RET FRC Model Solutions
Fall 2015

1. Learning Objectives:

1. The candidate will understand how to analyze data for quality and appropriateness.

7. The candidate will understand how to apply the standards of practice and professional conduct guidelines.

Learning Outcomes:

(1a) Identify data needed.

(1b) Assess data quality.

(1c) Make and/or recommend appropriate assumptions where data cannot be provided.

(1d) Comply with regulatory and professional standards pertaining to data quality.

(7a) Apply the standards related to communications to plan sponsors and others with an interest in an actuary's results (i.e., participants, auditors, etc.).

(7e) Explain and apply all of the applicable standards of practice related to valuing pension benefits.

Sources:

FR-100-13, CSOP 1600, CSOP 3260

Commentary on Question:

A well prepared candidate will be able to identify the data required to perform the valuation. They will also be able to recommend assumptions in respect of incomplete data and list the disclosure requirements relating to the incomplete data.

Solution:

(a) Identify the data required to perform the actuarial valuation as at January 1, 2015 in respect of the ABC members.

1. Continued

Commentary on Question:
Overall, candidates performed quite well on this part of the question. There were a number of candidates who mentioned additional data items that were not relevant.

Full-time status [Note: or estimate of service in first year]

Gender

Date of birth [Note: or age]

Starting salary [Note: or estimated earnings in first year]

(b) Recommend reasonable assumptions for the incomplete ABC member data in order to complete the valuation.

Commentary on Question:
Overall, candidates performed reasonably well on this part of the question. Some candidates only mentioned one or two of the items below, however.

Assume all ABC members full-time to be more conservative

Assume all ABC members are male assuming ABC is in the same/similar industry as NOC

Use the average age as the age for ABC members

Use the average service to determine the salary for ABC members based on NOC's age/service/salary table

Average age and service provided may be used to tailor average salary assumption based on profile instead of simply using average salary of existing actives.

Note: Award full marks if reasonable assumptions are provided for projected service in the next year, percentage male, and average salary in the next year. Providing sufficient answers that may not be as specific as the above should get good marks. Answers referencing the existing NOC data should get higher marks than those using independent assumptions.

Any reasonable assumptions made to the membership data should be awarded points.

1. Continued

(c) List the actuarial report disclosure requirements with respect to the incomplete ABC member data, taking into consideration professional standards.

Commentary on Question:
Overall, candidates performed reasonably well on this part of the question, with most identifying at least a couple of the following points.

Need to disclose in report subsequent event of new members being taken into account in valuation

Actuary should disclose all assumptions used for new members

Actuary should disclose that data is missing for new group

Data is insufficient for valuing going concern normal cost for new members

Actuary should consider if assumptions are too uncertain and then disclose it in the report

Actuary should re-file the report after receiving the actual membership data

2. Learning Objectives:

3. The candidate will understand how to apply/synthesize the methods used to value pension benefits for various purposes.

Learning Outcomes:

(3b) Perform periodic valuations of ongoing plans, calculating normal cost and actuarial liability, using a variety of cost methods.

Sources:

Pension Mathematics for Actuaries, Anderson, 3rd Edition

Commentary on Question:

The candidates were expected to calculate the accrued liability and normal cost for each member. In general, candidates did well, but had some difficulty reflecting the termination decrements and the excess contributions accurately.

Solution:

Calculate the accrued liability and normal cost for each member as at January 1, 2015.

Show all work.

Member A

Termination benefit age 54 (end of year age 53)		
Years of service age 54		11
Salary 2015		$60,000.00
Contributions yr 2015	4% * 60000	$2,400.00
CWI eoy 53	30,000*(1.055)+2,400	$34,050.00
PV Accrued Benefit age 54 (end of year decrements)	1.4%*60,000*11*11.35*1.055^(54-65)	$58,195.68
Excess contribution age 54	max(34,050-58,195.68/2,0)	$4,952.16
Total Benefit age 53 discounted to val date	=sum of PV and excess * 1.055 ^ (-1)	$59,855.77

Termination benefit age 55 (end of year age 54)		
Years of service age 55		12
Salary 2016	60,000 * 1.035	$62,100.00
Contributions 2016	4% * 62,100	$2,484.00
Total CWI eoy age 54	34,050*(1.055)+2,484	$38,406.75

2. Continued

PV Accrued Benefit age 55 (end of year decrements)	1.4%*62,100*12*11.35*1.055^(55-65)	$69,322.17
Excess contribution age 55	MAX(38,406.75-69,322.17/2,0)	$3,745.67
Total Benefit age 54 discounted to val date	=sum of PV and excess * 1.055 ^ (-2)	$65,647.97
Retirement benefit age 65		
Years of service age 65		22
Salary age 65	60,000*(1+0.035)^(65-53-1)	$87,598.18
PV Accrued Retirement Benefit age 65	1.4%*87,598.18*(22)*11.35* 1.055^(53-65)	$161,069.07
Total AL & NC		
AL	161,069.07*10/22*(1-0.02)*(1-0.02) +65,647.97*10/12*(1-0.02)*0.02 +59,855.77*10/11*(0.02)	$72,474.51
NC	161,069.07*1/22*(1-0.02)*(1-0.02) +65,647.97*1/12*(1-0.02)*0.02 +59,855.77*1/11*(0.02)	$7,247.45
Member B		
Salary 65	90,000*(1.035)	$93,150.00
As the member has no service, there is no actuarial liability		
NC = B(r) * 1/(r-e) * ${}_{r-x}p_x v^{(r-x)} a_r$	93,150 * 1.4% *2 * (1/ 2) * 11.35 * 100% /(1.055^2)	$13,298.47

3. Learning Objectives:

3. The candidate will understand how to apply/synthesize the methods used to value pension benefits for various purposes.

5. The candidate will understand how to evaluate and apply regulatory policies and restrictions for registered retirement plans.

7. The candidate will understand how to apply the standards of practice and professional conduct guidelines.

Learning Outcomes:

(3a) Differentiate between the various purposes for valuing pension plans:
- (i) Funding
- (ii) Solvency
- (iii) Termination/wind-up/conversion

5d) The candidate will be able to describe and apply regulation pertaining to plan termination/wind-up.

(5e) The candidate will be able to describe and apply regulation pertaining to plan conversion.

(5f) The candidate will be able to describe and apply regulation pertaining to plan merger or spin-off.

(5h) The candidate will be able to describe and apply regulation pertaining to members' rights.

(5j) The candidate will be able to describe and apply regulation pertaining to individual savings plans.

(7e) Explain and apply all of the applicable standards of practice related to valuing pension benefits.

