
SOCIETY OF ACTUARIES
Funding & Regulation Exam - Canada

Exam RETFRC

MORNING SESSION

Date: Wednesday, November 2, 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 5 questions numbered 8 through 12.

The points for each question are indicated at the beginning of the question. Questions 3, 5, and 12 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 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 contributory defined benefit pension plan registered in Ontario. The plan is winding up effective January 1, 2016. You are preparing the windup valuation.

Compare and contrast the treatment of the following items for a windup valuation versus a going concern valuation:

- (i) Member data
- (ii) Asset data
- (iii) Plan provisions

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

You are given:

Plan Provisions:

Retirement benefit:	1% of final year's earnings per year of service
Normal form of payment:	Life only, payable monthly in advance
Normal retirement age:	Age 65
Early retirement reduction:	Actuarially reduced from Normal retirement age
Termination benefit:	Deferred pension payable at age 65

Actuarial Assumptions:

Interest rate:	5.0% per year
Salary increase rate:	3.0% per year
Retirement age:	Age 65
Pre-retirement decrements:	None
Actuarial cost method:	Entry age normal, level percent of earnings
Asset valuation method:	Market value of assets

Participant Data as at January 1, 2016:

	<u>Member A</u>	<u>Member B</u>
Age:	35	50
Years of service:	5 years	20 years
Salary for 2016:	\$50,000	\$100,000

Annuity Factor:

$$\ddot{a}_{65}^{(12)} = 13.5$$

Financial Information:

Market value of assets at January 1, 2016: \$200,000

2. Continued

- (a) (3 points) Calculate the total normal cost and the unfunded accrued liability of the plan at January 1, 2016.

Show all work.

You are given:

- A contribution of \$20,000 is made to the plan on January 1, 2016.
- The fund earns a rate of return of 0% during 2016.
- Member A terminates at December 31, 2016.
- Member B receives a salary increase of 5% at December 31, 2016.

- (b) (1 point) Calculate the unfunded accrued liability of the plan at January 1, 2017.

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

Show all work.

Questions 3 pertains to the Case Study.

- 3.** (11 points) The CEO of NOC retired from the NOC Full-time Salaried Pension Plan on January 1, 2016.

You are given:

Participant Data as at January 1, 2016:

Age:	Age 58
Marital status:	Married
Best average earnings:	\$500,000
Credited service:	9 years
Early retirement eligibility service:	9 years
Province of employment:	Ontario

Additional Information at January 1, 2016:

Maximum defined benefit limit:	\$2,890
Annual maximum Old Age Security benefit:	\$6,849
3-Year Average Year's Maximum Pensionable Earnings:	\$53,667
5-Year Average Year's Maximum Pensionable Earnings:	\$52,440

- (a) (3 points) Calculate the CEO's annual pension benefit payable from the NOC Salaried Plan under the normal form of pension.

Show all work.

- (b) (3 points) You are subsequently informed that the NOC Salaried Plan was amended in 2015 to include a bridge benefit equal to 0.75% of best average earnings times years of credited service, for retirements after 2015. The bridge benefit is payable from the member's date of retirement to age 65.

Calculate the CEO's annual bridge benefit payable from the NOC Salaried Plan under the normal form of pension.

Show all work.

3. Continued

- (c) (5 points) Assume the NOC Salaried Plan allowed the CEO to make optional ancillary contributions throughout the CEO's career. Ancillary contributions are used to purchase enhancements on the lifetime pension benefit payable at retirement. Enhancements are purchased in the following order:
- (i) Post-retirement indexing:
 - lesser of 1% or CPI increase each year after pension commencement
 - (ii) Post-retirement death benefits, if married at retirement:
 - 66.67% joint & survivor annuity, 60 payments guaranteed; or
 - 66.67% joint & survivor annuity, 120 payments guaranteed

Any unused optional ancillary contributions are forfeited.

You are given:

Additional Information at January 1, 2016:

Optional ancillary contribution account balance: \$150,000

Actuarial equivalence basis: Commuted value basis as of the retirement date

Annuity Factors:

	Non-indexed	Indexed*
Joint & 60% survivor annuity	21.2	23.8
Joint & 66.67% survivor annuity, 60 payments guaranteed	22.5	25.4
Joint & 66.67% survivor annuity, 120 payments guaranteed	23.7	27.6

*Indexed at the lesser of 1% or CPI each year after pension commencement

Calculate the CEO's total enhanced annual lifetime pension benefit payable from the NOC Salaried Plan and any forfeited balance, if applicable.

Show all work.

