEB Plans, Dec 2019

Commentary on Question:

This question requires candidates to demonstrate their understanding of the Actuarial Standards of Practice including situations where the Standards are violated. Successful candidates were able to recognize and articulate their rationale in these situations. Candidates did better in part (a) than part (b).

2. Continued

Solution:

(a) Develop the assumption rationale required to be included in the disclosure reports under Actuarial Standards of Practice No. 27, Selection of Economic Assumptions for Measuring Pension Obligations and No. 35, Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations for the following assumptions:

(i) Discount rate

(ii) Expected return on assets

(iii) Mortality

(iv) Turnover

(v) Retirement age

(vi) Per capita claims cost

Commentary on Question:
To receive full credit in part (a), candidates needed to note that all assumptions were prescribed by NOC, comment on the reasonability of each assumption, and note the relevant ASOP criteria.

All assumptions are prescribed by NOC.

Discount rate:

The discount rate, chosen by the company, is in accordance with accepted actuarial practice and the actuary believes it is within the accepted range of reasonable assumptions. The discount rate is based on high quality corporate bond yields as of the measurement date. Discount rate should be based on the expected benefit payments of the plan. For the health benefit program, should be based on expected payments of claims and for the pension plan should be based on expected payments of pension.

Expected return on assets:

The long-term expected return on assets assumption measured as of January 1, 2023, as prescribed by NOC, is 6.75%. The rationale for setting this assumption includes utilization of a building block approach wherein the expected real return of each asset class is added to the expected impact of inflation.

2. Continued

The real rate of return reflects the expectation of long-term return to equilibrium for each asset class and relies upon the current and target allocations as set in the plan's investment policy. Using this method, as well as an arithmetic approach, suggests a long-term return assumption that significantly exceeds the current assumption prescribed by NOC. As such, the EROA assumption, chosen by NOC, is not in accordance with accepted actuarial practice and the actuary believes it is not within the accepted range of reasonable assumptions.

Mortality:

The mortality table, chosen by the company, is in accordance with accepted actuarial practice and the actuary believes it is within the accepted range of reasonable assumptions.

The mortality table is based on the most recent mortality table available. The company does not have credible experience to establish its own mortality table and believes it is reasonable to have the plan's mortality assumption follow the most recent mortality table available with no adjustment. There have been liability gains due to mortality experience during the last 3 years. Using no mortality improvement is reasonable since experts believe long-term improvement is not expected to materialize.

Turnover:

The turnover assumption, chosen by the company, is not in accordance with accepted actuarial practice and the actuary believes it is not within the accepted range of reasonable assumptions. This assumption is usually based on the following factors:

- Age / service;
- Hazardous conditions, location, work environment;
- Early retirement subsidies, and
- Occupation.

The turnover assumption is based on an outdated experience study from 2000-2005. There have been liability gains of at least 2% for each of the past 5 years due to turnover experience. The actuary does not take responsibility for this assumption.

Retirement age:

The retirement assumption for the pension plan, chosen by the company, is in accordance with accepted actuarial practice and the actuary believes it is within the accepted range of reasonable assumptions.

2. Continued

The retirement age is based on the earliest unreduced retirement age of the plan. There have not been significant liability gains or losses from retirement. There are no reasons to believe the assumption is not adequate given it seems to follow the actual experience closely.

The retirement assumption for the retiree medical plan, chosen by the company, is not in accordance with generally accepted actuarial practice, and the actuary does not believe it is within the accepted range of reasonable assumptions.
The retirement age is based on the earliest unreduced retirement age of the pension plan. Even though there have not been significant liability gains or losses from retirement, it is not reasonable to assume a single retirement at age 62 for retiree medical purposes given that there is no social plan coverage in Gevrey. Someone retiring at age 55 receives a significantly greater medical benefit than they would if they retired at age 62. The pension benefit is reduced for this early retirement adjustment while the retiree medical benefit is actually greater for an earlier retirement age.

Per capita claims cost:

Per capita claims cost assumption was chosen by the company. There has not been any recent analysis on claim costs. Therefore, the actuary cannot assess the reasonableness of that assumption. The actuary does not take responsibility for this assumption.

(b) Recommend a response under the guidelines outlined in Actuarial Standards of Practice No. 21, Responding to or Assisting Auditors or Examiners in Connection with Financial Audits, Financial Reviews and Financial Examinations.

Commentary on Question:
Many candidates did not answer the question which was asked. Credit was not provided for stating that actuaries should be cooperative and professional. While that is true and included in ASOP 21, this question only asked the candidate to provide information that would support the valuation assumptions.

After confirming with NOC, the actuary should draft an assumptions memo with the following information:

Discount rate – provide data and results generated from the model detailing the selection of the bond portfolio supporting the discount rate of 5.75%. The information should include the bonds selected, the yields, the benefit payment stream, and the resulting discount rate and duration.

Expected return on assets – provide the target allocation for NOC's fund as well as the results of the actuary's capital markets expectations.

2. Continued

Mortality – the information should summarize the conclusions on the mortality assumption, highlighting the use of the most recent table and the agreement from mortality experts for future expectation.