Sources:

1- Morneau Shepell, Handbook of Canadian Pension and Benefit Plans, 15th edition, Ch. 12

2- Canadian Pensions and Retirement Income Planning, Towers Watson, 5th Edition. Ch. 14

3- FR-112-13: Filing Requirements and Procedure on Full or Partial Wind up of a Pension Plan

4- FR-113-13: Converting Pension Plans from DB to DC

3. Continued

5- FR-114-15: Ontario Pension Benefits Act R.R.O. 1990, Reg 909

6- FR-115-15: Ontario Pension Benefits Act, R.S.O. 1990, Ch. P.8

7- FR-123-15: Pension Benefits Act–Ontario Regulation 310/13

8- FSCO policy on Conversion of a Plan from Defined Benefit to Defined Contribution

Commentary on Question:
The question was asking for Regulatory considerations so we were looking for considerations according to the Ontario PBA, the ITA and CAPSA guidelins. Most candidates were able to name some considerations, but only few were able to name enough to get full marks, especially in part c). The question gave some background on the financial position of the plan so we also expected candidates to be able to tell what was required regarding the deficit.

Solution:
Describe the regulatory considerations for each scenario.

Commentary on Question Part a):
Most candidates did well on this portion of the question. However, many candidates did not consider the DC plan.

1. **Conversion**
   - Plan members must receive full information with respect to the conversion and the options available to them
   - A notice must be remitted to all members and the Superintendent
   - Plan members must be given choice to convert or not.
   - If no choice is made, considered as if elected not to convert
   - The statement of benefits and options should contain:
     - choice to retain DB
     - commuted value if converts (including ancillary benefits and any improvements)
     - amount of excess member contributions
     - explanations as to the pension the member would receive from DC plan (purchasing annuity upon termination)
     - non-eligible ancillary benefits; and
     - vesting rule that still applies.
   - An amendment needs to be registered. The effective date of amendment may not be earlier than the date of the notice
   - Sponsor can purchase annuities, but must comply with legislation for the early retirement commencement, the transfer of the commuted value and pre-retirement death benefits

3. Continued

- The commuted value must be calculated in accordance with the Regulation and take into account any bridge or early retirement benefits for which the member has met the eligibility requirements.
- The commuted value must contain reasonable salary projection if plan formula related to earnings. The commuted value may contain a probability of termination. The commuted value must comply with the 50% rule
- The transfer value over the Maximum Transfer Limit prescribed by the ITA must be paid cash to the member
- The plan vesting rules continue through the DC plan
- The plan sponsor must contribute any shortfall of the conversion in a lump sum
- The plan sponsor must also make lump sum payment to ensure the solvency ratio of the remaining members in the DB provision is not reduced by the conversion
- A conversion report is required
- The plan will remain registered with FSCO
- The administrator must continue to file Annual Information Returns
- The Pension Benefits Guarantee Fund will still apply to the deferred pension but not to the DC benefits.
- The conversion to DC may create a Pension Adjustment Reversal (PAR)
- The *ITA* DC contribution limit will apply

Commentary on Question Part b):
Part b) of the question was also answered very well. In general, candidates were able to describe the wind-up process but most candidates forgot to write considerations about the Group RRSP.

2. Full Wind Up + Group RRSP

- A wind-up notice must be remitted to all members, former members and persons entitled to benefits and the Superintendent
- Effective date of the wind up cannot be earlier than date notice is given to members
- A wind up report must be submitted to FSCO.
- Wind up report must consider early retirement options, joint and 60% survivor option, full vesting, minimum credited interest.
- The wind up report must be prepared in accordance with the Act, the regulation and the CIA Standards. The wind up report sets out the assets and liabilities, the benefits to be provided to members, former members, retired members and other persons, the methods of allocating and distributing the assets and determining the priorities for payment of benefits and other prescribed information. Membership data is required by FSCO to make their review including the accrued benefits and the commuted value
- Amendment, Resolutions, Form 1.1 and Superintendent's Checklist must be submitted to FSCO

3. Continued

- Annual Information Return, including PBGF, and Financial Statements must be filed within 6 months following the wind up date
- Must consider grow in benefits
- No payments must be done unless already in payment on the date of the wind up
- Benefit statements must be remitted to members within 60 days of report approval by FSCO
- Members must make an election within 90 days. If no election is made, will consider immediate pension if eligible, otherwise deferred pension to earliest date
- Plan sponsor has 60 days to make payment after the later of reception of member's choice or report approval by FSCO
- Within 30 days after the final distribution of assets, the administrator must give written notice to Superintendent that all assets of the plan have been distributed
- As a minimum, the deficit must be funded by annual special payments over a maximum period of 5 years commencing on the effective date of the wind up
- The administrator is required to file a report annually until the employer's obligation has been fulfilled
- Employer needs to set up Group RRSP with an insurer or a trustee
- Contributions to RRSP are considered salary under the *ITA*, thus payroll taxes apply
- Vesting is immediate because of salary taxes
- Employer has fiduciary responsibility
- Subject to CAP Guidelines
- Contributions can't exceed member's contribution limit

Commentary on Question Part c):
Part c) of the question is the section where candidates have had more difficulties.

3. Sale + Transfer

- An employee of the original employer who is a member of the original pension plan and becomes an employee of the successor employer and a member of the successor pension plan, is deemed not to have been terminated by the change of employer

3. Continued

- If the original employer's employee who is a member of the original pension plan becomes the successor employer's employee and a member of the successor pension plan, (a) he or she continues to be entitled to the benefits provided under the original pension plan in respect of employment in Ontario or in a designated jurisdiction to the effective date of the sale of the business without further accrual; (b) he or she is entitled to credit in the successor pension plan for the period of his or her membership in the original pension plan, for the purpose of determining eligibility for membership in or entitlement to benefits under the successor pension plan; and (c) he or she is entitled to credit in the original pension plan for the period of employment with the successor employer for the purpose of determining entitlement to benefits under the original pension plan.
- The original employer and the successor employer may enter into an agreement, (a) to transfer the responsibility for providing pension benefits and (b) to transfer assets from the original pension plan
- The Superintendent's prior consent is required to authorize the transfer of assets from the original pension plan to the successor pension plan
- The effective date of a transfer of assets is the effective date of the sale, assignment or disposition of all or part of the original employer's business or all or part of the assets of the business to the successor employer
- The application must be filed within nine months after the effective date of the transfer
- Within 60 days after a transfer of assets has been completed, the administrators shall file the following documents: A statement certifying that the transfer of assets has been made; and, An actuarial cost certificate that indicates the amount of assets transferred from the original pension plan to the successor pension plan.
- The commuted value must be determined in accordance with actuarial methods and assumptions that are consistent with section 3500. The commuted value of a transferred member's benefits must be determined as if his or her employment had terminated on the effective date of the transfer of assets
- The amount of assets to be transferred from the original pension plan to the successor pension plan is the sum of the total amount of the solvency assets of the original pension plan and the total amount of all letters of credit held in trust, minus the total amount to be paid into prescribed retirement savings arrangements, plus the amount of special payments made into the original pension plan from the effective date of the transfer of assets to the date on which the assets are transferred, minus the amount of payments made, on or after the effective date of the transfer of assets to the date on which the assets are transferred

3. Continued

- A transfer of assets is not authorized unless, after the transfer, at least one of the following conditions would be satisfied:
  - The solvency ratio of the successor pension plan is at least 0.85.
  - The solvency ratio of the successor pension plan is,
    (i) no more than 0.05 below the solvency ratio of the original pension plan before the transfer, and
    (ii) no more than 0.05 below the solvency ratio of the successor pension plan before the transfer.
- The obligation of the original employer to make special payments under the original pension plan continues until the transfer of assets is completed

4. Learning Objectives:

3. The candidate will understand how to apply/synthesize the methods used to value pension benefits for various purposes.

