1. **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.

**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
(j) Risk-sharing provisions

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

(4b) Assess the risk from options offered, including:

(i) Phased retirement
(ii) Postponed retirement
(iii) Early Retirement
(iv) Option factors
(v) Embedded options
(vi) Portability options
1. Continued

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

(4d) Analyze the issues related to plan provisions that cannot be removed.

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

Sources:
Morneau Shepell Handbook of Canadian Pension and Benefit Plans, Shepell, Morneau, Whiston, Bethune and Clooney, J. Gregory, 16th Edition, 2016, Ch. 3

DA-100-13: Issues for Implementing Phased Retirement in Defined Benefit Plans

DA-165-17: Phased Retirement – An Important Part of the Evolving Retirement Scene

Commentary on Question:
Commentary listed underneath question component.

Solution:
(a) Explain the advantages and disadvantages of phased retirement from the following perspectives:

(i) Employer

(ii) Employee

Commentary on Question:
Candidates received credit for other items not explained below.

Advantages of Phased Retirement (Employer Perspective)
• Employer retains experience and knowledge of employee
• Employer may postpone search for and training of new employees
• Employer can use employee in an as-needed basis (e.g., seasonal work)
• Phased retirement for older employees allow more opportunities for growth of junior employees
• Flexibility in terms of setting up a phased retirement program for employees (e.g., timing of phasing, level of phasing, etc.)
• Cost savings from reducing workload of older and higher-salaried employees
• Opportunities to have specialized employees work on special projects or training
• Employer can retain employees who do not wish to work full time
1. Continued

Disadvantages of Phased Retirement (Employer Perspective)
- Working retirees may introduce other issues in terms of other employee benefits (e.g., part-time status)
- Employer would need to provide guidance on appropriate use of phased retirement
- Health benefits would need to be aligned with the work
- May not be able to choose which employees elect to take a phased retirement

Advantages of Phased Retirement (Employee Perspective)
- Employees have the option of easing into retirement without changing jobs (i.e., managing the end of their own career)
- Early access to retirement benefits may cause inadequate benefits upon full retirement vs. having a phased retirement
- For those electing to work part time after retirement, not all employees will have other sources of income
- Employee might continue to be eligible for other employment benefits available to full-time employees

Disadvantages of Phased Retirement (Employee Perspective)
- Employees may be limited to working fewer hours in phased retirement as part of the program
- Certain restrictions may need to be met before employees are eligible to qualify for phased retirement benefits (e.g., no in-service distributions can be made before the plan’s normal retirement date, not in a designated plan)
- Phased retirement may be difficult for participants to understand in terms of impact on pension benefits
- Additional spousal consents may be required if members receive benefits during phased retirement, which may increase confusion

(b) Propose three plan provision changes to Company ABC’s defined benefit plan to encourage utilization of phased retirement.

Justify your response.

Commentary on Question:
Credit was only given for proposing changes based on plan provisions provided in this question; no credit was awarded for suggesting new plan provisions. Successful candidates identified at least 2 justifications for each change.

Candidates received credit for other appropriate responses not indicated below.
1. **Continued**

1. ABC can modify the accrual formula to use a different earnings definition
   a. The current formula will significantly reduce the pension accrual for phased retirements
   b. ABC can annualize the final pay to create a more equitable formula

2. ABC can modify the commencement rules for the plan so that members can begin receiving payments before the current requirements
   a. The current formula will not allow members to receive pension income until the later of age 65 or full termination from ABC
   b. The current rules do not provide ABC with any flexibility regarding workforce management for employees approaching to retirement age

3. ABC can remove the maximum service cap for members who may receive over 30 years in phased retirement
   a. Older, long-service employees may not see much benefit in phased retirement if they are already at the service cap
   b. For workforce management issues, ABC can opt to increase the service cap slightly to accommodate phased retirements
2. **Learning Objectives:**
   3. Candidate will be able to analyze the risks faced by retirees and the participants of retirement plans and retiree health plans.

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

**Sources:**
CIA Ed Note: Financial Risks Inherent in Multi-Employer Pension Plans and Target Benefit Pension Plans, CIA TF on MEPP/TBPP Funding, May 2011

**Commentary on Question:**
Most candidates did well on part (a), but struggled with parts (b) and (c).

**Solution:**
(a) The following risks are associated with a multiemployer defined benefit pension plan:
   (i) Mismatch between the contribution rate and cost of accruals
   (ii) Decline in hours worked
   (iii) Intergenerational transfers

Explain each of the above risks.

1. **Risk from the Difference between the Contribution Rate and the Cost of Accruals**
   - If the difference between the contribution rate and the normal actuarial cost is small, then the plan has only a limited ability to absorb experience losses.
   - This is because only a small part of the contribution rate is available to fund any required past service contributions.
   - This risk is particularly great for mature plans.
2. Continued

2. Risk of a Decline in Hours Worked
   • Where a portion of the contribution is used to cover a deficit, a reduction in the hours worked leads to lower contributions to finance that deficit.
   • In addition, a reduction in hours worked, may influence part of the workforce to retire earlier, leading to an experience loss when subsidized early retirement is offered.
   • Also, an increase in retirements, together with increased lump sum termination benefits, can result in negative cash flows for mature plans, increasing their liquidity needs and limiting investment alternatives.

3. Risk of Intergenerational Transfers
   • The benefits received from the plan should be reasonable based on the relative proportion of contributions made to the plan (i.e., everyone should pay their own way).
   • Intra-generational equity does not adhere to this principle since the relative value that similarly situated members take out of a plan can vary widely depending on plan experience, the individual’s personal circumstances, basic plan design terms, etc.
   • The board of trustees would decide the extent to which inequities (expected on an a priori basis) are reasonable, particularly since many factors affecting the plan’s finances are completely out of the board’s control

(b) Describe how each of the above risks are measured.

Commentary on Question:
Many candidates reiterated the description of the risks from part a, as opposed to describing how to measure the risk.

Overall, candidates did not provide enough detail to demonstrate an understanding of how to measure the risks in question.

1. Difference between the Contribution Rate and the Cost of Accruals
   • The risk can be measured by looking of the present value of portion of future expected contributions that is in excess of the cost of expected future accruals.
   • This represents the maximum experience loss that can be absorbed by the plan.
   • This present value should be determined over the number of years over which the plan desires to be able to achieve full funding (10 to 15 years).
   • Expressing the excess present value as a percentage of the liabilities provides an indication of the relative risk of the plan.
2. Continued

- Expressing the sum of the surplus and the present value of the excess contributions as a percentage of the liabilities provides an indication of the cushion that exists to avoid the risk that the total contribution rate could become insufficient to support the benefits.

2. **Hours Worked**
- The risk may be measured by performing sensitivity and stress testing analyses.
- Such analyses can assess the impact on the funded status and the ability of the fixed contribution rate to satisfy statutory funding requirements for a plan.
- The frequency of this monitoring should increase when hours worked fluctuate by more than pre-established acceptable range.
- Increased monitoring may be in the form of annual valuations or the preparation of monthly / quarterly financial projections
- Asset/liability studies using variable work hours over the projection period can also provide insights into the plan’s ability to absorb the variances.

3. **Risk of Intergenerational Transfers**
- In order to measure risk, current contributions can be split into the portion to fund the normal actuarial cost and the portion to fund any deficits.
- The greater the amount by which current contributions differ from the normal actuarial cost, the greater is the wealth transfer among past generations, current generations and future generations.

(c) Describe employer strategies for mitigating each of the above risks.

**Commentary on Question:**
Similar to part b, most candidates did not provide enough detail to demonstrate an understanding of mitigating the risks in question.

Other strategies that were appropriately described also received credit.