Turnover assumption – provide information on the most recent experience study and that recent gains are a product of possible workforce disruption, especially for oil & gas providers like NOC. We should note these disruptions do not reflect long-term expectations and that our current study reflects our best estimates of future experience. If the auditors remain concerned, we might recommend a select and ultimate assumption, increasing terminations in the near term and then reverting back to normal levels.

Retirement – provide information on any significant gains or losses from this assumption. We should also note that the single age, while not appropriate for all cash flow projections, is adequate for pension valuation purposes. It is likely not appropriate for retiree medical purposes.

In addition to the data, methods, assumptions and corresponding rationale, the actuary should disclose the source of methods and assumptions for which the actuary is not taking responsibility

The actuary should also disclose any significant risks to the entity, NOC.

3. Learning Objectives:

7. The candidate will be able to recommend and advise on the financial effects of funding policy and accounting standards in line with the sponsor's goals, given constraints.

Learning Outcomes:

(7a) Perform valuations for special purposes, including:
   (i) Plan termination/windup
   (ii) Accounting valuations
   (iii) Plan mergers, acquisitions and spinoffs

(7d) Advise plan sponsors on accounting costs and disclosures for their retirement plans under various standards and interpretations.

Sources:

DA-179-19: Introduction (A58), IFRS1 (paragraphs 1-40 & Appendix A), IAS19, IFRIC14

Commentary on Question:

Parts (a) and (b) of the question tested the candidates' knowledge on the concepts of IFRIC14. This question was not well done overall. Many candidates gave incomplete, or even blank responses. See additional commentary in each individual part below.

Solution:

(a) Explain the concept of an economic benefit under IFRIC Interpretation 14: IAS 19 – The Limit on a Defined Benefit Asset, Minimum Funding Requirements and their Interaction.

Commentary on Question:

This was the best answered part of the three. Most candidates received credit for recognizing that economic benefits are related to future contributions and had to take into consideration minimum funding requirements.

- an economic benefit is available if the entity can realize it at some point during the life of the plan or when the plan liabilities are settled
- an entity shall determine the maximum economic benefit available from refunds, reductions in future contributions, or combination of both
- if there is no minimum funding requirements for contributions relating to future service, the economic benefit available as a reduction in future contributions is the future service cost to the entity
- If there are minimum funding requirements
    - o analyze minimum funding contributions required to cover (a) any existing shortfall for past service on the minimum funding basis and (b) future service

3. Continued

- o if an entity has an obligation under a minimum funding requirement to pay contributions to cover an existing shortfall on the minimum funding basis in respect of service already received, the entity shall determine whether the contributions payable will be available as a refund or reduction in future contributions after they are paid into the plan
- o To the extent that the contributions payable will not be available after they are paid into the plan, the entity shall recognize a liability when the obligation arises
- o The liability shall reduce the net defined benefit asset or increase the net defined benefit liability

(b) List the considerations used to test whether an entity has an unconditional right to a refund under International Accounting Standard IAS 19, Rev. 2011 (IAS 19).

Commentary on Question:
This part of the question was poorly answered by candidates.

- Refund is available to an entity:
  - o during the life of the plan, without assuming that the plan liabilities must be settled in order to obtain the refund (eg. In some jurisdictions, the entity may have a right to a refund during the life of the plan, irrespective of whether the plan liabilities are settled); or
  - o assuming the gradual settlement of the plan liabilities over time until all members have left the plan; or
  - o assuming the full settlement of the plan liabilities in a single event (eg. Plan wind-up)
- An unconditional right can exist, whatever the funding level of a plan, at the end of the reporting period

(c) Describe the disclosure requirements under IAS 19 for defined benefit pension plans.

Commentary on Question:
The question asks for disclosure requirements per IAS 19, meaning what is to be presented in the financial statement results. Majority of candidates instead listed the items required for a funding actuarial report and did not reference items specifically listed in IAS 19.

- explain the characteristics of the defined benefit plan and risks associated
  - o nature of benefits (i.e. final salary, contribution based with guarantees)
  - o regulatory framework (i.e. minimum funding requirements, asset ceiling)
  - o description of risks, with focus on unusual, entity/plan-specific risks
  - o description of amendments, curtailments, settlements

3. **Continued**

- Identify and explain the amounts in its financial statement arising from the plan
  - o net defined benefit liability (asset)
  - o show: current service cost, interest income/expense
  - o show: remeasurement (return on assets, actuarial gains/losses from change in demographic, and economic assumptions)
  - o disclose significant actuarial assumptions
- Describe how the plan may affect the amount, timing, and uncertainty of the entity's future cash flows
  - o sensitivity analysis for each significant actuarial assumption
  - o description of asset-liability matching strategies, including annuities, longevity swaps, etc.
  - o expected contribution to plan for next annual reporting period
  - o information about maturity profile of defined benefit obligations (i.e. weighted average duration)

4. Learning Objectives:

6. The candidate will be able to analyze/synthesize the factors that go into selection of actuarial assumptions.

Learning Outcomes:

(6a) Evaluate appropriateness of current assumptions.

(6b) Describe and explain the different perspectives on the selection of assumptions.