5. The candidate will understand how to evaluate and apply regulatory policies and restrictions for registered retirement plans.

Learning Outcomes:

(3b) Perform periodic valuations of ongoing plans, calculating normal cost and actuarial liability, using a variety of cost methods.

(5c) The candidate will be able to describe and apply regulation pertaining to plan amendment.

Sources:

FSCO policy on Actuarial Filing for Plan Amendments

Pension Benefits Act of Ontario

Commentary on Question:

Candidates generally did well on this question.

4a - Question tested knowledge of FSCO filing requirements due to plan amendment and required information on cost certificate. To attain full marks, a well prepared candidate would need to include that the increase in Normal Cost, Going Concern, Solvency, and PBGF liabilities due to amendment and the increase in required contributions due to amendment

4b - Question tested candidates understanding of Canadian funding requirements and demonstrate the ability to calculate the change in normal cost, going concern, and solvency contributions due to plan amendment.

Solution:

(a) List the information that must be included in a cost certificate as required under the Ontario Pension Benefits Act and Regulations and professional standards.

Cost certificate, prepared as at the effective date of the benefit improvement, should contain the following information:
(a) Any increase in the normal cost due to the benefit improvement;

(b) Any increase in the going concern liabilities due to the benefit improvement, if not already reflected in the last filed valuation report or a previous cost certificate;

(c) Any increase in the solvency liabilities due to the benefit improvement;

4. Continued

(d) Any increase in the Pension Benefits Guarantee Fund (PBGF) liabilities due to the benefit improvement;

(e) The rule for computing the incremental normal cost due to the benefit improvement for the period up to the valuation date of the next report, if applicable;

(f) The estimate of the incremental normal cost due to the benefit improvement for each year up to the valuation date of the next report, if applicable;

(g) The incremental going concern special payments determined in accordance with paragraph 3 below, if any;

(h) The incremental solvency special payments determined in accordance with paragraph 4 below, if any; and

(i) A description of the actuarial assumptions and methods that are used to determine the incremental normal cost, incremental going concern liabilities and incremental solvency liabilities, as applicable.

(b) Calculate the increase in monthly contributions due to the benefit improvement.

Show all work.

Increase due to plan change (monthly): $250 ($54,000-$51,000)/12

Going Concern Liability at 7.1.15 before plan change: $1,174,000
Going Concern Liability at 7.1.15 after plan change: $1,231,000
Market Value of Assets at 7.1.15: $1,169,000

Going Concern Deficit (before plan change): $(5,000)
Going Concern Deficit (before plan change): $(62,000)
Increase in Deficit: $57,000
Amortization Factor over 15 years: 10.15
Increase in Monthly in GC contribution: $468 (=$57,000/10.15/12)

Solvency Liability at 7.1.15 before plan change: $1,768,000
Solvency Liability at 7.1.15 after plan change: $1,856,000

Increase in Deficit: $88,000
Amortization Factor over 15 years: 4.75
Present Value of Going Concern additional payment over 5 years: $26,676 ($468*12*4.75)
Additional Solvency Monthly contribution: $1,076 (=($88,000-$26,676)/4.75/12)

4. Continued

Normal Cost: $250
Going Concern special payments: $468
Solvency special payments: $1,076
Total: $1,794

5. Learning Objectives:

6. The candidate will understand how to apply the regulatory framework in the context of plan funding.

Learning Outcomes:

(6a) Evaluate retirement funding alternatives for the plan sponsor, shareholders and the participants.

Sources:

FR-119-14, Morneau Chpt 5 and 8, Canadian Pensions and Retirement Income Planning chpt 1 and 15

Commentary on Question:

Candidates were asked to describe reasons for developing a funding policy for a typical plan sponsor, and then to evaluate the adequacy of a sample funding policy provided. Candidates did well at describing the reasons for developing a funding policy. However, the evaluation generally did not cover the aspects related to the impact and the management of the risks and the use of the excess.

Solution:

(a) Describe the reasons for developing a funding policy for a single employer defined benefit registered pension plan.

Lead to more robust governance

Improve the identification, understanding and management of the risk factors that affect the variability of funding requirements and the security of benefits

Contribute to more predictability in funding

Increase the plan sponsor's discipline around funding decisions

Improve transparency of funding decisions and increase the beneficiaries' understanding of pension funding issues

Provide guidance to the plan's actuary when selecting actuarial methods and assumptions in accordance with actuarial standards of practice and within the plan's risk tolerance limit

(b) Critique the draft funding policy considering CAPSA guidelines.

5. Continued

Commentary on Question:
Candidates were asked to evaluate the adequacy of a sample funding policy provided. The candidates did well at pointing out that most of plan provisions were missing. However, the evaluation generally did not cover the aspects related to the impact and the management of the risks and the use of the excess. Also, many candidates confused the funding policy with the requirements of an investment policy.

Plan Overview
The plan overview in the draft funding policy covers the normal retirement age and Benefit formula but many key provisions are not addressed such as:

- member contributions
- benefits upon non-retirement events (e.g., termination, death)
- cost-of-living adjustments
- covered employees
- is the plan open or closed?

Funding Objectives
The draft funding policy states funding objective is to minimize Company contributions, however, this is not sufficient as the integration with the investment policy should be addressed

Key Risks Faced by the Plan
It is expected that the funding policy discusses key risks from the perspectives of various stakeholders

Funding Volatility Factors and Management of Risk
The policy should describe the plan's tolerance for volatility in funding requirements and the relationship between assets and liabilities movements/ Document structure of the plan's liabilities as it affects funding risk

Draft funding policy has funding valuations performed annually:

- should also address frequency for evaluating certain risks
- should also address scenario testing practices

Funding Target Ranges
Could add a description of funding targets and contribution targets levels

Utilization of Funding Excess
Factors that may be considered in deciding how and when to use the funding excess contribution holidays or benefit improvement

5. Continued

Actual Methods, Assumptions and Reporting
Guidance to plan's actuary in selecting actuarial methods and assumptions that appropriate for the plan sponsor's risk management approach (actuarial cost method, margin for adverse deviation, asset valuation method, etc.)