1. **Difference between the Contribution Rate and the Cost of Accruals**
- This risk would first be considered by assessing the degree of asset/liability mismatch and the current level of “margin” (the sum of the surplus and the present value of the excess of the expected contributions over the expected normal actuarial cost for a period of time).
- If the margin is too small for the level of the asset/liability mismatch, the benefits may not continue to be supportable. Risk can be mitigated by means of effective disclosures in the actuarial report.
2. Continued

- If the margin is more than sufficient, it suggests that the benefits can be improved (a decision of the board), but the advice that the practitioner provides to the board would include the point at which the margin becomes too small.

2. **Hours Worked**
- Stress testing may be undertaken to determine the extent of the risk of a reduction in hours worked.
- When undertaking such stress testing, it is also important to reflect any other experience that is likely to occur due to the reduction in hours.
- Examples of other adverse experience include:
  - If the reduction in hours is likely to be borne by older members, then there may be associated losses due to additional retirements,
  - If the reduction in hours is likely to be borne by younger members, then there may be an associated increase in the unit credit normal cost rate,
  - Many multiemployer plans permit the banking of hours such that a reduction in hours worked (leading to a reduction in contributions) may not result in a similar reduction in the hours credited under the plan, and
  - Some plans have a relatively low threshold for a full year of credit, in which case reduced hours (and the related reduction in plan contributions) may not result in reduced credits.
- Reflecting these additional “side effects” of a reduction in hours worked may lead to very different conclusions in assessing risk.

3. **Risk of Intergenerational Transfers**
- In order to mitigate the risk, the Board of Trustees should answer the following questions:
  - Is it desirable to have generations of members, who happen to be at a vulnerable age when market conditions deteriorate, bear the full impact on benefits of the financial implications of these results?
  - Is there some downside protection that is part of the implicit contract under this type of program?
  - Is it desirable for the generation of members present at the time of a large surplus to reap the full reward of such a surplus?
- An actuary can provide analysis to assist the Board
3. **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.

8. 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:**

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
- (j) Risk-sharing provisions

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

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

(8e) Advise plan sponsors on accounting costs and disclosures for their retirement plans under various standards and interpretations.
3. Continued

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

Commentary on Question:
Commentary listed underneath question component.

Solution:
(a) List reasons a company would offer retiree health and welfare benefits as part of its total compensation and benefits package.

Commentary on Question:
Most candidates did well on this part. Eight distinct reasons were required to receive full credit for this question.

- Tax effective means of providing retirement financial security
- Valuable benefit for current retirees and those soon to retire
- Benefits can support workforce planning and growth opportunities for employees (attraction and retention)
- Availability of ongoing health care coverage considered social responsibility of employer
- Retiree health care benefits help provide competitive package of total compensation
- Current cash costs are nominal relative to total spending on benefits
- Retiree benefits are often at top of list of union demands
- Employer has a history of providing these benefits

(b) Propose three changes to the National Oil Full-Time Salaried and Union Retiree Health Benefit Program to lower the Accumulated Postretirement Benefit Obligation without changing the underlying medical and life benefits covered.

Justify your response.

Commentary on Question:
Candidates did not do as well on part b, mostly because they did not justify each proposal. In addition to providing three distinct changes, candidates needed to explain why each change would both lower the APBO and not impact the benefits to eligible retirees, in order to receive full credit. Credit was not given to proposals which did not meet the criteria of immediately lowering the APBO and leaving current medical/life benefits unchanged.
3. Continued

Proposal 1: Charge retirees premiums for own coverage: ex. retiree pays 25% of total premium (not 100% funded by er)
Premium could be service or age based
Cost sharing will reduce NOC liability since retirees are now also paying
Cost sharing may lead to lower participation if retirees/spouses can find other coverage elsewhere

Proposal 2: Make early retirement age/eligibility more stringent than 55/10 ex. change to 60/10
Fewer retirees would be eligible, so lower benefit payments from NOC
NOC still providing access to post-retirement medical coverage for retirees who meet stated requirements
Retiree medical eligibility would no longer match pension eligibility for union: could lead to workforce mgmt. problems

Proposal 3: Charge for spousal coverage
Should lead to reduction in number of covered parties -> lower liability for NOC
Spouses may already have access to coverage from own work so NOC does not need to provide this benefit
No change in coverage of retiree’s own medical care for retiree’s lifetime

(c) Describe how the elimination of the $50,000 retiree life insurance benefit would impact the components of the Net Periodic Postretirement Benefit Cost under U.S. Accounting Standard ASC 715.

No calculations required.

**Commentary on Question:**
*Most candidates did well on part c. To receive full credit for this question, candidates needed to comment on the impact of all aspects of benefit cost.*

- anticipate lower SC
- anticipate lower IC, due to lower APBO
- anticipate lower expected benefit payments from employer
- Need to create PSC base due to plan change
- PSC base will equal change in APBO
- Since PSC base will be negative, recognized first as credit to OCI (meaning it first offsets the existing positive PSC base(s))
- PSC (the remainder after offsetting the existing positive PSC base(s)) should be amortized over expected future service to full eligibility among active ees
- G/L amortization could change because the corridor (based on APBO) will change
4. **Learning Objectives:**

8. 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:**

(8a) Perform valuations for special purposes, including:

(i) Plant termination/windup
(ii) Accounting valuations
(iii) Open group valuations
(iv) Plan mergers, acquisitions and spinoffs

(8e) Advise plan sponsors on accounting costs and disclosures for their retirement plans under various standards and interpretations.

**Sources:**

DA 804-19: FASB Accounting Standards Codification Topic 715

**Commentary on Question:**

*This question tests the candidate’s ability to recognize and account for a curtailment under US GAAP.*

**Solution:**

(a) Calculate the impact of the plan freeze on the Funded Status and Accumulated Other Comprehensive Income as of July 1, 2019 under U.S. Accounting Standard ASC 715.

Show all work.

**Commentary on Question:**

- Many candidates added interest to the service cost when determining the July 1, 2019 obligations. However, the service cost already included interest, which could be confirmed by recalculating the 2019 interest cost.
- Many candidates neglected to account for the actual benefit payments in the (gain)/loss and did not check using the accrued/(prepaid)
- As the problem does not clarify benefit payment timing, full points were awarded for assuming the $5 million in benefit payments were paid at April 1 or July 1
- Many candidates only awarded 1.5% return on assets when calculating the July 1, 2019. However, the question states the 3% return is for 6 months.
- As the problem does not clarify the duration prior to the plan freeze, full points were awarded for calculating the projected benefit obligation at 4.50% using any of the following: a duration of 10, the candidate’s assumed duration for the pre-freeze period, or indicating the pre-freeze duration was not provided and stating an assumed projected benefit obligation number as a way to continue on with the question. The model solution utilizes a pre-freeze duration of 10 for illustrative purposes.
4. Continued

The plan freeze eliminates future accruals for all employees and is, therefore, a curtailment under US GAAP. The curtailment is recognized at July 1, 2019.

The funding shortfall increases by $48,687,500 as a result of the plan amendment as outlined below. Note that both the assets and liabilities are remeasured at July 1, 2019, prior to recognition of the curtailment.

The total unrecognized loss of $73,707,500 (prior to the remeasurement) is reduced by the $48,687,500 gain due to the plan amendment remeasurement. The entire $9,500,000 of unrecognized service cost is recognized as a curtailment gain as average future service goes to 0. In total, the AOCI is reduced by $58,187,500 as a result of the plan amendment.

See below for details.

