
SOCIETY OF ACTUARIES
Funding & Regulation Exam - Canada

Exam RETFRC

MORNING SESSION

Date: Wednesday, May 4, 2016

Time: 8:30 a.m. – 11:45 a.m.

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This examination has a total of 100 points. It consists of a morning session (worth 60 points) and an afternoon session (worth 40 points).
 - a) The morning session consists of 7 questions numbered 1 through 7.
 - b) The afternoon session consists of 6 questions numbered 8 through 13.

The points for each question are indicated at the beginning of the question. Questions 1 and 2 pertain to the Case Study, which is enclosed inside the front cover of this exam booklet.
2. Failure to stop writing after time is called will result in the disqualification of your answers or further disciplinary action.
3. While every attempt is made to avoid defective questions, sometimes they do occur. If you believe a question is defective, the supervisor or proctor cannot give you any guidance beyond the instructions on the exam booklet.

Written-Answer Instructions

1. Write your candidate number at the top of each sheet. Your name must not appear.
2. Write on only one side of a sheet. Start each question on a fresh sheet. On each sheet, write the number of the question that you are answering. Do not answer more than one question on a single sheet.
3. The answer should be confined to the question as set.
4. When you are asked to calculate, show all your work including any applicable formulas.
5. When you finish, insert all your written-answer sheets into the Essay Answer Envelope. Be sure to hand in all your answer sheets because they cannot be accepted later. Seal the envelope and write your candidate number in the space provided on the outside of the envelope. Check the appropriate box to indicate morning or afternoon session for Exam RETFRC.
6. Be sure your written-answer envelope is signed because if it is not, your examination will not be graded.

Tournez le cahier d'examen pour la version française.

CASE STUDY INSTRUCTIONS

The case study will be used as a basis for some examination questions. Be sure to answer the question asked by referring to the case study. For example, when asked to compare proposed assumptions with existing assumptions, use membership data, or valuation results referenced in the case study, your response should be limited to those assumptions, member data, or valuation results. Other assumptions, data, or valuation results should not be listed, as they are extraneous to the question and will result in no additional credit.

****BEGINNING OF EXAMINATION****
Morning Session

Questions 1 and 2 pertain to the Case Study.

- 1.** (5 points) You are the actuary for the NOC Full-Time Salaried Pension Plan. The analyst working with you has proposed the following assumption changes for the going concern valuation of the plan:
- (i) Retirement rates: 50% at age 55, 10% at ages 56 to 61; 100% at age 62; and
 - (ii) Termination rates: 10% increase to current termination rates at all ages below age 55, 0% for ages 55 and above.

Describe considerations in assessing the appropriateness of these assumptions.

Questions 1 and 2 pertain to the Case Study.

- 2.** (6 points) You are the actuary for the NOC Full-Time Hourly Union Pension Plan. Two full-time Ontario plan members were involuntarily terminated on July 1, 2015.

You are given:

Participant Data as at July 1, 2015:

	<u>Member A</u>	<u>Member B</u>
Age:	54	45
Service:	27 years	5 years

Actuarial Assumptions as at July 1, 2015:

Commutated value interest rate:	2.5% per annum
Proportion married:	80%
Pre-retirement mortality:	None

Immediate Annuity Factors:

Age	Lifetime Factor	Joint and 60% Survivor Factor	Bridge Factor
55	21.0	22.7	8.7
56	20.5	22.3	7.9
57	20.1	21.8	7.2
58	19.6	21.4	6.3
59	19.2	21.0	5.5
60	18.7	20.5	4.7
61	18.2	20.1	3.8
62	17.8	19.6	2.9
63	17.3	19.2	1.9
64	16.9	18.7	1.0
65	16.4	18.2	0.0

Calculate the commuted value of each member's termination benefit.

Show all work.

3. (11 points) Your client sponsors a non-contributory defined benefit pension plan. You are given:

Plan Provisions:

Normal retirement benefit:	2% of final year's earnings times years of service
Normal form of payment:	Life only, payable monthly in advance
Normal retirement age:	Age 65
Termination benefit:	Deferred pension payable at age 65 or lump sum commuted value transfer from the plan

Actuarial Assumptions and Methods:

Interest rate:	5% per annum
Salary increase rate:	3% per annum
Retirement age:	Age 65
Pre-retirement decrements:	None
Actuarial cost method:	Projected Unit Credit, pro-rated on service
Asset method:	Market value of assets

Participant Data as at December 31, 2015:

	<u>Member A</u>	<u>Member B</u>
Age:	35	40
Service:	5 years	10 years
2015 Salary:	\$40,000	\$80,000

Annuity Factor:

$$\ddot{a}_{65}^{(12)} = 13.0$$

Additional Information:

Market value of assets as at December 31, 2015: \$160,000

- (a) (2 points) Calculate the normal cost and the unfunded actuarial liability as at December 31, 2015.