Monitoring
Documentation of roles, responsibilities and oversight of the funding policy, as well as the frequency of review

Communication Policy
Covered by draft funding policy

(c) Recommend updates to the funding policy to reflect the use of a letter of credit.

Commentary on Question:
Candidates described the characteristic of letter of credits and rules imposed by regulators in using a letter of credit as a funding mechanism. Few candidates discussed the risk implications of using a letter of credit and the integration with the funding policy.

Describe how the use of letter of credit funding aligns with the funding objectives

The use of letter of credit would be described as an acceptable mean of meeting minimum funding requirements.

Consider specifying in which circumstances it is acceptable to use letter of credit funding

The risks to various stakeholders of using letter of credit funding would be described in the funding policy

6. Learning Objectives:

5. The candidate will understand how to evaluate and apply regulatory policies and restrictions for registered retirement plans.

6. The candidate will understand how to apply the regulatory framework in the context of plan funding.

Learning Outcomes:

(5i) The candidate will be able to describe and apply regulation pertaining to contributions and benefits.

(6b) Evaluate funding restrictions imposed by regulations.

Sources:

Canadian Pensions and Retirement Income Planning, Chapter 18
Ontario Pension Benefits Act

Commentary on Question:

In this question, the candidate is asked to determine the funded position of a Designated Pension Plan and determine the Company contribution under various circumstances that are unique to Designated Plans.

Full credit is obtained only where the candidate calculates the plans funded position, contribution requirements in accordance with provincial pension regulations, and determines the amount that the company may contribute when the Income Tax Act restrictions on Designated Pension Plans are recognized.

Solution:

(a) Calculate the funded status of the pension plan as at January 1, 2015 on all bases required by legislation.

Commentary on Question:

Candidates did not need to calculate all interim values to receive full credit as long as they showed the correct formulas and determined the final values correctly.

Going Concern Liabilities at Valuation Date (Val'n) January 1, 2015
Assumed Retirement Age (ARA) = 62
Income Tax Act (ITA) Maximum = Current Dollar Limit x Industrial Wage Increase x Credited Service = 2,819 x [(1.03) ^ (62 - 60)] x 12 = $35,888
Final Earnings at ARA = 850,000 x [(1.055) ^ (62 - 60)] = $946,071
Early Retirement Factor = 1 since benefits are unreduced at age 62
Accrued Plan Benefit at ARA = .02 x 946,071 x 12 x 1 = $227,057
Unreduced Benefit at ARA = min [227,057, 35,888] = $35,888
Factor at Val'n = 11.9 ÷ [(1.06) ^ (62 - 60)] = 10.6

6. Continued

Liabilities = Unreduced Benefit at ARA x Factor at Val'n = 35,888 x 10.6 = $380,413

Solvency Liabilities at January 1, 2015
ARA = 60 since the benefit is actuarially reduced from age 62
ITA Maximum = Current Dollar Limit x Credited Service = 2,819 x 12 = $33,828
Early Retirement Factor = actuarial equivalent to age 62 benefit = (17.4 x 1.022^-2)/18.3 = 0.91
Accrued Plan Benefit at ARA = .02 x 850,000 x 12 x 0.91 = $185,640
Unreduced Benefit at ARA = min [185,640, 33,828] = $33,828
Factor at Val'n = 18.3
Liabilities = Unreduced Benefit at ARA x Factor at Val'n = 33,828 x 18.3 = $619,052

Maximum Funding Liabilities at January 1, 2015
ARA = 65
ITA Maximum = Current Dollar Limit x prescribed wage increase x Credited Service
= 2,819 x [(1.055) ^ (65 - 60)] x 12 = $44,212
Final Earnings at ARA = 850,000 x [(1.055) ^ (65 - 60)] = $1,110,916
Early Retirement Factor = 1
Accrued Plan Benefit at ARA = .02 x 1,110,916 x 12 x 1 = $266,620
Unreduced Benefit at ARA = min [266,620, 44,212] = $44,212
Factor at Val'n = 14.5 ÷ (1.075) ^ (65 - 60) = 10.1
Liabilities = Unreduced Benefit at ARA x Factor at Val'n = 44,212 x 10.1 = $446,541

Position at January 1, 2015
Going Concern Deficit = $380,413 - $350,000 = $30,413
Solvency Deficit = $619,052 - $350,000 = $269,052
Max Funding Deficit = $446,541 - $350,000 = $96,541

(b) Calculate the 2015 contribution requirements.

Show all work.

Commentary on Question:
Candidates received full credit where they calculated the Normal Cost as the Liability divided by Credited Service.

6. Continued

Going Concern Normal Cost (GC NC)
ITA Max per year of service = Current Dollar Limit x Industrial Wage Increase
= 2,819 x [(1.03) ^ (62 - 60)] = $2,991
Benefit per year of service = min of (.02 x 946,071 x 1, 2,991) = $2,991
Normal Cost = Benefit per year of service x Factor at Val'n = 2,991 x 10.6 = $31,701

Maximum Funding Normal Cost (MF NV)
ITA Max per year of service = Current Dollar Limit x prescribed wage increase
= 2,819 x [(1.055) ^ (65 - 60)] = $3,684
Benefit per year of service = min [.02 x 1,110,916 x 1, 3,684] = $3,684
Normal Cost = Benefit per year of service x Factor at Val'n = 3,684 x 10.1 = $37,208

Annual Going Concern Special Payments (GC SP)
= Going Concern Deficit amortised over 15 years at 6% = 30,413/(1-(1+i)^-15)/i(12)
= 30,413/ 9.9765 = $3,048
where i(12) = 12 * (1.06^(1/12)-1)

PV of Going Concern Special Payments for 5 years at 2.2%
= 3,048 * (1-(1+i)^-5)/i(12) = 3,048 *4.7333 = $14,427
where i(12) = 12 * (1.022^(1/12)-1)

Solvency Deficit to be amortised over 5 years = 269,052 – 14,427 = $254,625

Annual Solvency Special Payments (Solvency SP)
= Solvency Deficit amortised over 5 years at 2.2% = 254,625 / 4.7333 = $53,794

The maximum contribution under Designated Plan rules = min(MFV NC + MFV deficit, GC NC + GC deficit)
= min(96,541 + 37,208, 30,413+31,701) = $62,114

In the absence of the special rules for Designated Plans, the minimum contribution
= GC NC + GC SP + Solvency SP = 31,701 + 3,048 + 53,794 = $88,543

As such, the minimum contribution will be equal to the maximum = $62,114.