<table>
<thead>
<tr>
<th></th>
<th>December 31, 2018</th>
<th>July 1, 2019 (before freeze)</th>
<th>Impact of Plan Amendment</th>
<th>July 1, 2019 (after freeze)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBO</td>
<td>(280,000,000)</td>
<td>(270,322,500)</td>
<td>48,687,500</td>
<td>(221,635,000)</td>
</tr>
<tr>
<td>FVA</td>
<td>220,000,000</td>
<td>221,525,000</td>
<td>0</td>
<td>221,525,000</td>
</tr>
<tr>
<td>FS</td>
<td>(60,000,000)</td>
<td>(48,797,500)</td>
<td>48,687,500</td>
<td>(110,000)</td>
</tr>
<tr>
<td>PSC</td>
<td>10,000,000</td>
<td>9,500,000</td>
<td>(9,500,000)</td>
<td>0</td>
</tr>
<tr>
<td>NGL</td>
<td>80,000,000</td>
<td>64,207,500</td>
<td>(48,687,500)</td>
<td>15,520,000</td>
</tr>
<tr>
<td>AOCI</td>
<td>90,000,000</td>
<td>73,707,500</td>
<td>(58,187,500)</td>
<td>15,520,000</td>
</tr>
<tr>
<td>A/P</td>
<td>30,000,000</td>
<td>24,910,000</td>
<td>(9,500,000)</td>
<td>15,410,000</td>
</tr>
<tr>
<td>Discount Rate</td>
<td>4.00%</td>
<td>4.50%</td>
<td>4.50%</td>
<td>4.50%</td>
</tr>
</tbody>
</table>

Funded Status Impact:

*PBO at July 1, 2019 (4.00%):*

\[280,000,000 \times (1 + \frac{1}{2} \times 4\%) + \frac{1}{2} \times 8,000,000 - 5,000,000 \times (1 + \frac{1}{4} \times 4\%) = 284,550,000\]

*PBO at July 1, 2019 (4.50%):*

\[284,550,000 \times (1 - (4.50\% - 4.00\%) \times 10) = 270,322,500\]

*ABO at July 1, 2019 (4.00%):*

\[230,000,000 \times (1 + \frac{1}{2} \times 4\%) + \frac{1}{2} \times 7,500,000 - 5,000,000 \times (1 + \frac{1}{4} \times 4\%) = 233,300,000\]

*ABO at July 1, 2019 (4.50%):*

\[233,300,000 \times (1 - (4.50\% - 4.00\%) \times 10) = 221,635,000\]

Assets are not impacted by the plan amendment.

Liabilities are reduced by 48,687,500 due to the plan amendment.
4. Continued

Accumulated Other Comprehensive Income (AOCI) Impact:

*Expected Fair Value of Assets (FVA) at July 1, 2019:*
220,000,000 + $1/2 * 14,980,000 – $1/2 * 12,000,000 = 221,490,000

*Actual FVA July 1, 2019:*
220,000,000*(1+3%) – 5,000,000*(1+$1/2 * 3%) = 221,525,000

Total asset gain of 35,000 (which includes the impact of actual/expected benefit payments).

*Expected PBO at July 1, 2019:*
280,000,000 + $1/2 * 8,000,000 + $1/2 * 10,960,000 – $1/2 * 12,000,000 = 283,480,000

*Actual PBO at July 1, 2019: 270,322,500*

Total liability gain of 13,157,500 (which includes the impact of actual/expected benefit payments).

*Net (Gain)/Loss at July 1: 2019:*
80,000,000 - $1/2 * 5,200,000 – 13,157,500 – 35,000 = 64,207,500

The entire gain of 48,687,500 due to the plan amendment is recognized in the net loss.

*Prior Service Cost at July 1, 2019:*
10,000,000 – $1/2 * 1,000,000 = 9,500,000

All future accruals are eliminated due to the plan amendment. As a result, the entire prior service cost must be recognized at the remeasurement date.

The total impact on AOCI is a decrease 58,187,500.

*Accrued/Prepaid Check:*

*Expected Accrued/Prepaid:*
30,000,000 – $1/2 * 10,180,000 = 24,910,000

*Actual Accrued/Prepaid:*
-48,797,500 + 9,500,000 + 64,207,500 = 24,910,000
4. Continued

(b) Calculate the fiscal year 2019 Net Periodic Pension Cost reflecting the plan freeze.

Show all work.

Commentary on Question:
In order to receive full credit, the candidate needed to calculate the net (gain)/loss after the July 1, 2019 remeasurement and show that it was within the 10% corridor.

Prior to the plan freeze, the Fiscal 2019 Net Period Benefit Cost is 10,180,000.

The total FY19 NPBC after the plan freeze is 11,860,913.

The total impact on benefit cost is an increase of 1,680,913.

See below for details.

<table>
<thead>
<tr>
<th>Service Cost</th>
<th>January 1 – June 30</th>
<th>July 1 – December 31</th>
<th>Total Fiscal Year 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest Cost</td>
<td>5,480,000</td>
<td>4,919,288</td>
<td>10,399,288</td>
</tr>
<tr>
<td>Expected Return on Assets Amortization of:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prior Service Cost</td>
<td>500,000</td>
<td>0</td>
<td>500,000</td>
</tr>
<tr>
<td>Net (Gain)/Loss Curtailment</td>
<td>2,600,000</td>
<td>0</td>
<td>2,600,000</td>
</tr>
<tr>
<td>Defined Benefit Cost</td>
<td>5,090,000</td>
<td>6,770,913</td>
<td>11,860,913</td>
</tr>
</tbody>
</table>

To remeasure the Fiscal 2019 Net Periodic Benefit Cost, we split the calculations into the first and second half of the year.

The first half of the year benefit cost is simply the total benefit cost prior to the plan freeze divided by 2 (5,090,00).

After the plan freeze, there are no more accruals in 2019. The service cost is $0 in the second half of the year. The curtailment charge is recognized as a past service cost.

The interest cost for the second half of the year is measured at the July 1, 2019 discount rate. Expected benefit payments of 6,000,000 were used in this calculation, but points were also awarded if the candidate used 7,000,000 (which makes the total benefit payments for the year equal to expected).
4. Continued

\[ 221,635,000 \cdot \frac{1}{2} \cdot 4.5\% - 6,000,000 \cdot \frac{1}{4} \cdot 4.5\% = 4,919,288 \]

The expected return on assets is calculated similarly to interest cost. The contribution is expected at 12/31/2019 so there is no return on the contribution.

\[ 221,525,000 \cdot \frac{1}{2} \cdot 7\% - 6,000,000 \cdot \frac{1}{4} \cdot 7\% = 7,648,375 \]

The entire prior service cost is recognized as a curtailment charge. Therefore, there is no prior service cost left to amortize in the second half of the year.

Calculate G/L amortization if \( \text{abs(unrec (g/l))} > 0.1 \times \text{max(PBO,MVA)} \), otherwise 0. Since 15,520,000 < 10\% \times 221,635,000, there are no gains/losses to amortize.
5. **Learning Objectives:**

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

2. The candidate will understand the impact of the regulatory environment on plan design.

**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  
(j) Risk-sharing provisions

(2a) Explain and apply restrictions on plan design features to a proposed plan design.

(2d) Describe the process and apply the principles and rules governing the conversion from one type of plan to another.

**Sources:**

DA-112-13: Converting Pension Plans From a DB to a DC design – Issues to Consider in Canada, pp. 1–6

DA-159-16: The OECD Roadmap for the Good Design of Defined Contribution Pension Plans

DA-164-17: Defined Contribution Plan Success Factors
5. Continued

Commentary on Question:
This question tests candidates’ knowledge on DB and DC plans, including why a plan sponsor would prefer one over the other; how to convert from a DB plan to a DC plan; and DC plan design considerations.

Candidates did well on this question.

Solution:
(a) Explain why a plan sponsor would prefer a defined contribution (“DC”) pension plan instead of a defined benefit (“DB”) pension plan.