(6d) Recommend appropriate assumptions for a particular type of valuation and defend the selection.

Sources:

Credibility Educational Resource for Pension Actuaries, Society of Actuaries

Commentary on Question:

Candidates generally did well on this question. To receive full credit, they needed to provide justification for their responses.

Solution:

(a) Propose the data items to collect for the mortality study.

Justify your response.

Commentary on Question:

Candidates needed to provide justification to receive full credit. Only partial credit was provided for items listed without justification.

Date of birth for each exposure each year – this item is needed to assess age for each exposure each year

Date of death, as applicable, for each exposure each year – this is needed to quantify number of deaths at each age

Gender – Standard mortality tables are gender-specific, and there is much evidence available that mortality significantly differs between males and females.

Benefit Amount – this is necessary because pension liabilities are amounts weighted. Benefit amounts are often a predictor of mortality rates, and standard tables are often developed using amounts weighting

(b) Recommend a response to Company ABC's inquiry.

Justify your response.

4. Continued

Commentary on Question:
Candidates needed to provide a response, with justification for why limiting the experience to only 2021 and 2022 may not be reasonable, to receive full credit.

NOC's recommended experience period of 2021-2022 is not appropriate, and five years of experience data should instead be used

Reasons NOC's suggested experience period may not be reasonable:
- Generally, three to five years of experience is recommended for a mortality credibility study
- 2021 and 2022 seem likely to be anomalous years and are not representative of the plan's experience as a whole
- Inclusion of additional years would increase the amount of exposures and provide greater credibility
- This shorter experience period may be difficult to justify by the actuary under ASOP 35

(c) Derive the multiplier to be applied to the standard table base rates based on credibility theory.

Show all work.

Commentary on Question:
Candidates generally performed well on this question.

The model solution for this part is in the Excel spreadsheet

5. Learning Objectives:

3. Candidate will be able to analyze the risks faced by retirees and the participants of retirement plans and retiree health plans.

4. The candidate will be able to evaluate plan design risks faced by sponsors of retirement plans and retiree health plans.

Learning Outcomes:

(3b) Describe and contrast the risks face by participants of:
- (i) Government sponsored retirement plans
- (ii) Single employer sponsored retirement plans
- (iii) Multiemployer retirement plans, and
- (iv) Social insurance plans

(4c) Recommend ways to mitigate the risks identified with a particular plan feature.

(4d) Assess the impact of possible changes in plan design due to changes in legislation.

Sources:

DA-114-13: Risk Management and Public Plan Retirement Systems - Appendices A to C only (remainder is background)

DA-166-17: Shifting Public Sector DB Plans to DC, pp. 1-22

Commentary on Question:

Candidates generally did well on parts a and c. Candidates sometimes struggled to identify a second COLA structure for part b.

Solution:

(a) Describe the impact of the current inflationary environment on the following stakeholders of Municipality ABC's pension plan.

- (i) Society/taxpayers

- (ii) Municipality ABC

- (iii) Current and future plan participants

Commentary on Question:

Candidates generally did well on this part.

5. Continued

Society/Taxpayers

- Higher inflation increases the cost of the plan without changing the plan provisions
- It could result in reduced quality of public services if less money is available to invest in other public items
- It could result in increased taxes if funding requirements increase as a result of the high COLAs

Municipality ABC

- Increases costs to the municipality by increasing pension benefits
- Could result in difficulty getting people to retire if they are concerned about the purchasing power of their benefits and they are not going to receive a COLA for at least 10 years after retirement
- Could lead to municipality employees expecting wage increases, resulting in 1) increased turnover if wages don't meet employee expectations and/or 2) increased costs to Municipality ABC as a result of increased wages

Current and future plan participants

- Inflation reduces the purchasing power of benefits for retirees not immediately eligible for a COLA
- Higher costs to the plan could result in reduced benefit security for participants that aren't immediately eligible for a COLA
- Retirees eligible for a COLA see no reduction in the purchasing power of their benefits
- Current employees rely on future wage increases in line with inflation to protect the purchasing power of their benefits

(b) Propose two alternative COLA structures that result in more equitable sharing of the inflation risk among current retirees, future retirees, and Municipality ABC.

Justify your response.

Commentary on Question:
Candidates needed to describe two separate COLA structures and describe how those structures shift the inflation risk to receive full credit. Credit was not given for proposing a second version of the same structure or for simply proposing an increase in benefits.

5. Continued

Automatic COLA for all retirees with cap (e.g., the COLA is equal to inflation but no greater than 3%).

- An automatic COLA with a cap allows all retirees to gain some sort of inflation protection
- Limiting the size of the COLA reduces Municipality ABC's cost and risk.

COLA for all retirees with amount tied to investment performance

- Design: COLA could be either [1] conditioned on investment return meeting a certain threshold (e.g., full COLA is given if return exceeds the discount rate) or [2] scaled on investment return (e.g., COLA is somewhere between 0% and inflation depending on how well assets performed).
- This method separates the direct link between inflation and the COLA, and allows all retirees to receive equal increases in their benefits
- Conditioning or scaling the COLA on investment performance makes the plan more affordable and less risky to Muncipality ABC.