7. Learning Objectives:

2. The candidate will understand how to analyze/synthesize the factors that go into selection of actuarial assumptions for funding purposes.

7. The candidate will understand how to apply the standards of practice and professional conduct guidelines.

Learning Outcomes:

(2a) Describe and apply the techniques used in the development of economic assumptions for funding purposes.

(7e) Explain and apply all of the applicable standards of practice related to valuing pension benefits.

Sources:

CIA Revised Educational Note: Selection of Mortality Assumptions for Pension Plan Actuarial Valuations – March 2014

Selecting Mortality Tables: A Credibility Approach

Commentary on Question:

The question asked candidates to describe the considerations in updating the mortality assumptions; however, many candidates provided recommendations rather than describing considerations. It was important for candidates to recognize that the considerations were different for each plan due to membership size. Very few candidates described considerations for how to adjust a standard mortality table.

Solution:

Describe the considerations in updating the going concern pre-retirement and post-retirement mortality assumptions on a best estimate basis for the January 1, 2015 valuations of each plan.

<u>Comments that apply to Plan A and Plan B</u>

General Comments

- There are two key components to the selection of an appropriate best estimate mortality assumption:
  - The best estimate of the current rates of mortality for the plan; and
  - Appropriate adjustments for future improvements in mortality.

7. Continued

Pre-Retirement Mortality

- Same assumption as for post-retirement mortality will generally be satisfactory

- Pre-retirement mortality assumptions are not of great significance to the calculation of actuarial liabilities, since
  - Rates of mortality at pre-retirement ages are generally very low; and
  - In many cases, benefits payable on death are equal to the commuted value of a deferred pension entitlement.

- Give greater consideration to the selection of the pre-retirement mortality assumption in particular cases where:
  - Benefits payable on member death are significantly different from the commuted value of accrued pensions; and/or
  - Actual observed rates of mortality for active members are significantly different from those expected based on the standard mortality tables.

Improvement Scale

- Insufficient data in Plan A or Plan B to development improvement table for either plan.

- Future mortality improvements, generational (2-D or 1-D), are normally based on published mortality studies

- Development of a best estimate of future mortality improvement rates typically comprises three elements:
  - A short-term rate based on recently observed improvement rates;
  - An ultimate long-term improvement rate, which is highly uncertain; and
  - A transition from the short-term to the ultimate improvement rates over a certain period and based on a particular pattern.

Plan A Base Table – Very Small Plan

- Number of retirees is insufficient to conduct a credible mortality experience study
- Select an appropriate published mortality table
- Adjust mortality table for characteristics of the plan if warranted
- Since lacking credible experience, may consider using experience from other similar plans to adjust base table

Plan B Base Table – Large Plan

- Plan B should have enough data to credible mortality experience to adjust a standard table

7. Continued

When Should You Consider Changing a Valuation Mortality Table

- Experience studies would typically be prepared every three to five years

- When assessing whether to change a valuation mortality table based on the results of an experience study, begin by comparing the observed deaths weighted by benefit amount to the expected deaths weighted by benefit amount.

- If the current mortality table is a good representation of the actual underlying mortality rates of plan members and former members, the ratios of actual to expected deaths should closely track 1

- Consider the characteristics of plan members and former member:
  - Collar type (higher rates of mortality for blue collar vs. white collar)
  - Industry (higher rates of mortality for private sector vs. public sector)
  - Pension size (higher rates of mortality for pensioners receiving smaller pensions)

- Use caution when deriving adjustments for variations in more than one plan characteristic at the same time, as the combined effect may overstate or understate the actual relationship – should instead look at characteristic separately

Adjusting a Standard Table

- A more practical approach is often to rate a version of a standard table up or down based on the total death amounts from the experience study.

- Multiply mortality rate at each age x by the ratio of actual to total expected death amounts for all ages

- For ages close to the maximum age to which a plan member is assumed to live, mortality rates should be adjusted, if necessary, so that there is a reasonable progression from the mortality rates close to the maximum age to the mortality rate of 1 at the maximum age

- If there are ages or age bands where Plan B has insufficient data for the adjustment to a standard table to be fully credible, a more appropriate approach would be to assign partial credibility to the results of the mortality study.

- Credibility weighting assigned to experience study = square root(actual number of deaths / expected number of deaths) or square root (actual dollars of death / expected dollars of death)

7. Continued

- Credibility approach outlined above assumes the shape of the standard table is appropriate for the plan being valued and all that is required is a proportional adjustment (either up or down) to the standard table.

- If the underlying shape of the mortality curve for a plan differs significantly from all available standard tables, the actuary may choose to build a table from scratch using experience data from the plan, even if a credible amount of experience data is not available.

8. Learning Objectives:

7. The candidate will understand how to apply the standards of practice and professional conduct guidelines.

Learning Outcomes:

(7a) Apply the standards related to communications to plan sponsors and others with an interest in an actuary's results (i.e., participants, auditors, etc.).

(7b) Explain and apply the Professional Conduct Guidelines.

(7c) Explain and apply relevant qualification standards.

(7d) Demonstrate compliance with requirements regarding the actuary's responsibilities to the participants, plans sponsors, etc.

(7e) Explain and apply all of the applicable standards of practice related to valuing pension benefits.

(7f) Recognize situations and actions that violate or compromise Standards or Professional Conduct Guidelines.

(7g) Recommend a course of action to repair a violation of the Standards or Professional Conduct Guidelines.

Sources:

CIA Rules of professional conduct, SOA rules of professional conduct, CIA guidance document: general advice on the application of Rule 13, CIA standards of practice

Commentary on Question:

Commentary listed underneath question component.

Solution:

Explain how you will address each of the above concerns, taking into account the rules of professional conduct.

Commentary on Part (a)

Most candidates centered the discussion on "discussing with other actuary and revise the assumptions" instead of "disclose not taking responsibility for the assumptions"

In general:

1. A member shall act **honestly**, with integrity and **competence**
2. Fullfil the profession's **responsibility to the public**, and **uphold reputation** of the actuarial profession

8. Continued

In particular for Part (a)

1. Report that the actuary does not take responsibility for the assumptions
2. Report the results of alternative assumptions that are
   - **Appropriate in aggregate** and **independently reasonable** in the actuary's opinion if
   - **members of the plan** are identified as users of the report. These alternate results may be **useful to the users of the valuation report**.

Commentary on Part (b)

Candidates generally did well in talking about "declining the assignment", although many could not give the full requirement to take on the assignment – qualified, follow SOP and have adequate knowledge

He/she should decline because:

1. a member shall provide professional service only when he is qualified to do so [Rule 2]
2. a member shall ensure that professional services performed meet applicable standards of practice [Rule 2]
3. the actuary should have adequate knowledge of the circumstances of the case on which he or she is working

Commentary on Part (C)

Candidates generally did well in relating to rule 13.