Plan sponsors prefer DC plans over DB plans because of the following reasons:
- Desire for greater cost stability
- Plan design that fits the career pattern of a more mobile and younger workforce, rather than focusing on the traditional model of employees spending their career with one employer
- Relatively, employer bears little risk under a DC design
- Reflect the plan designs adopted by competitors
- A concern that plan members do not fully understand the value of DB coverage, therefore affecting the perceived value of the plan
- Compliance activities will be reduced by adopting a DC design
- Ease of administration
- Stable accounting charge
- No more PBGC premiums / ASC 715 valuations

(b) Explain the rationale behind four different methods of transitioning from a DB to a DC pension plan.

Commentary on Question:
Other appropriate methods that were explained also received credit.

Method 1:
Leave the existing DB provisions in place (for past and future service) for current employees, and adopt a new DC design for future new hires.

Rationale: employers who are concerned about the cost of providing DC coverage of comparable value to the DB coverage available to existing members, or about the possibility of DC conversion values being too high if employees leave shortly after conversion, or about short-term accounting implications

Method 2:
Retain existing DB provisions for past service/Plan Freeze (soft/hard), and to adopt a new DC design only for future years of service.
5. Continued

**Rationale:** Employers concerned about the cost of converting existing DB entitlements to DC account balances (in a low interest rate environment)

**Method 3**
Grandfather certain employees based on age/service criteria in the DB plan

**Rationale:** Employers concerned that the new DC formula is not as generous for employees at or close to retirement eligibility. Such grandfathered employees could be offered the option of continuing to receive DB coverage for future service, or they could be offered an enhanced DC formula

**Method 4**
Provide DC coverage for future service and convert DB entitlements for past service into the DC account balances

**Rationale:** Employers wanting to reduce DB commitments more quickly. Employers may enhance the conversion values somewhat to entice employees to convert

(c) Describe plan sponsor considerations when establishing plan provisions for a new DC plan.

The Plan sponsor’s considerations would include:

- The employers competitive position with respect to the contribution level
- The competitive position with respect to cost
- The desired balance between various elements of the total rewards package offered to employees
- The underlying message conveyed in the DC formula: does the formula imply that saving for retirement is a joint responsibility, by offering an employer contribution that matches the employee contribution or does the formula provide an automatic employer contribution
- A possible desire to ensure that employees covered by a DB design are not expected to be significantly disadvantaged by a new DC design.
- Ensure the design of DC pension plans is internally coherent between the accumulation and payout phases and with the overall pension system
- Encourage people to enroll, to contribute and contribute for long periods
- Promote low-cost retirement savings instruments
- Establish appropriate default investment strategies (life-cycle), while also providing choice between investment options with different risk profile and investment horizon
- For the payout phase, encourage annuitization as a protection against longevity risk.
- Ensure effective communication and address financial illiteracy and lack of awareness.
6. **Learning Objectives:**
3. Candidate will be able to analyze the risks faced by retirees and the participants of retirement plans and retiree health plans.

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

8. 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:**
(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

(7a) Evaluate appropriateness of current assumptions.

(7b) Describe and explain the different perspectives on the selection of assumptions.

(7c) Describe and apply the techniques used in the development of economic assumptions.

(7d) Recommend appropriate assumptions for a particular type of valuation and defend the selection.

(7e) Select demographic and economic assumptions appropriate for a projection valuation.

(8a) Perform valuations for special purposes, including:
   (i) Plant termination/windup
   (ii) Accounting valuations
   (iii) Open group valuations
   (iv) Plan mergers, acquisitions and spinoffs

(8b) Analyze, recommend, and defend an appropriate funding method and asset valuation method in line with the sponsor’s investment policy and funding goals.

**Sources:**
DA-139-15: ASOP 35, Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations
6. Continued

DA-140-15: ASOP 27 Selection of Economic Assumptions for Measuring Pension Obligation

DA-142-15: ASOP 4, Measuring Pension Obligations and Determining Pension Plan Costs or Contributions


DA-169-17: Mergers and Acquisitions: Key considerations for retirement plan conversion

DA 161-16: Pension Issues in Mergers and Acquisitions

**Commentary on Question:**
*Commentary listed underneath question component.*

**Solution:**
(a) Assess the risks to the acquiring company of relying solely on NOC’s publicly available financial statements when reviewing NOC’s pension plan for the potential company acquisition.

**Commentary on Question:**
*Many candidates struggled with this part. Successful candidates articulated the main risk of not valuing and transferring an appropriate amount of assets and liabilities over to the purchasing company.*

The risks of relying on only the financial statement pension disclosures and not reviewing the other documents

Outdated actuarial assumptions could lead to insufficient assets transferred which would result in higher future cost and larger balance sheet liability

Moving from the unregulated country of Gevrey to an international company - benefits may be non-compliant with the existing law and regulation that applies to the parent company

Review of other plan documents would be necessary to ensure there are no other hidden benefit subsidies  e.g. benefits that trigger on sale of business

Undocumented promises may exist or benefits documented in other places

Legal risk of voiding representations and warranties
6. Continued

Void or delay the sale of the business and add complexity in the transition process
Risk of not receiving regulatory approval of the acquisition

(b) Describe the due diligence process that the acquiring company’s actuary should follow when reviewing NOC’s pension plan for the potential company acquisition.

Commentary on Question:
Candidates generally did well in identifying the information needed. Few candidates were able to assess how that information should be reviewed.

Gather information and data on:
1) Pension plans (and other Benefit plans) involved in transaction
2) Covered employees
3) Plan documents
4) Plan amendments
5) Board resolutions
6) Actuarial reports
7) Audited financial statements
8) Schedule of assets
9) List of service providers/investment managers and corresponding agreements
10) PBGC reports
11) Trust agreements
12) IRS determination letter
13) Financial statement disclosures
14) CBA

Assess Issues and Impact based on the information collected.
1) adjustments to purchase price based on employees covered
2) any unusual plan provisions that might contravene the law
3) assess if plan text is up to date
4) assess if there are any prohibited transactions
5) assess the funded status of the pension plan
6) assess pbgc premium history
7) assess any other potential liabilities dues to reported transactions
8) compare fees paid from the pension funds
9) Compare accounting assumptions to buyer’s accounting assumptions
10) assess how much the pbo exceeds the abo
11) assess if price adjustment is needed
12) assess the future liability and cost of the negotiated benefits in the CBA
13) assess if there is an opportunity/ability to modify the CBA benefits
6. Continued

(c) Evaluate the funded status impact of adopting the acquiring company’s accounting assumptions to measure the NOC Full-Time Salaried Pension Plan assets and liabilities under U.S. Accounting Standard ASC 715.

No calculations required.

**Commentary on Question:**
*Candidates generally did well in identifying the directionality of the change in assumptions. However, candidates did not address the accounting implication on the re-measurement*

Evaluation of the funded status impact of adopting the acquiring company’s accounting assumptions that pertain to the comparison of the seller’s and buyer’s assumptions to assess how much the PBO exceeds the ABO

Discount rate is lower than NOC’s. This would increase the PBO and increase the deficit in the Salaried plan.

Salary scale remains unchanged. However, the spread between the discount rate and salary scale has narrowed to 25 bps from 50 bps. The CSC would increase as well going forward.

Retirement - the change from a singular retirement age assumption to an optimal age assumption would increase the PBO because the pension plans offer a subsidized early retirement provision.

Termination - moving from an outdated termination scale to no termination scale would generally increase the PBO.

Mortality and mortality improvements- adopting mortality improvements would increase the PBO

Asset valuation method - Although the asset valuation method remains unchanged, the pension fund should be reviewed to determine whether a change is needed in the nature of the investments, the investment policy, and/or the asset allocation. Changes of this nature would affect the return on assets assumption.