(c) Describe how changing from a defined benefit structure to a defined contribution structure would impact the inflation risk faced by the following stakeholders:

(i) Current and future plan participants

(ii) Society/taxpayers

Commentary on Question:
Candidates generally did well on this part.

Current and future plan participants

- Current and future employees absorb the inflation risk associated with their DC benefit once retired.
- Inflation risk unchanged for legacy DB benefit for retirees and current employees
- It may be difficult to purchase an annuity with the DC benefit that provides inflation protection for current and future employees.

Society/Taxpayers

- Reduced inflation risk with regard to the DC benefit once it has been accrued
- Could exacerbate wage increases needed to retain employees to offset the increased risk retained by employees with regard to their retirement benefits
- Retains inflation risk associated with legacy DB benefit

6. Learning Objectives:

7. The candidate will be able to recommend and advise on the financial effects of funding policy and accounting standards in line with the sponsor's goals, given constraints.

Learning Outcomes:

(7d) Advise plan sponsors on accounting costs and disclosures for their retirement plans under various standards and interpretations.

Sources:

DA-170-17 Accounting for Buy-Ins

DA-168-19: IFRS and US GAAP: Similarities and Differences, Ch. 5 only

Commentary on Question:

This question requires candidates to demonstrate their understanding of the accounting impact of an annuity buy-in and whether or not it triggers any special accounting events. Successful candidates were able to demonstrate such understanding and compare how the accounting treatments are different between IAS 19 and ASC 715

Solution:

(a) Compare and contrast the accounting implications of an annuity buy-in under International Accounting Standards IAS 19, Rev 2011 (IAS 19) versus U.S. Accounting Standard ASC 715 (ASC 715).

No calculations required.

Both IAS 19 and ASC715 would not consider an annuity buy-in transaction a settlement.

Balance sheet impact:
IAS 19: assets are reduced to reflect the value of the underlying DBO and there is no impact on the DBO
ASC 715: buy-in policy is a plan asset measured at fair value. Relevant PBO may be unchanged (same as under IAS 19) OR it may be potentially valued on the same basis as the policy value.

Profit and loss impact will be different under the two accounting standards.
IAS 19: No immediate impact. However, a lower asset value will feed through into a higher net interest charge in future years.
ASC 715: If the fair value is less than the premium paid, there would be an asset loss to amortize (plus there will be impact on subsequent EROA). Also, there could be assumption losses to amortize if the PBO was determined based on the fair value of the policy (plus impact on subsequent interest cost).

6. Continued

(b) Describe the accounting implications of converting an annuity buy-in to an annuity buy-out under both IAS 19 and ASC 715.

No calculations required.

Under IAS19 a buy-in followed by a buy-out will technically trigger settlement accounting. The settlement charge is expected to be $0 since the PBO associated with the annuity buy-in / buy-out is not changed. There will likely be an immediate asset loss associated with the premium paid for the buy-in vs. the PBO removed.

Under ASC 715 a buy-in followed by a buy-out will trigger a settlement if the amount of the PBO removed is greater than the sum of service cost and interest cost. The settlement gain/loss reflects the pro-rata recognition of previously unamortized gains or losses on the entire plan.

7. **Learning Objectives:**

1. The candidate will be able to analyze different types of registered/qualified retirement plans and retiree health plans.

6. The candidate will be able to analyze/synthesize the factors that go into selection of actuarial assumptions.

Learning Outcomes:

Describe the structure of the following plans:

(a) Traditional defined benefit plans
(b) Defined contribution and savings plans
(c) Hybrid Plans
(d) Retiree Health plans
(e) Other alternative retirement plans such as share risk plans, target benefit plans, etc.

Given a plan type, explain the relevance, risks and range of plan features including the following:

(a) Plan eligibility requirements
(b) Benefit eligibility requirements, accrual, vesting
(c) Benefit/contribution formula, including the methods of integration with government-provided benefits
(d) Payment options and associated adjustments to the amount of benefit
(e) Ancillary benefits
(f) Benefit subsidies and their value, vest or non-vested
(g) Participant investment options
(h) Required and optional employee contributions
(i) Phased retirement and DROP plans

(6d) Recommend appropriate assumptions for a particular type of valuation and defend the selection.

Sources:

CIA Educational Note: Financial Risks Inherent in Multi-Employer Pension Plans and Target Benefit Pension Plans, CIA Task Force on MEPP/TBPP Funding, May 2011

Morneau Shepell Handbook of Canadian Pension and Benefit Plans, Shepell, Morneau, 17th Edition, 2020 – Chapter 1

7. Continued

Commentary on Question:
This question tests candidates' knowledge on the plan design and governance structure of multiemployer pension plans. Further, it tests candidates' knowledge on underlying risks present in multiemployer pension plans and different mechanisms available to reduce those risks. The question requires candidates to utilize their knowledge and apply it from the perspective of the Board of Trustees who administrate these types of pension plans.

To receive full credit, candidates must provide supporting information when requested to justify their response.