1. Shall attempt to **discuss the situation with the other member** [Rule 13] because
2. a member shall perform professional services with **courtesy and professional respect**, and shall **cooperate** with others in the client's or employer's interest. [Rule 8]
3. If the colleague **admits** to the mistake, **rectifies the problem** and **inform** the users, **nothing further** needs to be done. [Guidance Document on Rule 13]
4. If the colleague **refuses** to do the above, the actuary shall **report** such apparent noncompliance to the Committee on Professional Conduct. [Guidance Document on Rule 13]
5. A third review might be necessary
6. may consult in confidence with the chairperson (or vice-chairperson) of a designated council

9. Learning Objectives:

2. The candidate will understand how to analyze/synthesize the factors that go into selection of actuarial assumptions for funding purposes.

3. The candidate will understand how to apply/synthesize the methods used to value pension benefits for various purposes.

Learning Outcomes:

(2a) Describe and apply the techniques used in the development of economic assumptions for funding purposes.

(2b) Evaluate and recommend appropriate assumptions for funding purposes.

(3a) Differentiate between the various purposes for valuing pension plans:
- (i) Funding
- (ii) Solvency
- (iii) Termination/wind-up/conversion

Sources:

Pension Mathematics for Actuaries, Anderson, 3rd Edition, Chapter 4.
FR-102-15

ASOP 27

Commentary on Question:

Commentary for parts (a) and (c):

Candidates generally performed well on these parts. The accuracy of the final answer was not a key component in answering this question. If the wrong final answer for a part was given but some elements of the calculation were correct, partial marks were awarded accordingly.

Commentary for part (b):

Candidates generally did not perform well on this part. When asked to critique the proposed assumption, this question was trying to test the candidate's understanding of the selection of assumptions and whether the proposed assumption was appropriate. Some candidates instead explained the impact the change would have on the liabilities. No credit was awarded for discussion of the impact on the liabilities, or for discussion of assumptions other than that listed in the question.

9. Continued

Solution:

(a) Calculate the impact of the proposed change in early retirement benefits on the going concern liabilities as at January 1, 2015 for each sample participant, assuming no change to the retirement age assumption.

Show all work.

Member A (age 57, service 24)

Current Provisions

Pension = $80 x 12 x 24 = 23,040
Early reduction factor (ERF) = 1 – 0.25% x 12 x (65 – 62) = 91%
Present value factor (v) = (1 + 5.75%) ^ (62 – 57) = 0.756
Blended annuity factor = 20% x Single + 80% x J&60S = 20% x 13.8 + 80% x 15.5 = 15.2
APV factor = 91% x 0.756 x 15.2 = 10.457
AL(pension) = 23,040 x 10.457 = 240,929

Note: at retirement, Member A will have attained both age 55 and 85 points, therefore will be eligible to receive a bridge benefit
Bridge = $20 x 12 x 24 = 5,760
Present value factor (v) = 0.756
Temporary annuity factor = 2.7
APV factor = 0.756 x 2.7 = 2.041
AL(bridge) = 5,760 x 2.041 = 11,756

Total AL = 240,929 + 11,756 = 252,685

Proposed Provisions

Early reduction factor (ERF) = 1 – 0.25% x 12 x (63 – 62) = 97%
APV factor = 97% x 0.756 x 15.2 = 11.146
AL(pension) = 23,040 x 10.457 = 256,804

Bridge = $30 x 12 x 24 = 8,640
AL(bridge) = 8,640 x 2.041 = 17,634

Total AL = 256,804+ 17,634= 274,438

Impact of provision = 274,438 – 252,685 = 21,753

9. Continued

Member B (age 42, service 1)

Current Provisions
Pension = $80 x 12 x 1 = 960
Early reduction factor (ERF) = 1 – 0.25% x 12 x (65 – 62) = 91%
Present value factor (v) = (1 + 5.75%) ^ (62 – 42) = 0.327
Blended annuity factor = 15.2
APV factor = 91% x 0.327 x 15.2 = 4.523
AL(pension) = 960 x 4.523 = 4,342

Note: at retirement, Member B will not have attained 85 points, therefore will be ineligible to receive a bridge benefit
AL(bridge) = 0

Total AL = 4,342

Proposed Provisions
AL(pension) = 4,342 (No change to Member B pension)

Bridge = $30 x 12 x 1 = 360
Present value factor (v) = (1 + 5.75%) ^ (62 – 42) = 0.327
Temporary annuity factor = 2.7
APV factor = 0.327 x 2.7 = .883
AL(bridge) = 360 x 0.883 = 318

Total AL = 4,342 + 318 = 4,660

Impact of provision = 4,660 – 4,342 = 318

(b) Critique the proposed change to the going concern retirement age assumption.

Advantages
- Aligned with proposed plan provision.
- More conservative than previous assumption of age 62.
- A single retirement age may facilitate ease of calculations.

Disadvantages
- A single retirement age may not generate reasonable results for all liability measures such as PV of benefits and normal cost, though it may provide reasonable results for a single liability.
- Using a single age assumption makes it more difficult to cost out changes in early retirement benefits; a retirement rate table facilitates this.

9. Continued

- When using a single age, the actuary would need to determine an appropriate adjustment to the single age to account for the average expected impact of the early retirement enhancement, which may be a far more difficult and arbitrary process.
- Single age is not representative of different status groups (ie. active versus deferred vested).
- A table of retirement rates produces a more reasonable pattern of cash flows including spreading out the potential first year jump in payments that can occur when the valuation system assumes that everyone over a single age retires immediately.
- A retirement rate table also facilitates cost estimates for changes in early retirement benefits.
- Retirement assumption should be developed based on recent plan experience.

(c) Calculate the impact of the change in retirement age assumption on the going concern liabilities as at January 1, 2015 for each sample participant.

Show all work.

