
SOCIETY OF ACTUARIES
Funding and Regulation Exam – Canada

Exam RETFRC

AFTERNOON SESSION

Date: Wednesday, April 25, 2018

Time: 1:30 p.m. – 3:45 p.m.

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This afternoon session consists of 5 questions numbered 8 through 12 for a total of 40 points. The points for each question are indicated at the beginning of the question. No questions pertain to the Case Study.
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.

****BEGINNING OF EXAMINATION****
Afternoon Session
Beginning with Question 8

8. (8 points) Your client sponsors a non-contributory defined benefit pension plan.

You are given:

Plan Provisions:

Retirement benefit: 2% of final earnings times years of service
 Normal form of payment: Life Only, payable monthly in advance
 Normal retirement age: Age 65
 Early retirement reduction: 4% for each year prior to normal retirement age

Actuarial Assumptions and Methods:

Interest rate: 5% per year
 Salary increase rate: 3% per year
 Termination rates: None
 Pre-retirement mortality: None
 Retirement rates: 25% at age 63, 50% at age 64 and 100% at age 65
 Timing of decrements: Beginning of year

Annuity Factors:

$\ddot{a}_{63}^{(12)}$	$\ddot{a}_{64}^{(12)}$	$\ddot{a}_{65}^{(12)}$
13.9	13.6	13.3

Member Data as at December 31, 2017:

	Member A	Member B
Age	62	64
Earnings for 2017	\$80,000	\$100,000
Service	17 years	28 years

The market value of assets as at December 31, 2017 is \$950,000.

8. Continued

- (a) (6 points) Calculate the total accrued liability and total normal cost at December 31, 2017 under the following actuarial cost methods.
- (i) Projected unit credit method, prorated on service.
 - (ii) Attained age normal method, as a level percent of earnings

Show all work.

- (b) (2 points) Compare the pattern of cost recognition of the two actuarial cost methods in (a). No calculations are required.

9. (9 points) ABC Company would like to reflect expected future funding requirements of their pension plan in their long term budget forecast.

The funding valuation was just completed and the results are to be projected over the next 20 years.

- (a) (5 points) Compare how the setting of the following assumptions varies for projection purposes versus going concern funding valuations:
- (i) new entrants
 - (ii) retirement age
 - (iii) inflation
 - (iv) investment return
- (b) (2 points) Explain how your answer in (a) would change in the event that ABC Company is planning an early retirement window in 2 years.
- (c) (2 points) Explain how your answer in (a) would change in the event that a recession is expected to occur in 5 years.

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10. (9 points) You are an actuary for a pension plan registered in Ontario with three active members. You are given the following information as at January 1, 2018:

Valuation Data:

Member	Age	Credited Service	Salary		
			2015	2016	2017
A	45	9 years	\$50,000	\$52,000	\$53,000
B	54	20 years	\$85,000	\$88,000	\$89,000
C	62	35 years	\$90,000	\$92,000	\$93,000

Plan Information:

Retirement benefit: 2% of Final 3-year Average Earnings multiplied by credited service
 Normal form: Life Only
 Termination benefit: Deferred pension payable at age 65; early retirement pension is actuarial equivalent
 Early retirement reductions: Unreduced at age 62, and 3% per year before age 62

Solvency Assumptions:

Discount rate: 3.00% per year
 Salary Increase: 3.00% per year

Solvency Annuity Factors:

Age	Deferral Period	Annuity Factor	Age	Deferral Period	Annuity Factor	Age	Deferral Period	Annuity Factor
45	10	14.98	54	1	19.32	62	0	17.12
45	17	10.64	54	8	13.71	62	3	14.57
45	20	9.06	54	11	11.66			
						63	0	16.73
46	9	15.43	55	0	19.90	63	2	15.00
46	16	10.96	55	7	14.12			
46	19	9.33	55	10	12.01			

- (a) (6 points) Calculate the 2018 Solvency Incremental Cost (SIC) for each member.

Show all work.

10. Continued

The going concern valuation as at January 1, 2018 was performed under the Projected Unit Credit Method and uses the same assumptions for discount rate, salary increase, and mortality rates as the solvency valuation.

You are given:

Going Concern Information:

Member	Age	Assumed Retirement Age	Liability	Normal Cost
A	45	62	\$162,900	\$18,100
B	54	62	\$600,400	\$30,000
C	62	63	\$1,042,100	\$30,400

- (b) (3 points) Discuss the differences between the Solvency Incremental Cost and the going concern normal cost by member.

11. (8 points) ABC Company sponsors a flat dollar pension plan.

You are given the following information:

- The benefit rate is \$50 per month per year of service.
- The date of the last benefit rate increase was January 1, 2015.
- The date of the next benefit rate increase is December 1, 2018.
- Average Industrial Wage (“AIW”) increases as per the table below:

Year	AIW Increase
2015	2.1%
2016	2.4%
2017	0.7%

- (a) (2 points) Calculate the maximum increase to the benefit rate that may be granted on December 1, 2018 for all past years of service such that no Past Service Pension Adjustment (PSPA) is required to be reported.

Show all work.

- (b) (2 points) List the requirements for a PSPA to be exempt from certification.

ABC Company decides to provide an increase in the benefit rate from \$50 to \$60 per month per year of service as at December 1, 2018.

A full-time member was hired on January 1, 2016 and has 3 years of Credited Service as at December 31, 2018.

- (c) (2 points) Calculate the PSPA for the member.

Show all work.

- (d) (2 points) The member terminated on February 1, 2019 and received a lump sum transfer of \$14,000.

Calculate the Pension Adjustment Reversal.

Show all work.

- 12.** (6 points) You are the actuary for a multi-employer pension plan registered in Ontario. You have been asked to perform the going concern valuation as at January 1, 2018.

You are given the following:

- The last going concern valuation was performed as at January 1, 2017.
 - The plan provides a flat dollar benefit that varies by pay grade.
 - There are 10,000 active members.
 - There are no inactive members.
 - You have been given data for only 8,000 active members.
- (a) (1 point) List the minimum data required to complete the valuation for the 8,000 members that you received data for.
- (b) (3 points) Describe how you would address the missing data for the other 2,000 members in order to complete the valuation.
- (c) (2 points) Describe how you would disclose the assumptions made for the missing data in the actuarial valuation report, taking into consideration professional standards.

****END OF EXAMINATION****
Afternoon Session

USE THIS PAGE FOR YOUR SCRATCH WORK