Solution:
(a) Identify the design and governance characteristics of a traditional multiemployer pension plan (MEPP).

Commentary on Question:
Overall, candidates successfully identified the design characteristics of a traditional multiemployer pension plan but struggled to fully identify the governance characteristics.

MEPP design characteristics:
- Known cost for participating employers
- Reasonable benefit expectations for plan members
- The business failure or other termination of participation of a participating employer will generally have little impact on the plan's sustainability, unless the failed group represents a dominant portion of the plan
- Administrative ease for participating employers
- Continued membership if the member changes employers within the same industry, thus full benefit portability
- Flat benefit or career average accrual formula
- Ability to reduce benefits, as the benefit that is communicated to members is a target
- Contributions are collectively bargained

MEPP governance characteristics:
- Administrator of a MEPP takes the form of a board of trustees
- Legislated plan member participation in plan governance because typically at least half of the board of trustees must represent plan members.
- The board is charged with the fiduciary responsibility of making decisions on behalf of all plan beneficiaries
- The Board sets the benefits based on the collectively bargained contributions

7. Continued

(b) Compare and contrast participation in a MEPP and a single employer defined contribution pension plan from the perspective of the plan participants.

Commentary on Question:
Candidates need to ensure they compare and contrast from the perspective of the plan participants.

COMPARE:
MEPP:
i. Employers remit contributions on a fixed rate basis for each employee.
ii. The risks are borne by the members as the benefits can be reduced (retroactive and prospective) if the benefits are not supportable or mis-managed.

Single Employer Defined Contribution Plan:
i. Employers remit contributions on a fixed rate basis for each employee
ii. The risks are borne by the individual members

CONTRAST:
MEPP:
The members are entitled to a lifetime pension at retirement based on the MEPP benefit formula and plan provisions.
The benefit communicated to members at their normal retirement age is a target.
The risks (investment, longevity, interest rate, credit, etc.) are pooled among the members and not assumed by each member.
No flexibility in retirement income.

Single Employer Defined Contribution Plan:
The members are entitled to an accumulated account balance at retirement based on the contributions remitted and the investment income earned over their career.
The benefit or retirement income at the normal retirement age is unknown.
The risks (investment, longevity, interest rate, credit, etc.) are not pooled among the members and are assumed by each member.
Flexibility in retirement income.

(c) Propose three ways a Board of Trustees could mitigate financial risks in a fully funded MEPP with a significant retiree population.

Justify your response.

Commentary on Question:
Candidates struggled to justify the risk mitigating techniques they proposed. Other valid mitigating strategies, with appropriate justification, also received credit.

7. Continued

Implement Margins:

- There are a variety of approaches that may be taken to include margins in the valuation. Such approaches include margin in the actuarial assumptions, establishing a non-specific liability or reserve, or specifying an acceptable range for the relationship between the contractual contribution rate and the best estimate normal actuarial cost or total actuarial cost.
- Most common assumption to include margin for adverse deviation is the discount rate. Can also include margin in the mortality and retirement rates.
- A variable level of margin (one that increases in good times and reduces in bad times) is appropriate to address risks such as interest rate risk, inflation risk, and demographic risk.
- The level of margin in the contribution rate is the present value of the excess of the expected contributions over the expected normal actuarial cost for a period of time (for example, the period permitted under legislation to eliminate a going-concern unfunded liability).

Reducing the equity allocation:

- Trustees may want to consider alternative asset classes with reasonable inflation matching characteristics and traditionally lower volatility. Asset classes with these characteristics include:
  - Real return bond coupons
  - Real estate
  - Infrastructure
- Reducing equity allocation may reduce risk in the plan, but the asset allocation is directly linked to the actuarial assumption for future returns. Reducing equity may result in the reduction in the plan's discount rate and an increase in the liabilities.

Applying Immunization techniques:

- Immunization techniques include duration matching, cash flow matching and annuitization of retired life liabilities.
- Full cashflow matching or duration matching increases the likelihood that benefits will be paid.
- Complete matching of assets and liabilities is rarely appropriate though, as the level of benefits that can be provided on this basis is likely lower. A balance must be struck.
- Annuitization of retiree life liabilities ensures a perfect immunization and, in most cases, is a complete transfer of future risk to the insurer.

8. **Learning Objectives:**

5. The candidate will be able to evaluate sponsor's goals for the retirement plan, evaluate alternative plan types and features, and recommend a plan design appropriate for the sponsor's goals.

6. The candidate will be able to analyze/synthesize the factors that go into selection of actuarial assumptions.

Learning Outcomes:

(5c) Assess the feasibility of achieving the sponsor's goals for their retirement plan.

(5f) Design retirement programs that manage retirement risk and are consistent with sponsor objectives.

(5l) Recommend an appropriate plan type and plan design features for providing retirement benefits and defend recommendations.

(6a) Evaluate appropriateness of current assumptions.

Sources:

DA-174-18: An Improved Application of the Variable Annuity

DA-188-21: AAA practice note on Variable Annuity Plans, pp. 6-20 & Appendix (pp. 55 -58)

Commentary on Question:

This question was designed to test candidates' understanding of how variable annuities work in a Defined Benefit pension scheme. To receive full credit, candidates needed to recognize the variable annuity provision was being added to the current Defined Benefit pension plan and have a strong understanding of the design of the variable benefit provision.