Member A (age 57, service 24)

Proposed Provisions
Pension =23,040
Early reduction factor (ERF) = 1 – 0.25% x 12 x (63 – 60) = 91%
Present value factor (v) = (1 + 5.75%) ^ (60 – 57) = 0.846
Blended annuity factor = 20% x Single + 80% x J&60S = 20% x 14.4 + 80% x 16.0 = 15.7
APV factor = 91% x 0.846 x 15.7 = 12.087
AL(pension) = 23,040 x 12.087 = 278,484

Bridge = 8,640
Present value factor (v) = (1 + 5.75%) ^ (60 – 57) = 0.846
Temporary annuity factor = 4.3
APV factor = 0.846 x 4.3 = 3.638
AL(bridge) = 8,640 x 3.638 = 31,432

Total AL = 278,484+ 31,432 = 309,916

Impact of assumption change = 309,916 – 274,438 = 35,478

9. Continued

Member B (age 42, service 1)

Proposed Provisions
Pension = 960
Early reduction factor (ERF) = 1 – 0.25% x 12 x (65 – 60) = 85%
Present value factor (v) = (1 + 5.75%) ^ (60 – 42) = 0.366
Blended annuity factor = 20% x Single + 80% x J&60S = 20% x 14.4 + 80% x 16.0 = 15.7
APV factor = 85% x 0.366 x 15.7 = 4.884
AL(pension) = 960 x 4.884 = 4,689

Bridge = 360
Present value factor (v) = (1 + 5.75%) ^ (60 – 42) = 0.366
Temporary annuity factor = 4.3
APV factor = 0.366 x 4.3 = 1.574
AL(bridge) = 360 x 1.574 = 567

Total AL = 4,689+ 567 = 5,256

Impact of assumption change = 5,256 – 4,659 = 596

10. Learning Objectives:

3. The candidate will understand how to apply/synthesize the methods used to value pension benefits for various purposes.

Learning Outcomes:

(3b) Perform periodic valuations of ongoing plans, calculating normal cost and actuarial liability, using a variety of cost methods.

Sources:

Pension Mathematics for Actuaries, Anderson, 3rd Edition.

Commentary on Question:

In general, this question was answered well. There were two possible calculation methods – both were given full marks if correct.

Solution:

(a) Calculate the accrued liability and normal cost for the plan as at January 1, 2015.

Normal Cost

Note for EAN, in this case NC is constant and no pre ret decrements AL = PVFB - PVFNC, $PVFB_e = PVFNC_e$

$PVFNC_e = NC * a_{r-e:5.5\%}$

$PVB_e = B(60)v^{(r-e)}a_{60}$

$a_{r-e:5.5\%} = (1-v^{r-e}) /d = (1-v^{r-e}) * (1 + i) /i$

	Member A	Member B	Total
	15.33	14.66	
$v^{(r-e)}$	0.20	0.24	
B(60) = \$85 * 12 * (r-e) * (1-.03*5)	26,010.00	23,409.00	
$NC = B(60)v^{(r-e)}a_{60} / a_{r-e:5.5\%}$	4,730.98	5,228.45	
Total NC	473,098.27	130,711.37	603,809.64

10. Continued

Liability

	Member A	Member B	Total
$v^{(r-x)}$	0.59	0.90	
$PVB_x = B(60)v^{(r-x)}a_{60}$	211,655.99	292,343.03	
$a_{r-x:5.5\%} = (1-v^{r-x}) /d = (1-v^{r-x}) * (1 + i) /i$	7.95	1.95	
$PVFNC_x = NC * a_{r-x:5.5\%}$	33,020.48	8,938.77	
AL = PVFB -PVFNC	174,034.29	282,158.69	
Total AL	17,403,428.79	7,053,967.32	24,457,396.11

(b) Calculate the increase in the accrued liability and normal cost as at January 1, 2015.

Show all work.

Commentary on Question:
There was a simplified Pro-rata method that could have been used to calculate the normal cost and liability for member A. If the writer used this method, full marks were given.

Don't need to re-calculate for Member B as no change

All factors remain the same, the only changes are to the benefit at retirement

Member A will have \$90 per month of service at retirement, member B will have \$85 per month of service at retirement

	Member A	Member B	Total
B(60) = \$(90 member a, 85 member b) * 12 * (r-e) * (1 - .03 * 5)	27,540.00		
$NC = B(60)v^{(r-e)}a_{60} / a_{r-e:5.5\%}$	5,009.28		
Total NC	500,927.58	130,711.37	631,638.95
Change in normal cost due to negotiated increase:	27,829.31		

10. Continued

Liability	Member A	Member B	Total
$PVB_x = B(60)v^{(r-x)}a_{60}$	224,106.34		
$PVFNC_x = NC * a_{r-x:5.5\%}$	39,834.74		
AL = PVFB -PVFNC	184,271.60		
Total AL	18,427,159.89	7,053,967.32	25,481,127.21
Change in AL due to negotiated increase:	1,023,731.11		

11. Learning Objectives:

3. The candidate will understand how to apply/synthesize the methods used to value pension benefits for various purposes.

Learning Outcomes:

(3c) Analyze and communicate the pattern of cost recognition that arises under a variety of funding and asset valuation methods.

Sources:

Guidance on asset valuation methods, CIA Educational Note, September 2014

Asset valuation methods under ERISA, Pension Forum 9/2002, Ch. 3

Asset Smoothing for Solvency Valuations, FSCO Q1 and A1

CIA Consolidated Standards of Practice – Pension Plans 3200

Commentary on Question:

Commentary listed underneath question component.

Solution:

(a) Calculate the AVA at the end of year 5 under the above methodologies and the balance of the reserve account in method (iii).

Show all work.

Commentary on Question:

Many candidates were unexpectedly unable to set up the solution for the linear method correctly, even though it is thoroughly covered in the material.

The annuity reserve method was more complex and therefore expected to pose some difficulty to candidates. It was answered fairly well.

11. Continued

Linear Recognition of G/L over 6 years

Amount of each prior year to be recognized =Total G/(L) for year x t/6

t	1	2	3	4	5
Total G/(L)	-18,170	-459,410	9,480	647,230	401,270
Amount recognized in year 6	-3,028	-153,137	4,740	431,487	334,392

AVA at end of year 5 = MVA – Σ amounts to be recognized
= 2,326,640 +3,028 +153,137 - 4,740 -431,487-334,392
= 1,712,186

Annuities-certain over 3 years with reserve account

i = 4%, v= 0.9615, d = 0.0385

ä(1year)=1.0000, ä(2year)=1.9615, ä(3year)=2.8861

To be recognized in	%	$
year 4 g/l	34.65% (1/2.8861)	224,258
year 5 g/l	67.97% (1.9615/2.8861)	272,724

Preliminary AVA = 2,326,240 - 224,258 - 272,724 **= 1,829,658**
Upper Limit = 105% of MVA = 2,442,972
Lower Limit = 80% of MVA = 1,861,312
Increase AVA for use of Reserve Account since preliminary is below threshold.
Reserve account to be used = min (Lower Limit-PAVA, Reserve Account) = 31,654
Final AVA = 1,829,658 + 31,654 **= 1,861,312**
Reserve account at End of Year 5 (before applying reserve) = 540,500

Balance of reserve account = 540,500-31,726 = 508,846

(b) Assess the appropriateness of the three possible asset valuation methods with respect to the desirable characteristics as described in the CIA Educational Note on Guidance on Asset Valuation Methods.