Future expenses are paid from the fund. This change may result in an increase in the plan liabilities as a result of including an explicit expense assumption.
6. Continued

Adopting the accounting assumptions of the parent company as the basis of the purchase and sale agreement of the pension plan would push the Salaried plan into a further deficit position. This might need to be addressed through the negotiation process by either requiring top up payments or an adjustment to the purchase price of NOC.

The accounting assumptions are a point in time measure. Any notes or disclosure on subsequent events describing changes in circumstances known that occurred after the measurement date that would affect the assumptions selected as at the measurement date (i.e. asop 41) should be considered when negotiating the purchase price and the transfer value of the assets and liabilities.

It is not uncommon to have delays between the closing date and the actual transfer of assets. The parent company’s accounting assumptions, although more updated than NOC’s assumptions, may not be the best basis of calculating the transfer of asset amount if there is significant time lag between the closing date and the actual transfer date. A method of adjusting the transfer of asset value should be considered. As an example, the adjustments should consider the subsequent events disclosed in the financial statements, the changes in the membership and the cash-flow.

Accounting implications are a re-measurement under ASC 715 whereby the loss arising from the assumption changes can be recognized immediately or amortized over a period of time.

No settlement would trigger from the purchase and sale under ASC 715.
7. **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.

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  
(j) Risk-sharing provisions  

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

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

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

(5m) Recommend an appropriate plan type and plan design features for providing retirement benefits and defend the recommendations.
7. Continued

Sources:
The Next evolution in Defined Contribution Retirement Plan Design: A Guide for DC Plan Sponsors to Implementing Retirement Income Programs

DA-164-17: Defined Contribution Plan Success Factors


DA-159-16: The OECD Roadmap for the Good Design of Defined Contribution Pension Plans

Commentary on Question:
Commentary listed underneath question component.

Solution:
(a) Compare and contrast each plan design feature’s ability to generate retirement savings.

Commentary on Question:
Many candidates struggled with this part, as they were not able to address each design feature relative to generating retirement savings.

Eligibility:
Company A has an immediate enrolment feature which ensures employees are enrolled at their earliest eligibility and do not lose out on pension plan participation. Company B has a 2 year waiting period before joining the plan which creates a gap in the individual’s service period and loss of pension accrual for 2 years.

Vesting:
Company A has a long service period before full vesting occurs (5 year cliff vesting – no vesting prior to 5 years) whereas all benefits vest immediately at Company B. This will impact retirement income if an individual leaves Company A before 5 years of service, all company contributions are lost. An individual doesn’t lose out on any retirement savings with Company B if leaving prior to retirement.
7. Continued

**Fixed Company Contribution:**
Company A has a higher contribution level compared to Company B using base salary only, however Company B incorporates the bonus in the earnings definition increasing retirement savings potential. Bonuses can be volatile. If we assume a 25% target bonus, the core company contribution at Company A is still higher (Company B equivalent to 5% of base vs 6% of base with Company A). Company contributions between A and B can be quite different depending on the bonus levels.

**Required Employee Contribution:**
Company A does not require any employee contribution which may not encourage employees to save for retirement compared to Company B which has a required employee contribution structure. Company B further helps increase retirement savings with an auto-escalation feature increasing contributions after each year.

**Company Matching Contribution:**
Company A has a matching component on a higher amount of employee contributions, encouraging employees to contribute at least 5% to maximize company match whereas Company B has a higher percentage matched on a lower amount of employee contributions. Maximum company match payable is higher with Company B (ie 6% of base salary vs 5% with Company A).

Maximum company contribution under Company A is 11% for a 5% employee contribution. Maximum company contribution under Company B is 10% for a 3% contribution but definition of earnings for core contribution is base + bonus (if bonus is 25%, then maximum company contribution for Company B is 11%, which is the same as Company A).

**Investment Options:**
Company A likely has a good balance of fund choices for various risk appetites but the employee bears investment risk. Company B protects against downward market risk by offering a savings fund but no upside potential and may not keep up with inflation.
7. Continued

*Retirement Benefit Options:*
A lump sum payment at retirement will provide an individual with flexibility but responsibility to handle retirement income. There is still earnings potential post-retirement if the individual manages the portfolio. The individual will need to weigh other risks like outliving assets, draw-down rates that are too high, market declines, etc. A fixed annuity will convert existing savings at retirement to a fixed payment after retirement. No further earnings potential is available but the individual is protected against longevity risk. An individual will need to weigh other risks like the fixed payments losing purchasing power over time (ie inflation risk)

Draw-down options will allow some flexibility with determining the rate/amounts of payment post retirement with some earnings potential.

(b) Propose four enhancements to Company A’s plan design to increase retirement savings.

Justify your response.

*Commentary on Question:*
*Candidates also struggled with this part, as they were not able to propose four enhancements.*

*Other enhancements that were appropriately justified also received credit.*

- Change the definition of earnings to include bonus instead of base pay only to increase the core company contribution (and also employee contributions) and hence improve retirement income
- Add required employee contributions or auto-enrolment to increase savings.
- Increase core company contribution to increase savings
- Increase the maximum company contribution matched (ie in excess of 5%) hence encouraging employees to contribute more of their own money to increase total contributions paid to the plan.

(c) Calculate the projected replacement ratios at retirement from the DC plan for each of Company A and Company B. Assume the individual contributes the minimum required to receive the full company matching contribution.

Show all work.

*Commentary on Question:*
*Most candidates did well on this part.*
7. Continued

**Company A**
Salary at retirement: $80,000 x (1.025)^24 = $144,698

Contributions: Individual contributes 5%. Company contributes core 6% + match 5%. Total contribution: 16% of base salary

Accumulate contributions*: 80,000 x 16% x 69.655 = $891,585

Annual income: $891,585 / 15 (annuity factor) = $59,439

Replacement ratio: Annual income / Salary at retirement = $59,439 / $144,698 = 41%

*(Credit was also awarded for calculating the replacement ratio considering Salary + Bonus at retirement: $59,439 / (125% x $144,698) = 33%)*

*Accumulation factor of 69.655 calculated using the formula:
\[
\frac{1}{(Investment Return – Salary Scale)} \times \frac{1-((1+ Salary Scale)/(1+Investment Return))^N}{1+ Investment Return} \times (1+ Investment Return)^N \\
= \frac{1}{(.06-.025)} \times \frac{1-((1+.025)/(1+.06))^25}{1+.06} \times (1+.06)^25 = 69.655
\]

**Company B**
Salary & Bonus at retirement: 125% X $80,000 x (1.025)^24 = $180,872.50

Contributions: Individual contributes 3% salary. Company contributes core 4% (base + salary) + match 6% salary. Total contribution: 14% of base salary (ie 4% of base + bonus = 5% of base salary)

Accumulate contributions*: 80,000 x (1.025)^2 x 14% x 37.542 = $441,757

Annual income: $441,757 / 15 (annuity factor) = $29,450

Replacement ratio: Annual income / Salary at retirement = $29,450 / $144,698 = 20%

*(Full credit also awarded for deducting 6% contribution from above for year 1 and 3% for year 2)*

Individual contributes only 1% in first year which auto-escalates to 2% in 2nd year to reach 3% in 3rd year. Total contribution: 8% of base salary 1st year, 11% 2nd year & 14% 3rd year. (After 2-year waiting period)
7. Continued

(Candidate may also calculate Replacement ratio considering Salary + Bonus at retirement: $29,450 / (125% x $144,698) = 16%)

*Accumulation factor of 37.542 was calculated using the formula (Individual has 2 years less service with Company B):
\[
\frac{1}{(Investment\ Return - \ Salary\ Scale)} \times \frac{1 - ((1 + \ Salary\ Scale) / (1 + Investment\ Return))^{N}}{1 + Investment\ Return}^N
\]
\[
= \frac{1}{(0.02 - 0.025)} \times \frac{1 - ((1+0.025)/(1+0.02))^{23}}{(1+0.02)^{23}} = 37.542
\]

(d) Recommend which employment offer the individual should accept.