Solution:

(a) Describe how a variable annuity provision works.

A variable annuity provision that is being added to a career average defined benefit pension arrangement will allow pensioners the option to take on investment risk to earn future pension growth:

- Fixed defined benefit pension may be converted to a variable benefit pension
- Variable benefit will be increased and decreased when actual investment returns (or measurement) are greater and less than, respectively, the hurdle rate
- Plan document must define the assumed investment return to be used as the hurdle rate

8. Continued

- May apply to entire Plan Fund, designated subaccount, specific index or a specific fund
- A hurdle rate chosen to be the targeted real rate of investment return is expected to provide post-retirement inflation protection
- Floors or ceilings can be applied to annual variable benefit adjustments

(b) Describe two methods for adjusting accrued benefits payable under a variable annuity provision.

Commentary on Question:
The solution below provides formulas which could be used to adjust benefits. Candidates who successfully described the adjustments in words, vs. formulas, also received credit.

Method 1: Variable benefit provision benefits could be adjusted as follows:

$Bn = Bn\text{-}1 * (1 + i_n) / (1 + h)$

Whereas,
Bn = accrued annual benefit at beginning of nth plan year
Bn-1 = accrued annual benefit at beginning of previous plan year
i_n = investment return between year n-1 and n
h = hurdle rate

A smoothing technique could be adopted for the variable benefit adjustments to reduce larger fluctuations in benefits year to year.

Method 2: Variable benefit provision benefits could be adjusted as follows:

$B_n = B_{n-1} * (1 + i_n - h)$

This method has some theoretical basis for plans that pay monthly benefits but determine the adjustment annually. This method would produce larger gains or losses than realized.

(c) Explain the impact of adding a variable annuity provision on the following:

(i) Investment risk

(ii) Valuation of liabilities

8. Continued

(i) Investment Risk

Adding this designed variable benefit annuity (VBA) provision to the defined benefit pension plan will shift the investment risk to the pensioners selecting this option at retirement.

If VBA pensioners' accrued benefits at retirement are fully funded by the Plan Sponsor, the Sponsor's investment risk would be fully shifted onto the VBA pensioners for assets backing these obligations. If the accrued benefit is not fully funded at retirement, investment returns exceeding the hurdle rate would have an inverse effect and would deteriorate the funded position of the VBA obligation further.

(ii) Valuation of liabilities

For valuing the VBA obligation, the present value of the VBAs will be discounted by the defined hurdle rate as any investment gains or losses adjust the actual benefit payable to the pensioners. The VBA obligation is independent of market interest rates as the obligation is tied directly to the performance of the portfolio of assets; therefore, changes in market interest rates have no effect on the sponsor's obligation. If accrued benefits are fully funded, any remaining variation in VBA obligation will be associated with non-investment experience being different than assumed.

If other provisions that are difficult to measure are built into the VBA provision, such as floors or ceilings of the annual adjustment, other modeling techniques such as stochastic modeling, option-pricing techniques, or deterministic procedures may be a more appropriate valuation method.

9. **Learning Objectives:**

7. The candidate will be able to recommend and advise on the financial effects of funding policy and accounting standards in line with the sponsor's goals, given constraints.

Learning Outcomes:

(7a) Perform valuations for special purposes, including:
- (i) Plan termination/windup
- (ii) Accounting valuations
- (iii) Plan mergers, acquisitions and spinoffs

(7d) Advise plan sponsors on accounting costs and disclosures for their retirement plans under various standards and interpretations.

Sources:

DA-170-17: Accounting for Buy-ins

DA-804-19: FASB Accounting Standards Codification Topic 715

Duration and Convexity for Pension Liabilities, Pension Section News, Sep 2013

Pension Risk Transfer: Evaluating Impact and Barriers for De-Risking Strategies, 2014, pp. 16, 17 & 20-27

Commentary on Question:

Commentary listed underneath question component.

Solution:

(a) Calculate the 2023 Net Periodic Pension Cost under U.S. Accounting Standard ASC 715 (ASC 715).

Show all work.

Commentary on Question:

This numerical question was answered well. Successful candidates showed detailed calculations of the 2023 Net Periodic Pension Cost. The model solution uses simple interest; calculations using compound interest approach are also acceptable and received credit.

The model solution for this part is in the Excel spreadsheet.

9. Continued

(b) Calculate the following values under ASC 715 reflecting the annuity buy-out:

(i) 2023 Net Periodic Pension Cost

(ii) 2023 Other Comprehensive Income

Show all work.

Commentary on Question:
To receive full credit for Part (i), candidates were required to show the following calculations:

- *Remeasurement of liabilities as at July 1, 2023 prior to the annuity buy-out*
- *Impact of the annuity buy-out on liabilities: settlement loss*
- *Revision to 2023 Net Periodic Pension Cost after the annuity buy-out, including fully recognizing the gains/losses due to remeasurement and settlement*

Although the question specifies that gains/losses are recognized immediately in the period in which they arise, many candidates spent time to calculate the 2023 Other Comprehensive Income and thus did not receive credit for Part (ii). Successful candidates were able to explain that the 2023 Other Comprehensive Income is 0.