4. (10 points) ABC Company sponsors three single-employer defined benefit pension plans registered in Ontario. You are setting the going concern discount rate assumption for the actuarial valuations as at January 1, 2017.

You are given:

Plan	Open or Closed to new entrants	Target asset allocation at January 1, 2017		Additional information
		Equity	Fixed Income	
Plan 1	Open	60%	40%	Target asset allocation to be maintained indefinitely.
Plan 2	Closed	60%	40%	The plan is 80% funded on a wind-up basis as at January 1, 2017. Once the plan becomes 95% funded on a wind-up basis the target asset allocation will change to 15% equity and 85% fixed income.
Plan 3	Closed	90%	10%	Target asset allocation to be maintained indefinitely. ABC Company has a policy to settle all current pensions in pay through an annuity purchase every 2 years.

- (a) (2 points) Describe two approaches under the CIA Standards of Practice for determining the going concern discount rate for Plan 1.
- (b) (4 points) Explain how you would set the going concern discount rate for Plan 2.
- (c) (4 points) Explain how you would set the going concern discount rate for Plan 3.

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Questions 5 pertains to the Case Study.

- 5.** (11 points) A member of the NOC Full-Time Salaried Pension Plan took a 5-year unpaid leave of absence from NOC from January 1, 2009 to December 31, 2013.

You are given the following for this member:

Year	Maximum Defined Benefit Limit	Deemed Earnings
2009	\$2,444	\$142,000
2010	\$2,494	\$142,000
2011	\$2,552	\$142,000
2012	\$2,647	\$142,000
2013	\$2,697	\$142,000
2014	\$2,770	Not applicable
2015	\$2,819	Not applicable
2016	\$2,890	Not applicable

- (a) (1 point) The member's 2016 earnings are \$145,000.

Calculate the 2016 pension adjustment (PA) for the member.

Show all work.

At January 1, 2017, the member elected to buy back five years of credited service in respect of the period of unpaid leave. The cost to purchase the five years of credited service is \$50,000 which is a qualifying transfer paid from the member's RRSP.

- (b) (2 points) Calculate the member's grossed-up past service pension adjustment.

Show all work.

- (c) (3 points) The member does not have any unused RRSP contribution room.

Calculate the minimum amount of the qualifying withdrawal that the member must make in order for Canada Revenue Agency to certify the provisional past service pension adjustment (PSPA).

Show all work.

5. Continued

The member made the minimum qualifying withdrawal and the PSPA was certified by Canada Revenue Agency in 2017. The member terminated employment on June 30, 2017.

You are given the sum of the PAs for the following periods:

Period	Sum of PAs
Prior to January 1, 2004	\$0
January 1, 2004 to December 31, 2008	\$91,500
January 1, 2014 to December 31, 2016	\$74,510
January 1, 2017 to June 30, 2017	\$12,730

- (d) (2 points) The member was paid a commuted value of \$290,000 to fully settle their entitlement under the plan.

Calculate the Pension Adjustment Reversal (PAR).

Show all work.

- (e) (3 points) Explain the principles behind PARs.

6. (8 points) You are the actuary performing a funding valuation as at January 1, 2017 for ABC Company's defined benefit pension plan registered in Ontario.

(a) (1 point) State an appropriate objective for using a smoothed asset valuation method for going concern funding purposes instead of using the market value.

(b) (4 points) You are given:

Current asset valuation method

The current asset valuation method is the average of:

- the market value of assets as at January 1, 2017; and
- the market value of assets at the prior four January 1st rolled forward to January 1, 2017 based on the actual benefit payments and contributions to the plan each year at an assumed rate of return equal to your best estimate rate of return. Assume mid-year cash flows.

Your best estimate rate of return is 5.5% per year.

The resulting smoothed market value of assets must not exceed 110% of the market value and must not be less than 90% of the market value.

Proposed asset valuation method

The CFO of ABC Company is proposing the use of a different asset valuation method where the current method is modified as follows:

- The best estimate rate of return is replaced by the one-year average of Canadian T- bills plus 2% for each year in the averaging period; and
- The resulting smoothed market value of assets must not exceed 125% of the market value and must not be less than 100% of the market value.

Compare the proposed asset valuation method to the current asset valuation method based on the CIA guidance on asset valuation methods.

(c) (3 points) You are also using the current asset valuation method to determine the plan's solvency financial position.

Describe in words how you would determine the interest rates used to value the solvency liabilities.

7. (6 points) New Brunswick and Alberta have implemented target benefit pension plan regulations.

Compare and contrast the main features of these regulations as they pertain to the funding of target benefit plans.

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

USE THIS PAGE FOR YOUR SCRATCH WORK