Justify your response.

**Commentary on Question:**
Successful candidates recommended Company A and justified their recommendations by commenting on the differences in offerings between Company A and Company B.

Both companies pay in the same maximum contribution (11%) so the replacement ratio obtained from company contributions alone is the same.

The difference in replacement ratio comes from:
• The employee paying in a higher contribution for the maximum match with Company A (5% vs 3% with Company B)
• The investment return being higher with Company A (6% vs. 2% with Company B)
• The individual has 2 years fewer service with Company B due to the 2-year waiting period & losing 2 years of investment return with Company B

The individual should choose Company A to maximize savings.
8. **Learning Objectives:**
3. Candidate will be able to analyze the risks faced by retirees and the participants of retirement plans and retiree health plans.

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

**Sources:**
DA-173-18: How Accurately Does 70% Final Employment Earnings Replacement Measure Retirement Income (In)Adequacy? Introducing the Living Standards Replacement Rate (LSRR)

**Commentary on Question:**
Many candidates struggled with this question.

**Solution:**
(a) Define the following:

(i) Conventional Earnings Replacement Rate (ERR)

(ii) Living Standards Replacement Rate (LSRR)

**Commentary on Question:**
Many candidates failed to provide accurate definitions, in particular the formula for calculating these replacement rates.

The earnings replacement rate (ERR) is the ratio of gross (i.e., before-tax) income in the first year of retirement over the gross pre-retirement final year employment earnings.

Living Standards Replacement Rate (LSRR)

= average annual retirement living standards / average annual working-life living standards

= average real annual retirement income for potential individual consumption expenditure / trimmed average real annual working income for individual consumption expenditure

Goal of LSRR is to capture a worker’s living standards continuity after retirement,

By comparing how much money a worker has available to support personal consumption of goods and services before and after retirement
8. Continued

(b) Evaluate whether the LSRR is a more appropriate measure than the ERR.

**Commentary on Question:**

*While the materials related to this question supported the superiority of the LSRR over the ERR, a few candidates made the case supporting the ERR and received credit if they provided a clear explanation and rationale. Candidates who supported both approaches depending on the circumstances also received credit. Other appropriate reasons not presented below also received credit.*

Reasons to support LSRR:

1. LSRR uses a much broader measurement period for pre- and post-retirement,

2. LSRR measures income at the family level rather than at the level of the individual

3. LSRR includes a much more comprehensive definition of income.

   Housing wealth, financial debt, savings decisions, number of children and the earnings of one’s spouse are among the many determinants of a person’s living standards, but the conventional earnings replacement rate ignores them.

4. LSRR provides guidance on how to evaluate current living standards and determine how much retirement income should be aimed for

5. Provides a more understandable measure so that workers can better appreciate the impact of alternative financial planning decisions*
9. **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.

**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.

(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

**Sources:**

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

CIA Report of the Task Force on Target Benefit Plans

Retirement Plans – 401(k)s, IRAs and Other Deferred Compensation Approaches, Allen, et al., 12th Edition, 2018, Ch. 2

**Commentary on Question:**

Candidates were able to identify how longevity risk is shared in defined benefit and defined contribution plans. Few candidates demonstrated a good understanding of target benefit plans. However, most were able to identify approaches a plan sponsor can use to manage the longevity risk.

**Solution:**

(a) Explain how longevity risk is shared between participants and plan sponsors within the following types of pension plans:

(i) Defined Benefit Plan
(ii) Defined Contribution Plan
(iii) Target Benefit Plan
9. Continued

Commentary on Question:
Part i) and ii) were answered well. Part iii) required an understanding of target benefit plans (TBPs). Most candidates identified that benefits could be reduced, and some identified that employer contributions are fixed. Few identified that idiosyncratic longevity risk is pooled amongst plan participants in Canadian and US TBPs that offer variable annuities. Most candidates did not clarify that residual longevity risk is not shared with the employer beyond the initial assumptions used to determine the employer’s fixed contribution.

(i) Defined Benefit Plan
In a traditional defined benefit plan the plan sponsor assumes the longevity risk by guaranteeing lifetime annuities to retirees. The plan sponsor must provide additional funding if the retiree group lives longer than expected. If available, the plan can transfer longevity risk to members by offering lump sums on retirement.

(ii) Defined Contribution Plan
In a traditional defined contribution plan the member assumes the longevity risk through receipt of a lump sum at retirement. The member must then manage their assets to avoid outliving their retirement savings. If available, the member can transfer longevity risk to an insurer at retirement by purchasing an annuity.

(iii) Target Benefit Plans
In a traditional target benefit plan where employer contributions are fixed it is the members who assume longevity risk as their benefits can be reduced in response to plan experience losses. Idiosyncratic longevity risk is pooled amongst members for target benefit plans that offer variable annuities.

(b) Propose three approaches a plan sponsor can use to manage the longevity risk in a Target Benefit Plan.

Commentary on Question:
Most candidates identified approaches that transferred longevity risk to plan participants or to a third party. Few candidates identified methods that managed longevity risk through intergenerational risk transfer.

Candidates received credit for other relevant approaches.
9. **Continued**

<table>
<thead>
<tr>
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<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>Transfer longevity risk to plan members by offering lump sums to actives at retirement/termination and/or adjusting retiree benefits based on plan experience.</td>
</tr>
<tr>
<td>2</td>
<td>Transfer longevity risk to a third party insurer by purchasing annuities for retirees and deferreds, or purchasing a longevity risk hedging product. Some derisking strategies may still be subject to counterparty risk.</td>
</tr>
<tr>
<td>3</td>
<td>Redistribute longevity risk by having younger generations underwrite the risks of older generations by putting their own benefits at greater risk. Have different generations of plan members enter into hedging contracts for all or part of the longevity risk amongst themselves.</td>
</tr>
</tbody>
</table>
10. **Learning Objectives:**

8. 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:**

(8a) Perform valuations for special purposes, including:

(i) Plant termination/windup

(ii) Accounting valuations

(iii) Open group valuations

(iv) Plan mergers, acquisitions and spinoffs

**Sources:**

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

**Commentary on Question:**

Many candidates struggled with this question, as they unnecessarily calculated year-end values for items that were already provided in the question. Most candidates checked the settlement thresholds appropriately.

**Solution:**

Calculate the impact of the lump sum payments for both plans under U.S. Accounting Standard ASC 715 as of December 31, 2019 on the following:

(i) Funded Status

(ii) Net Periodic Pension Cost

(iii) Accumulated Other Comprehensive Income

Show all work.

(i) The impact on funded status is the difference between lump sum sums paid and obligation for participants who received a lump sum. This is:

**SALARIED PLAN**

100,956,000 – 98,543,000 = 2,413,000

Since lump sums paid are more than obligation held, the plan becomes more unfunded.

**HOURLY PLAN**

75,589,000 – 73,775,000 = 1,814,000

Since lump sums paid are more than obligation held, the plan becomes more unfunded.
10. Continued

(ii) Since significant lump sums were paid, check if settlement accounting was triggered.

Settlement threshold = Service Cost (SC) + Interest Cost (IC)

HOURLY PLAN
79,070,000 = 41,386,000 + 37,684,000
Since lump sums paid of 75,589,000 is less than SC +IC, no impact on the hourly expense.

SALARIED PLAN
Salaried Plan settlement threshold: 57,706,000 + 41,690,000 = 99,396,000
Since lump sums paid of 100,956,000 are more than settlement threshold, settlement accounting is triggered.