The model solution uses simple interest; calculations using compound interest approach are also acceptable and received credit.

The model solution for this part is in the Excel spreadsheet.

(c) Describe how the values in part (b) would change if the transaction was an annuity buy-in rather than an annuity buy-out.

No calculations required.

Commentary on Question:
Candidates are expected to explain in words how Part (b) would change if this were instead an annuity buy-in. Candidates who performed well indicated how gains/losses would differ and how subsequent Net Periodic Pension Cost would be impacted.

9. Continued

- No settlement would be triggered under a buy-in.
- The policy is a plan asset, measured at “fair value”, i.e. the surrender value or possibly the premium that would be paid currently. Asset loss to be recognized immediately if “fair value” less than the premium paid.
- PBO may be unchanged or potentially valued on the same basis as the policy value. No immediate impact if PBO is unchanged. If PBO is based on fair value of the policy, liability loss will be recognized immediately.
- Subsequent EROA and interest cost would be impacted.

10. **Learning Objectives:**

1. The candidate will be able to analyze different types of registered/qualified retirement plans and retiree health plans.

4. The candidate will be able to evaluate plan design risks faced by sponsors of retirement plans and retiree health plans.

5. The candidate will be able to evaluate sponsor's goals for the retirement plan, evaluate alternative plan types and features, and recommend a plan design appropriate for the sponsor's goals.

Learning Outcomes:

Describe the structure of the following plans:

(a) Traditional defined benefit plans
(b) Defined contribution and savings plans
(c) Hybrid Plans
(d) Retiree Health plans
(e) Other alternative retirement plans such as share risk plans, target benefit plans, etc.

Given a plan type, explain the relevance, risks and range of plan features including the following:

(a) Plan eligibility requirements
(b) Benefit eligibility requirements, accrual, vesting
(c) Benefit/contribution formula, including the methods of integration with government-provided benefits
(d) Payment options and associated adjustments to the amount of benefit
(e) Ancillary benefits
(f) Benefit subsidies and their value, vest or non-vested
(g) Participant investment options
(h) Required and optional employee contributions
(i) Phased retirement and DROP plans

(4a) Identify how plan features, temporary or permanent, can adversely affect the plans sponsor.

(4c) Recommend ways to mitigate the risks identified with a particular plan feature

(5a) Describe ways to identify and prioritize the sponsor's goals related to the design of the retirement plan.

(5b) Assess the tradeoffs between different goals.

(5c) Assess the feasibility of achieving the sponsor's goals for their retirement plan.

10. **Continued**

(5l) Recommend an appropriate plan type and plan design features for providing retirement benefits and defend recommendations.

Sources:
DA-145-13: Acquiring a U.S. Operation—A Primer

DA-169-17: Mergers and Acquisitions: Key Considerations for Retirement Plan Conversion

Managing Post Retirement Risks: Strategies for Secure Retirement, 2020 (case study background only)

Commentary on Question:
Candidates did generally well on this question, which required recalling items in part (a) and analyzing, comparing, and evaluating plan features in part (b) from different perspectives.

Candidates needed to list both advantages and disadvantages to receive full credit in part (a), and they needed to critique each feature from each perspective to receive full credit in part (b).

Solution:
(a) Explain the advantages and disadvantages from an employer's perspective of merging defined contribution plans.

Commentary on Question:
Candidates needed to provide both advantages and disadvantages to receive full credit. Valid answers not shown below also received credit.

<u>Merging plans ADVANTAGES</u>
Cost savings after plans merged
Use of single provider for economies of scale and simpler communications
Easier administration for employer
Providing uniform benefits to all employees

<u>Merging plans DISADVANTAGES</u>
Administrative complexities
Higher legal, actuarial and communications costs
Greater communications challenge
May affect retention of employees since some inequitable benefits are provided

10. Continued

(b) Critique the merged plan provisions from the perspective of:

(i) A highly compensated employee from Company A

(ii) The Vice President of Human Resources focused on retention

(iii) The CFO focused on cost containment

Commentary on Question:
Several candidates only covered a few items for each perspective, so they only received partial credit.

The solution below is representative of what would earn full credit, but it is not an exhaustive list of all possible critiques. Valid answers not shown below also received credit.

