

Exam RETFRC

Funding & Regulation Exam - Canada MORNING SESSION

Date: Wednesday, May 1, 2019

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 8 and 12 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.

Canadian version of this exam is recognized by the Canadian Institute of Actuaries.

Tournez le cahier d'examen pour la version française.

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

- 1.** (6 points) You have been newly appointed as the actuary of Company ABC. The prior actuary used a smoothed asset value instead of the market value for valuation purposes with the objective of moderating the volatility of contributions to the pension plan.

The smoothed value of assets was determined as follows:

- average of the market value of assets at the valuation date and the prior three market values at January 1st.
 - the resulting average market value of assets must not exceed 120% of the market value at the valuation date and must not be less than 100% of the market value at the valuation date.
- (a) (3 points) Critique the asset valuation method taking into account accepted actuarial practice.
- (b) (3 points) Recommend an appropriate course of action taking into consideration the rules of professional conduct.

Justify your recommendation.

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2. (8 points) Your client sponsors a non-contributory defined benefit pension plan.

You are given:

Plan Provisions:

Normal Retirement Age: Age 65
Retirement Benefit: 2% of the final year's earnings per year of service
Earliest Unreduced Retirement Age: Age 60
Termination Benefit: Deferred pension commencing at Earliest Unreduced Retirement Age
Normal form of payment: Life only, payable monthly in advance

Actuarial Assumptions and Methods:

Interest rate: 5% per annum
Retirement age: Age 60
Salary increase rate: 4.0% per annum
Termination decrement: 5% per annum prior to age 55
Timing of decrements: Beginning of year
Other pre-retirement decrements: None
Actuarial cost method: Aggregate
Asset method: Market value of assets

Annuity Factor:

$$\ddot{a}_{60}^{(12)} = 14.8$$

Active Member Data at January 1, 2018:

Member	A	B
Age in Years	59	54
Years of Service	4	1
2017 earnings	\$100,000	\$80,000

Financial Information:

Market value of assets at January 1, 2018: \$200,000

2. Continued

- (a) (3 points) Calculate the normal cost of the plan as a percentage of earnings at January 1, 2018.

Assume the following:

- A contribution of \$30,000 was made to the plan on December 31, 2018.
- The return on plan assets was 5% during 2018.
- Both members' 2018 earnings are 10% higher than their 2017 earnings.
- Member A retires on December 31, 2018.

- (b) (1 point) Calculate the accrued liability of the plan at January 1, 2019.
- (c) (4 points) Calculate the accrued liability at January 1, 2019 using the Entry Age Normal, level percent of pay method.

Show all work.

3. (7 points)

- (a) (4 points) Describe the considerations for setting an appropriate mortality improvement assumption.
- (b) (3 points) Describe the relevant guidance and professional standards that apply when considering updating the mortality improvement scale valuation assumption from CPM-B to MI-2017.

4. (10 points)

- (a) (4 points) Describe the typical components of a funding policy for a single-employer defined benefit pension plan.
- (b) (6 points) Construct a funding policy for three of the components described in a) that address the objective of providing security to plan members.

5. (12 points) You are the actuary for a closed non-contributory defined benefit pension plan registered in Ontario. You are preparing a valuation as at December 31, 2018.

You are given the following:

Valuation results as at December 31, 2018:

	Going concern	Solvency/Hypothetical Wind-up
Market value of assets	\$800,000	\$800,000
Estimated wind-up expenses	N/A	\$50,000
Liability with indexation	\$900,000	\$1,200,000
Liability without indexation	\$800,000	\$1,050,000
2019 normal cost with indexation	\$60,000	N/A
2019 normal cost without indexation	\$50,000	N/A
2020 normal cost with indexation	\$65,000	N/A
2020 normal cost without indexation	\$55,000	N/A
Discount rate	4.75% per annum	3.00% per annum

Additional information:

- Target asset mix for the pension plan is 50% equity, 40% investment grade fixed income, and 10% specified alternative assets.
- The going-concern discount rate of 4.75% per annum is lower than the Benchmark Discount Rate (BDR).
- There are no special payment schedules established prior to December 31, 2018.
- Assume the transition rules do not apply.

Annuity factors:

Discount Rate	4.75%	3.00%
${}_1\ddot{a}_{\overline{5} }^{(12)}$	4.3	4.5
${}_1\ddot{a}_{\overline{6} }^{(12)}$	5.0	5.3
${}_1\ddot{a}_{\overline{10} }^{(12)}$	7.6	8.4
${}_1\ddot{a}_{\overline{15} }^{(12)}$	10.3	11.7

5. Continued

Provision for Adverse Deviation (PfAD):

A + B + C, where

- A is 0.05 for a closed plan and 0.04 for a plan that is not a closed plan
- B is determined using the information provided in the table below
- C is the additional PfAD in respect of a discount rate in excess of the BDR

Combined target asset allocation for non-fixed income assets	Value of “B” for closed plan	Value of “B” for plan other than closed plan
0%	0	0
20%	0.02	0.01
40%	0.04	0.02
50%	0.05	0.03
60%	0.07	0.04
70%	0.11	0.06
80%	0.15	0.08
100%	0.23	0.12

Calculate the minimum required employer contributions for 2019 and 2020 and the maximum permissible employer contributions for 2019 as per the December 31, 2018 valuation report.

Show all work.

6. (9 points) Company ABC sponsors three single-employer defined benefit pension plans registered in Ontario. You are setting the best estimate going concern discount rate assumption for the actuarial valuations as at January 1, 2019.

You are given:

Plan	Open or closed to new entrants	Target asset allocation at January 1, 2019		Additional information
		Equity	Fixed Income	
Plan 1	Open	65%	35%	Target asset allocation to be maintained indefinitely.
Plan 2	Closed	50%	50%	The plan is 85% funded on a wind-up basis as at January 1, 2019. Once the plan becomes 100% funded on a wind-up basis, the target asset allocation will change to 10% equity and 90% fixed income.
Plan 3	Closed	0%	100%	The plan has only retired members. The fixed income portfolio is immunized.

- (a) (2 points) Describe the two approaches under the CIA Standards of Practice for determining the best estimate going concern discount rate.
- (b) (7 points) Compare and contrast how you would set the best estimate going concern discount rate for each of the Plans above.

7. (8 points) Your colleague has asked you to peer-review the following email, which is to be sent to a client.

April 30, 2019

Ms. Jones,

As requested, we have estimated the impact of the proposed plan changes to the XYZ Company Registered Pension Plan (the “Plan”) as at January 1, 2019.

Effective January 1, 2019, the following proposed changes will be made to the Plan:

- 1. an ad-hoc pension increase will be granted to current pensioners;*
- 2. the option to elect a commuted value transfer at retirement will be removed; and*
- 3. any active member who is retirement eligible and has attained 85 points (age plus continuous service) will be eligible for unreduced early retirement.*

We estimate the combined impact of these changes to be \$1,500,000.

Plan Provisions

Apart from the changes outlined above, this estimate is based on plan provisions as at January 1, 2018.

Liabilities

Liabilities have been rolled forward from the most recent actuarial valuation as at January 1, 2018 using expected accruals and actual benefit payments over the projection period, and have been adjusted to reflect current market conditions.

Please let me know if you have any questions, or would like to discuss further.

Regards,

John Smith, FCIA

Critique the above email with respect to compliance with the Canadian Institute of Actuaries’ Standards of Practice.

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

USE THIS PAGE FOR YOUR SCRATCH WORK