Since lump sums paid at 12/31/2019, no impact to SC, IC, Expected Return on Assets, and amortization of Prior Service Cost

1,136,031,000 = 1,071,435,000 + 57,706,000 + 41,690,000 – 34,800,000
PBO remeasured for lump sum loss = PBO before settlement + (lump sums paid – PBO released)
1,138,444,000 = 1,136,031,000 + (100,956,000 – 98,543,000)

Unrecognized G/L, reflecting remeasurement for lump sum loss = 1/1/2019 Unrecognized G/L – 2019 G/L amortization + (lump sums paid – PBO released)
142,151,000 = 142,723,000 – 2,985,000+ (100,956,000 – 98,543,000)

Settlement charge = (lump sums paid / PBO remeasured for lump sum loss ) x unrecognized G/L remeasured for lump sum loss
12,605,800 = (100,956,000 / 1,138,444,000) x 142,151,000
Impact on expense is 12,605,800

(iii.) Since there is no Prior Service Cost, the only item affecting accumulated other comprehensive income (AOCI) is the gain/loss.

HOURLY PLAN
Impact on AOCI = loss from lump sums paid = 1,814,000
10. Continued

**SALARIED PLAN**
Impact on AOCI = loss from lump sums paid – immediate recognition from settlement

\[(10,192,800) = 2,413,000 – 12,605,800\]
11. **Learning Objectives:**

6. The candidate will be able to analyze, synthesize and evaluate plans designed for executives or the highly paid.

**Learning Outcomes:**

(6a) Given a specific context, synthesize, evaluate and apply principles and features of executive deferred compensation retirement plans.

(6b) Given a specific context, apply principles and features of supplemental retirement plans.

**Sources:**

Retirement Plans - 401(k)s, IRAs and Other Deferred Compensation Approaches, Allen et al., 12th Edition, 2018 Ch. 14


**Commentary on Question:**

*Commentary listed underneath question component.*

**Solution:**

(a) Describe the advantages and disadvantages of funding a non-qualified defined benefit pension plan from a plan sponsor’s perspective.

**Commentary on Question:**

Most candidates did well on this part.

**Advantages:**

- Provides benefit security to employees who have benefits under the supplementary plan
- Helps with attraction and retention of employees, especially executives
- Financing the supplementary plan makes sure that the responsibility of today’s benefits remains with current shareholders.
- By financing a supplementary plan, the employer avoids the sudden burden that is placed on its general revenues at the time of an employee’s retirement if the plan was not funded.

**Disadvantages:**

- Contributions to a non-qualified pension plan are subject to the claims of the company’s creditors.
- The contributions to a non-qualified plan are not tax deductible for the employer until the benefits are received by the employee.
- Financing a supplementary plan may reduce the cash that is available for business.
11. Continued

- By financing a supplementary plan, a company may not get the most return for its money that it may otherwise.
- The increased benefit security for the employees may not necessarily translate into an increased perceived value of the company’s total compensation package.

(b) Describe factors a plan sponsor should consider when selecting a funding arrangement for a non-qualified defined benefit pension plan.

Commentary on Question:
Many candidates struggled on this part. Instead of describing the factors to consider when selecting funding arrangement, they described various funding arrangements.

- Cash flow availability: Will the selected financing option require significant cash contributions, and does the company have enough cash available to make contributions or pay benefits?
- Volatility of annual cash requirements: How volatile will the cash requirements be under each financing option?
- Accounting considerations: The company should consider the impact on both the balance sheet and the defined benefit cost in accordance with the appropriate accounting standards. Will the asset generate a P&L gain that will offset the P&L expense of the non-qualified plan?
- Tax considerations: The tax consequences of each financing vehicle can vary widely and the choice should accommodate the company’s tax status.
- After-tax return: Will the after-tax growth of the asset track against the tax-deferred growth of the benefit?
- Flexibility: Can the asset be used in multiple circumstances, and will it meet the liquidity needs of the employer to make the benefit payments?
- Asset liability matching: Will the gains and losses in liability be appropriately hedged by the asset?
- Benefit security: Level of benefit security provided under each financing option

(c) Compare and contrast the following funding arrangements for non-qualified defined benefit pension plans:

(i) Rabbi Trust

(ii) Corporate-Owned Life Insurance

(iii) Taxable Securities

(iv) Secular Trusts
Commentary on Question:
Successful candidates indicated how the various arrangements are similar to and different from each other. Most candidates successfully compared/contrasted rabbi trust and secular trusts, but struggled with corporate-owned life insurance and taxable securities.

Rabbi Trust
- The company creates an irrevocable trust for the benefit of an executive or a group of participating executives.
- The terms of the trust limit the use of assets to providing benefits to the participating executives.
- Thus, trust assets cannot be used by current or future management.
- However, like COLI and taxable securities, they remain subject to the claims of the creditors in the event of firm’s insolvency.

COLI
- The company purchases an insurance policy on the life of a plan participant and the cash value asset from the policy offsets the benefit liability.
- The company is the named owner and beneficiary of the policy and ultimately receives a tax free death benefit if the policy is held until the death of the insured.
- Therefore, unlike the Rabbi Trust, it provides very little benefit security for the executive since cash values and death benefits are within employer’s control.
- This is the most financially efficient avenue for hedging since both this vehicle and the nonqualified liabilities it finances grow tax free.

Taxable Securities
- The company purchases taxable securities, such as stocks, bonds and mutual funds to offset the benefit liability.
- Unlike the COLI where insurance policy grows tax free, under taxable securities, taxes to the company are generated by the investment because realized gains and dividends are taxable as corporate income.
- However, companies carrying forward net operating losses (NOL) or that plan to be in alternative minimum tax (AMT) for a lengthy period may not reap the tax benefits of life insurance and hence often utilize taxable securities for financing.
11. Continued

Secular Trusts
- Provide the most benefit security amongst all 4 financing options
- Include employee-owned annuities and irrevocable trusts
- Similar to Rabbi trust, employer contributions are made on an irrevocable basis for the benefit of participating executives.
- However, unlike the other 3 financing options, secular trusts are funded plans and subject to Title 1 of ERISA, with executives being considered in constructive receipt of the value of their benefits when vested.
12. **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 and evaluate plans designed for executives or the highly paid.

**Learning Outcomes:**

(5k) Evaluate and incorporate, as appropriate, different social insurance and employer sponsored plan types and features that occur internationally in providing recommendations.

(6a) Given a specific context, synthesize, evaluate and apply principles and features of executive deferred compensation retirement plans.

(6b) Given a specific context, apply principles and features of supplemental retirement plans.

(6c) Integrate a plan for executives with the basic benefit plan.

**Sources:**

DA-130-13 International (Offshore) Pension Plans – A Growing Trend

Retirement Plans – 401(k)s, IRAs and Other Deferred Compensation Approaches, Allen et al., 12th Edition, 2018, Ch. 14

**Commentary on Question:**

This question tests candidates’ understanding of the differences between home country pension plans and international plans. Many candidates struggled with this question, since they described general pension plan design issues, as opposed to issues applicable to International Pension Plans.

**Solution:**

Describe the issues with respect to an International Pension Plan from the perspectives of the employees and Company ABC for each of the following:

(i) Design

(ii) Tax effectiveness

(iii) Funding
12. Continued

(i) Design

Employee perspective
- Benefits are more flexible than most home country plans as benefits are mainly paid as a lump sum at retirement or when employee leaves the company.
- A supplemental umbrella plan makes up any difference between the specified umbrella level of benefits and the benefits actually provided at the locations where the executives has been employed.
- Investment choices can be limited in other countries.
- May prefer a defined contribution plan over a defined benefit plan as the former is more portable and the executives might work in multiple countries during his/her career.
- The IPP can be used when employees do not qualify for home/host benefits (ex. social security).

