
SOCIETY OF ACTUARIES
Funding & Regulation Exam - Canada

Exam RETFRC

MORNING SESSION

Date: Wednesday, Oct 30, 2013

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 5 questions numbered 8 through 12.

The points for each question are indicated at the beginning of the question. Questions 5 and 10 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 since 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 for advantages of a particular plan design to a company referenced in the case study, your response should be limited to that company. Other advantages should not be listed, as they are extraneous to the question and will result in no additional credit. Further, if they conflict with the applicable advantages, no credit will be given.

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

- 1.** (6 points) You are the actuary for a company that sponsors a defined benefit pension plan. The Company is terminating the employment of two Ontario members of the plan.

You are given:

Plan Provisions:

Normal Retirement Benefit:	\$50 per month per year of service
Employee Contributions:	None
Normal Form of Pension:	Life only
Normal Retirement Age:	Age 65
Early Retirement Eligibility:	Age 55
Early Retirement Benefit:	Lifetime benefit: reduction of 6% per year before age 65, unreduced with 30 years of service Bridge benefit: \$10 per month per year of service
Termination Benefit:	Commutated value of a deferred pension beginning at Normal Retirement Age. Early commencement permitted after Earliest Retirement Age, subject to an actuarial reduction

Data for members to be terminated:

	<u>Member A</u>	<u>Member B</u>
Employee:		
Age:	35	52
Credited/Continuous Service:	3 years	25 years

Commutated value interest rates:

2.40% per annum for 10 years, 3.70% per annum thereafter

Annuity factors:

<u>Age</u>	<u>Lifetime</u>	<u>Bridge</u>
55	18.9	8.7
56	18.5	7.9
57	18.1	7.1
62	15.9	2.9
63	15.5	1.9
64	15.0	1.0
65	14.6	0.0

1. Continued

- (a) (5 points) Calculate the commuted value for each employee's termination benefit.

Show all work.

- (b) (1 point) Describe in words how the commuted value calculation would change if the employees terminated voluntarily.

- 2.** (10 points) Describe the pension specific professional standards that need to be addressed in preparing an actuarial valuation for funding purposes.

3. (10 points) You are the actuary for an Ontario company considering establishing a non-contributory defined benefit pension plan. Management has proposed the following plan provisions:

Normal retirement benefit per year of pensionable service: 1.5% of FAE up to AYMPE plus 2.2% of FAE in excess of AYMPE
where:
FAE = final 5 year average earnings
AYMPE = average YMPE in year of determination and 4 prior years

Vesting: 2 years of pensionable service

Normal form of payment: Lifetime pension guaranteed for 10 years with 100% continuing to spouse on member's death

Unreduced early retirement age: Age 55 with 25 years of pensionable service

Early retirement reduction if not eligible for unreduced pension: Reduction of 0.2% per month prior to unreduced early retirement age

Post retirement annual indexation: The greater of 4% per annum and the annual increase in Consumer Price Index for period ending September 30

Pre-retirement death benefit: Commuted value of accrued pension

Critique the proposed plan provisions from a regulatory perspective. Describe the applicable regulatory restrictions for each provision.

4. (8 points) Compare and contrast setting the following assumptions for a point-in-time closed group valuation versus a 10-year open group projection valuation:

- (i) salary increases;
- (ii) termination scale;
- (iii) retirement scale; and
- (iv) new entrant profile.

Question 5 pertains to the Case Study.

- 5.** (10 points) NOC is concerned with future volatility of contributions to the Full-Time Hourly Union Pension Plan.
- (a) (5 points) Describe the advantages and disadvantages of using a smoothed market value of assets versus a fair market value of assets for the going concern valuation in light of your client's concerns.
- (b) (1 point) Identify the desirable characteristics of an asset valuation method.
- (c) (4 points) Calculate the 3-year smoothed market value of assets as at January 1, 2013 using:
- (i) the Smoothed Market Value Without Phase-In asset valuation method; and
 - (ii) the Average Market Value Without Phase-In asset valuation method.

Assume all cash flows occur mid-year.

Show all work.

- 6.** (8 points) The government of ABC is considering introducing tax incentives with the following objectives:
- to encourage retirement savings; and
 - to mitigate potential decreases in tax revenue.

Describe the features of the Income Tax Act (Canada) that the government of ABC could adopt in order to meet these objectives.

7. (8 points) Your client sponsors a non-contributory defined benefit pension plan. You are given:

Plan Provisions:

Retirement benefit:	1.5% of career average earnings
Normal form of payment:	Life only, payable monthly in advance
Normal retirement age:	Age 65
Early retirement reduction:	3% per year prior to age 65

Actuarial Assumptions and Methods:

Interest rate:	5% per annum
Salary increase rate:	3% per annum
Retirement age:	50% probability of retirement at 55; 50% probability of retirement at 65
Pre retirement decrements:	None
Actuarial cost method:	Unit Credit
Asset method:	Market value of assets

Annuity Factors:

$$\ddot{a}_{65}^{(12)} = 12.5; \quad \ddot{a}_{60}^{(12)} = 13.9; \quad \ddot{a}_{55}^{(12)} = 15.0$$

Participant Data at December 31, 2013:

Age:	40
Service:	10 years
Accrued pension (annual):	\$10,000
2013 salary:	\$100,000

Financial Information:

Market value of assets at December 31, 2013: \$50,000

- (a) (3 points) Calculate the normal cost and the unfunded actuarial liability as at December 31, 2013.

7. Continued

You are given the following for 2014:

- At December 31, 2014 a contribution of \$10,000 is made to the plan.
 - The fund earns a rate of return of 0% during 2014.
 - At January 1, 2014, the member receives a salary increase of 1%, and
 - The retirement assumption is changed to:
Retirement age: 50% probability of retirement at 55;
50% probability of retirement at age 60.
- (b) (2 points) Calculate the unfunded actuarial liability as at December 31, 2014.
- (c) (3 points) Calculate the gains and losses by source for 2014.

Show all work.

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

USE THIS PAGE FOR YOUR SCRATCH WORK