Show all work.

3. Continued

You are given:

- A contribution equal to the normal cost for Member B is made to the plan on January 1, 2016;
- The fund earns a rate of return of 0% during 2016;
- At January 1, 2016, Member A terminates employment and transfers \$25,000 out of the Plan, in full settlement of his entitlement; and
- At January 1, 2016, Member B receives a salary increase of 0%.

(b) (2 points) Calculate the unfunded actuarial liability as at December 31, 2016.

Show all work.

(c) (4 points) Calculate the gains and losses by source for 2016.

Show all work.

(d) (3 points) Describe factors that would impact whether there would be a termination gain or loss during 2016, if a termination scale had been used at December 31, 2015.

4. (10 points) ABC Company sponsors a defined benefit pension plan registered in Ontario. ABC uses a letter of credit (LoC) to cover solvency special payments.

- (a) (2 points) Describe the circumstances under which the face value of the LoC may be reduced while the plan is ongoing.
- (b) (8 points) ABC has declared bankruptcy. As a result, the pension plan is being wound up. The face value of the LoC at the date of the wind up is greater than the wind up deficit.

Outline the process for winding up ABC's pension plan.

5. (8 points)

- (a) (4 points) Describe how a funding policy could address the following for a non-contributory defined benefit multi-employer pension plan (MEPP):
- (i) actuarial gains and losses over the long-term and the short-term;
 - (ii) use of funding excess; and
 - (iii) deficit funding.
- (b) (4 points) You are the actuary for a MEPP that is administered by a Board of Trustees. An actuarial valuation for funding purposes is required to be filed as at January 1, 2016.

You are given:

(\$000s)	Scenario 1	Scenario 2
Going concern financial position		
Assets	100,000	100,000
Liabilities	160,000	95,000
Funding excess (deficit)	(60,000)	5,000
Total current service cost as a % of earnings	17%	9%
Assumptions		
Discount rate	5.5% per annum	8.5% per annum
All other	Best estimate	Best estimate

Additional information:

- At present, each participating employer is contributing 9% of earnings.
- The MEPP is exempt from solvency funding.

You have presented the results of the January 1, 2016 actuarial funding valuation under Scenario 1 to the Board of Trustees. The Board has asked you to file your actuarial valuation report using Scenario 2.

Assess the Board's request, taking into consideration professional standards.

6. (12 points) ABC Company sponsors a non-contributory defined benefit pension plan registered in Ontario. The CFO of ABC Company wants to retire on January 1, 2016.

You are given:

Plan Provisions:

Normal retirement benefit	1.75% of final 3-year average earnings multiplied by credited service
Normal retirement age	Age 65
Earliest unreduced retirement age	Age 62
Early retirement reduction	4% per year prior to earliest unreduced retirement age
Bridge benefit	0.30% of final 3-year average earnings multiplied by credited service without any reduction for early retirement, payable from pension commencement to the earlier of age 65 or death
Normal form of payment	Life only, payable monthly in advance
Optional form for lifetime pension only	Joint and 60% survivor on an actuarially equivalent basis, payable monthly in advance
Application of maximum pension limit to optional forms of pension	The maximum pension payable is determined after converting to the optional form of payment

CFO Participant Data as at January 1, 2015:

Age:	57
Credited service:	20 years
2015 Earnings:	\$230,000
2014 Earnings:	\$190,000
2013 Earnings:	\$180,000
Marital status:	Married
Spouse age:	40

6. Continued

Additional Information:

2016 Income Tax Act Defined Benefit Dollar Limit:	\$2,890
2016 Maximum Monthly C/QPP Benefit:	\$1,093
January 2016 Maximum Monthly OAS Benefit:	\$571

<u>Year</u>	<u>Year's Maximum Pensionable Earnings</u>
2016	\$54,900
2015	\$53,600
2014	\$52,500
2013	\$51,100
2012	\$50,100

Annuity Factors:

$$\ddot{a}_{40}^{(12)} = 15.7$$

$$\ddot{a}_{57}^{(12)} = 13.0$$

$$\ddot{a}_{40:57}^{(12)} = 12.8$$

- (a) (8 points) The CFO retires on January 1, 2016. Calculate the immediate lifetime and bridge pensions payable under the normal form.
- (b) (4 points) The CFO has elected the Joint and 60% Survivor optional form of payment. Calculate the immediate lifetime and bridge pensions payable.

Show all work.

7. (8 points)

- (a) (3 points) Describe the underlying principles of New Brunswick's Shared Risk Pension Plan (SRPP).
- (b) (5 points) Compare and contrast New Brunswick's SRPP to:
 - (i) a traditional defined benefit pension plan; and
 - (ii) a traditional defined contribution pension planfrom both a funding and regulatory perspective.

****END OF EXAMINATION****
Morning Session

USE THIS PAGE FOR YOUR SCRATCH WORK

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