Employer perspective
- One of the most important elements of plan design is determining those employees eligible for participation.
- The most common criterion is to use it for employees who are posted to a location where there is no form of company retirement provision and where membership in the home country plan cannot be maintained.
- Can be a defined contribution or defined benefit plan but the trend is to move towards defined contribution type plans
- Benefits usually paid as lump sums.
- Can be a top-up provision: replacement of company benefits as well as offsetting any loss of social security benefits caused by mobility.
- Need to consider the different legislative implications of the home/host country.
- The IPP should be used for attraction and retention as the executives market can be competitive.
- It can be difficult to integrate the IPP design with social security benefits.
- The plan should not be used as a catchall solution but used only where necessary.
- In any one company, there can be multiple employee categories with similar requirements for an IPP but not necessarily for the same level of benefits.
- Need to find a balance between the simplicity of the design and the equitable treatment among members.
- Most common to apply stepped employer contribution rates targeted at specific areas of need.
12. Continued

- Restrictions on certain countries being included within the trust arrangement for some providers may exist.
- Local nationals and country nationals restrictions: Excluding persons who are living and working in the same country as the provider.

(ii) Tax effectiveness

Employee perspective
- Will benefit from a tax-free roll up of investment returns.
- The benefits accrued will be taxed in the country where they are received as opposed to where they are earned.
- Benefits are free of tax at source.

Employer perspective
- Taxation of IPPs is relatively grey area.
- Contributions are not necessarily tax effective.
- The employer can set up an offshore account as a fiscal strategy.
- There can be bilateral treaties between the countries that have an impact on the tax treatment of such benefits.
- In an unfunded retirement plan, the employer is generally entitled to a deduction only when the benefits are paid or become taxable to the executive.

(iii) Funding

Employee perspective
- Provides benefit security because IPPs are typically unfunded. An executive’s retirement income under an IPP is dependent on the solvency of the company and its willingness to pay.

Employer perspective
- An IPP can be funded or unfunded.
- Funding an IPP can be administratively complex / costly as employees can work for multiple countries during their career.
- Cost allocation can become complex as an executives will have earned service in multiple countries.
- An IPP can be implemented through a trust or an insurance contract.
13. **Learning Objectives:**

9. The candidate will be able to apply the standards of practice and guides to professional conduct.

**Learning Outcomes:**

(9a) Apply the standards related to communications to plan sponsors and others with an interest in an actuary’s results (i.e., participants, auditors etc.).

(9c) Explain and apply all of the applicable standards of practice related to valuing retirement obligations.

(9f) Recognize situations and actions that violate or compromise Standards or the Guides to Professional Conduct.

(9g) Recommend a course of action to repair a violation of the Standards or the Guides to Professional Conduct.

**Sources:**

DA-139-15: ASOP 35 - Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations

DA-142-15: ASOP 4 - Measuring Pension Obligations

DA-805-18: ASOP 23 - Data Quality (background only)

DA-809-13: ASOP 41 - Actuarial Communications

**Commentary on Question:**

This question tests candidates’ knowledge on the Actuarial Standards of Practice (ASOP) and the application for actuarial calculations and reporting. The question requires candidates to list actuarial reporting requirements and assess a case situation for potential deviations from the Actuarial Standards of Practice. Finally, candidates must provide potential remedies for the issues identified.

**Solution:**

(a) List the reporting requirements that must be included in actuarial communications under the applicable professional standards.

**Commentary on Question:**

Successful candidates received full credit for listing reporting requirements for actuarial communications based on the relevant ASOPs.

Credit was awarded for reporting requirements not listed below.
13. Continued

- Uncertainty or risk
- Conflict of interest
- Reliance on other sources for data and other information
- Responsibility for assumptions and methods
- Information date of report and measurement date
- Subsequent events
- A statement, appropriate for the intended users, indicating that future measurements (for example, of pension obligations, periodic costs, actuarially determined contributions, or funded status as applicable) may differ significantly from the current measurement.
- If, in the actuary’s professional judgment, the actuary’s use of approximations and estimates could produce results that differ materially from results based on a detailed calculation, a statement to this effect.
- An outline or summary of the plan provisions included in the actuarial valuation.
- A description of known changes in significant plan provisions included in the actuarial valuation from those used in the immediately preceding measurement prepared for a similar purpose.
- A summary of the participant information.
- A description of any accounting policies or funding elections made by the principal that are pertinent to the measurement.
- The actuarial cost method and the way normal costs are allocated.

(b) Assess potential violations of the applicable professional standards.

Commentary on Question:
Candidates struggled to identify and describe deviations from the ASOPs presented in the case.

Credit was also awarded to candidates who identified violations to the Code of Professional Conduct.

Violation #1
With respect to the data, the prior actuary deviated from the relevant ASOPs (ASOP 23 and ASOP 41) as follows:
- whether the actuary reviewed the data and, if not, any resulting limitations on the use of the actuarial work product;
- the extent of the actuary’s reliance on data and other information relevant to the use of data supplied by others;
- any material judgmental adjustments or assumptions that the actuary applied to the data, or are known by the actuary to have been applied to the data, to allow the actuary to perform the analysis;
13. Continued

- Identify the data used by the actuary with sufficient clarity that another actuary qualified in the same practice area could make an objective appraisal of the reasonableness of the actuary’s work as presented in the actuary’s report.

Violation #2
With respect to the amendment, the prior actuary deviated from the relevant ASOPs (ASOP 4 and ASOP 41) as follows:
- It is not clear from the question whether exclusion of the impact of the amendment is a typo in the report, or if the increased retirement benefits were excluded from the valuations.
- If the decreased retirement benefits were not reflected in the valuation results on January 1, 2018, then the exclusion is a clear violation of the ASOP 4.
- The actuary should take into account adopted plan provisions when determining costs or contributions for a period, unless contrary to applicable legislation.
- Provisions adopted on or before the measurement date (January 1, 2018) should be reflected for at least the portion of the period during which the provisions are in effect.

Violation #3
With respect to the amendment, the prior actuary deviated from the relevant ASOPs (ASOP 35 and ASOP 41) as follows:
- To extrapolate pertinent past experience and its trend to the near future is often, but not necessarily appropriate.
- It is unclear if the prior actuary reviewed this assumption in light of the losses.
- May not need to change assumption but should review at a minimum and continue to monitor future retirement experience.
- If the prior actuary did review the assumption, they failed to appropriately disclose the review in the report.

(c) Propose steps that should be taken to remedy the violations.

Justify your response.

Commentary on Question:
Most candidates successfully identified steps to remedy the violation of Precept 13 with the prior actuary and identified remedies for deviations to the ASOPs.
13. Continued

- The prior actuary deviated from the pension plan Standards of Practice and violated Precept 13 of the Code of Professional Conduct. As such, a member who becomes aware of an apparent material noncompliance with the Rules or the ASOPs by another member shall:
  - Attempt to discuss the situation with the other member and resolve the apparent noncompliance; and
  - In the absence of such discussion and resolution, the member shall report such apparent noncompliance to the Committee on Professional Conduct, except where such reporting would be contrary to law or, when the member is acting in an adversarial environment, for the duration of such adversarial environment.

- Violations can be corrected by redoing the valuation results to reflect the plan amendment on early retirement benefits.

- Violations can be corrected by documenting all work and reviews that have been done regarding the data and appropriately disclosing the adjustments made and any limitations of the results due to such adjustments (i.e. including proper disclosure of data assumptions).

- Violations can be corrected by revisiting the termination assumptions to make sure the assumptions are still reasonable and if not, modify the assumptions to reflect future expectations.

- A review of assumptions should be completed:
  - Experience studies showing relevant plan experience and analysis of gains and losses in past years.
  - Study of the effects of plan design changes, specific events, economic conditions, or sponsor characteristics.

- Violations can be remedied by re-issuing the January 1, 2018 valuation report with all the proper disclosures about data, benefits, including plan amendments, and assumptions.