Plan Provision	**Merged provision**	**Critique**
Employee required contributions	Fixed 4% of salary and bonus	(i) Most valuable for because the design includes bonus (ii) may not like the higher required level for participants since it could detrimentally impact lower paid participants who can't afford this: they may terminate employment (iii) Does not like the additional company costs that are going to be required as match due to higher required employee contributions
Employee AVCs	Up to 8% of salary and bonus	(i) appreciates the additional ability to save for retirement since likely has additional income to defer (ii) likes providing additional flexibility to company A ee's, but recognizes that this represents a cut-back for Company B employees (iii) No real opinion regarding this provision since it does not impact what the plan sponsor costs

10. Continued

Employer matching	100%	(i) appreciate the full match and increase from what previously received from company A (ii) offers a more valuable benefit to company A and keeps 100% match for Company B so makes retention related to benefit level easy (iii)less favorable because the total cost will be higher. All matches for Company A will be higher than previously, PLUS the employee required contributions for everyone are higher than under previous plans
Eligibility	After 1 year	(i) Probably doesn't care because most likely already has service, but is slightly less favorable if a new hire (ii) less favorable impression since EEs do not get in right away. May be harder to retain people who came from A. (iii) should lead to lower costs than if provide immediate eligibility to all so favorable impression
Vesting	After 1 year	(i) Probably doesn't care because already has service to be vested, but is slightly less favorable if a new hire (ii) will appreciate giving employees an incentive to stay at least 1 year (iii) may view negatively since newer employees from Company B now only have to stay 1 year to vest in benefits provided by company
Auto-enrollment	Yes	(i) Probably doesn't care because likely already in plan (ii) appreciates the feature since should help provide adequate retirement benefits for the workforce (iii) may view negatively since results in higher participation and higher costs
Default investment	Balanced fund	(i) no change from what was already provided by Company A, so no opinion (ii) not much of an opinion either way for the default option. May result in people (iii) not much of an opinion since how employees invest their money will not impact what the employer provides.

10. Continued

Earliest retirement age	50	(i) appreciates that it's the same as before (ii) offers better feature for B. These employees can now retire earlier than previously, so could be harder to retain post age 50 (but perhaps easier to retain people in their 40s) (iii) likes because if people retire earlier they are no longer getting contributions from the plan and could be replaced by lower-paid employees
Default payment	Variable annuity	Most may not care because it impacts participants versus the company. Participant in (i) has no change, plus this is just the default (not full range of options).

11. Learning Objectives:

1. The candidate will be able to analyze different types of registered/qualified retirement plans and retiree health plans.

5. The candidate will be able to evaluate sponsor's goals for the retirement plan, evaluate alternative plan types and features, and recommend a plan design appropriate for the sponsor's goals.

Learning Outcomes:

Describe the structure of the following plans:

(a) Traditional defined benefit plans
(b) Defined contribution and savings plans
(c) Hybrid Plans
(d) Retiree Health plans
(e) Other alternative retirement plans such as share risk plans, target benefit plans, etc.

(5f) Design retirement programs that manage retirement risk and are consistent with sponsor objectives.

(5j) Advise a plan sponsor regarding the choice of design elements for their retiree health program.

Sources:

Fundamentals of Retiree Group Benefits, Yamamoto, Ch 1 & 4 (excluding pp. 89-110)

Commentary on Question:

Candidates did well on part a of this question, but many did not do well on part b.

Solution:

(a) Identify reasons why the prevalence of employer-sponsored post-retirement health care programs has declined over the past several years.

- Health care benefits are tax effective but employers do not receive the full credit for providing benefits because of hidden costs of their subsidy to the plans
- Benefits are seen as valuable by only a minority of active employees until closer to retirement age.
- Employees are more mobile now and less focused on long-term careers and loyalty
- Because workers are less loyal and have more independence, there is less incentive for employers to feel social responsibility for providing retiree benefits

11. Continued

- Competition is more global across many industries. As other competitors eliminate or don't establish retiree plans, it becomes easier to reduce or remove these programs
- Cash cost of providing retiree benefits is increasing fast, typically faster than other company cash costs.
- Unions have been more flexible in this area, sometimes trading retiree benefits for something else they perceive of value.
- Availability of guaranteed, affordable health care coverage offered by PPACA has lessened need for retiree coverage for pre-Medicare retirees

(b) Compare and contrast three types of employer subsidy caps to a post-retirement health care program to contain future cost increases.

Commentary on Question:
This part of the question was generally not well answered by candidates. Many candidates did not know what was meant by "subsidy caps."

Employers can consider the following types of subsidy caps:

- **Total expenditure cap**: Expressed as a total amount employer is willing to pay for retiree health care plan. This is a total amount for projecting future obligation. This amount can be fixed in total based on number of retirees at that time. This amount could be indexed in the future (for example at a rate that is less than health care cost trends).
- **Defined Contribution Cap**: This is a cap stated as a fixed amount per retiree (eg $5,000) and the retiree pays the excess. Could have different pre/post 65 amounts. The difference with the total expenditure cap above is that the amount can be fixed per retiree instead of in total. There are various DC cap options.
- **Account Balance Plan**: The employer sets the subsidy as a lump sum amount in an account balance. There are various options, such as providing a lump sum based on service (eg $750 per year of service). The account can be used to withdraw health care related expenses – eg like a flexible spending account, or to pay for premiums. The difference with the other options above (Total expenditure /DC caps) is that the amount can fluctuate by person more than the other options and the future obligation may be harder to estimate.

All three options limit what the plan sponsor pays towards the post-retirement health care program and serve to shift higher costs to retirees.

The defined contribution cap and account balance plan approaches provide caps on an individual basis (so some retirees are immediately impacted while others may not be), whereas the total expenditure cap places a ceiling on the cost for the entire covered group.