Commentary on Question:
This question was poorly answered. Candidates were not asked to list the desirable characteristics. Candidates who merely listed the characteristics scored no points.

11. Continued

Rather, it was expected that candidates would review each method in relation to the characteristics in the list.

Many candidates listed that a method should achieve objectives but failed to consider what the "objectives" are within the context of the question and the real world, thereby missing the majority of the marks.

Candidates were expected to discuss how well each method achieves the goal of smoothing assets and how well that achieved the objective of reducing the volatility of employer contributions.

Bonus marks were given if the candidate made a recommendation of which AVA they would use.

Marks were also given if the candidate raised valid desirable characteristics that were not included in the list from the study note. For example; ease of understanding of method by report users.

Method I : MVA

- The MVA is easy to understand and requires no further computation.
- It does not moderate the volatility of contributions nor the accounting expenses since it keeps the plan funding level tied to the current position
- The MVA does not smooth the gains and losses on investment which makes it quite volatile rather than recognizing them over the full economic cycle.
- Is equal to MVA and will not deviate from MVA.
- Is free of bias.
- Could influence investment managers to find safer investment with less opportunity for return.
- MVA is less desirable for a long term assignment

Method ii: Adjusted Value of Assets

- This method moderates the volatility of employer contributions because it spreads unexpected investment impacts over a longer period of time. Does a good job of dampeneing these impacts.
- It tracks to the MVA and has a logical relation to the MVA.
- However, it may deviate largely from MVA if consistent gains (or losses) occur over several years. Application of corridor would resolve this concern.
- Investment managers may feel that riskier investments are an option because can spread any losses over a longer period and may re-correct in the deferral if necessary.It is not biased.
-

11. Continued

- This method smooths recognition over 6 years. However, a smoothing method should follow the typical length of an economic cycle. Therefore, we should not amortize over more than 5 years.
- Users of report will be able to easily understand this method.

Method iii: Reserve Method

- This method also smooths the recognition of gains and losses which reduces volatility and helps to moderate the swings in contributions required.
- It is tied to MVA as desired but will not have as reasonable a relationship with the MVA as the linear recognition method.
- However, the asymmetrical corridor might create a bias in this method. Gains may be recognized over a longer period of time than losses due to reserve account
- Won't unduly deviate and should track more closely to the MVA than Linear Recognition because of corridor and reserve. However, reserve could grow without limit. May get into a situation whereby could not use reserve for a very long time.
- May influence investment decisions when the reserve is large. Investment managers may take on riskier investments because larger losses can be absorbed by reserve.
- Actual amortization may be much longer than 3 years if gains continue to be held in reserve without being drawn down.
- Will be less easily understood by users of funding report.

12. Learning Objectives:

4. The candidate will understand the principles and rationale behind regulation.

5. The candidate will understand how to evaluate and apply regulatory policies and restrictions for registered retirement plans.

Learning Outcomes:

(4a) Describe the principles and motivations behind pension legislation and regulation.

(5g) The candidate will be able to describe and apply regulation pertaining to reporting requirements.

Sources:

Canadian Pensions and Retirement Income Planning, Towers Watson, 5th Edition - Ch. 5, 7, 8

Commentary on Question:

Commentary listed underneath question component.

Solution:

(a) Describe the principles underlying Pension Adjustments (PAs).

Commentary on Question:

Most candidates were only able to get half of the marks for this part. They simply did not include enough information to receive full marks. Most candidates listed a lot of the facts with regards to PA's instead of the principles behind PA's.

- PA is the deemed value of the RPP or DPSP benefit accrual for the calendar year.
- PA's are used to reduce the total registered retirement savings plan (RRSP) room for the following year for individuals with employer sponsored registered pension plans.
- For DC RPPs and DPSPs, the PA is the actual contributions made to the plan in a year, and is a representation of the value of the plan participation to the individual
- For DB RPPs, the PA does not necessarily represent the value of the benefits being earned by the individual under the DB RPP for the year
- A principle is that $9 of contributions should be enough to buy each $1 of target pension for a representative individual over an earning career.
- PA = (9 times Benefit Entitlement) - $600
- The Benefit Entitlement for an individual in a year is the portion of the individual's "normalized pension" under the DB provision at the end of the year that can be reasonably to have been accrued in respect of the year.

12. Continued

- The "normalized pension" represents the individuals' annual accrued lifetime pension that would be paid as if the individual were retiring at the end of the year at age 65, based on credited service to date.
- For PA purposes, to determine the "normalized pension", for a year the individual's pensionable earnings and the YMPE (if applicable), for that year, are used.
- The factor of 9, used to convert the Benefit Entitlement into a value that can be compared to money-purchase contribution is based on certain assumptions:
  - Retire at age 63 with an unreduced pension, after 35 years of plan membership
  - Pension is indexed in line with the Consumer Price Index less 1%
  - The pensioner has a spouse, and the pension reduces on the first death to 60% of the initial benefit
- For the early years of an individual's career, the factor of 9 will result in a PA that reduces RRSP room by more than what is required for target pension accumulation.

(b) Calculate the member's 2015 PA.

Show all work.

Commentary on Question:
Overall candidates performed very well on this part of the question.

2015 PA formula = (9 x 2015 DB accrual) – 600

2015 DB accrual = min (2% x 2015 Service x 2015 Pensionable Earnings, $2,819 x 2015 Service)

= min (2% x 1.0000 x $120,000, $2,819 x 1.0000)

= $2,400

2015 PA = 9 * 2,400 – 600 = $21,000

(c) Calculate the member's 2015 PA reflecting the plan amendment.

Show all work.

Commentary on Question:
This part of the question was comparatively poorly answered with many candidates using inaccurate formulas.

12. Continued

2015 PA = 2015 DC pension credit plus 2015 DB pension credit

where, the benefit entitlement determined in the DB pension credit is calculated using the DB benefit entitlement formula less 1/9 of the DC pension credit

2015 DC pension credit = 2015 employee contributions + 2015 employer contributions

= 8% x 2015 Earnings + 8% x 2015 Earnings

= 8% x 132,000 + 8% x 132,000

= 10,560 + 10,560

= 21,120

2015 DB benefit entitlement = min (2% x 2015 Service x 2015 Pensionable Earnings, $2,819 x 2015 Service) less 1/9 of 2015 DC pension credit

= min (2% x 1.0 x $132,000, $2,819 x 1.0) less 1/9 x 21,120

= min ($2,640, $2,819) less $2,346.67

= $2,640 - $2,346.67

= $293.33

2015 DB pension credit = 9 x 2015 DB benefit entitlement- $600

= 9 x $293.33 - $600

= $2,040

2015 PA = $21,120 + $2,040

= $23,160