SOCIETY OF ACTUARIES
Funding & Regulation Exam - Canada

Exam RETFRC

MORNING SESSION

Date: Wednesday, April 26, 2017
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 and 4 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.

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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. (*9 points*) You are the actuary for an Ontario registered defined benefit pension plan that was established on January 1, 2010. The plan provides a flat dollar benefit per month per year of credited service.

You are given the following for a plan member:

Date of plan entry	January 1, 2010
Credited Service at December 31, 2015	6 years
2016 credited service	8 months

You are also given:

Effective date	**Benefit rate per month per year of credited service (past and future)**	**Cumulative Average Industrial Wage increase to 2017**
January 1, 2010	$56.50	19%
January 1, 2011	$56.50	16%
January 1, 2012	$56.50	12%
January 1, 2013	$60.00	10%
January 1, 2014	$60.00	7%
January 1, 2015	$60.00	5%
January 1, 2016	$60.00	2%

(a) (*1 point*) Calculate the member's 2016 Pension Adjustment (PA).

Show all work.

(b) (*3 points*) Describe the principles behind the PA calculation.

Effective January 1, 2017, the flat dollar benefit rate increases to $70 per month per year of credited service for past and future service for all active members.

(c) (*3 points*) Calculate the Past Service Pension Adjustment for this member assuming there are no qualifying transfers or excess money purchase transfers for this member.

Show all work.

1. **Continued**

(d) (*2 points*) The member terminated on June 30, 2017 after having earned 6 months of credited service in 2017. The member received a commuted value payment of $40,000 in full settlement of the benefit entitlement from the plan.

Calculate the Pension Adjustment Reversal.

Show all work.

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, 2017:

	Member A	Member B
Age:	35	50
Years of service:	5 years	20 years
Salary for 2017	$50,000	$100,000

Annuity Factor:

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

Financial Information:

Market value of assets at January 1, 2017: $200,000

2. **Continued**

(a) (*3 points*) Calculate the total normal cost and the unfunded accrued liability of the plan at January 1, 2017.

Show all work.

You are given:

- A contribution of $20,000 is made to the plan on January 1, 2017.
- The fund earns a rate of return of 0% during 2017.
- Member A terminates at December 31, 2017.
- Member B receives a salary increase of 5% at December 31, 2017.

(b) (*1 point*) Calculate the unfunded accrued liability of the plan at January 1, 2018.

(c) (*4 points*) Calculate the gains and losses by source for 2017.

Show all work.

Questions 3 and 4 pertain to the Case Study.
Each question should be answered independently.

3. (*10 points*) You are the actuary for the National Oil Full-Time Salaried Pension Plan.

(a) (*5 points*) Describe the considerations in assessing the appropriateness of the following January 1, 2016 going concern assumptions for use in the January 1, 2017 funding valuation:

(i) Termination

(ii) Retirement

(iii) Salary increases

(b) (*5 points*) NOC is introducing a Defined Contribution (DC) component to the Plan.

- The defined benefit component is closed to new entrants effective January 1, 2017.
- All new entrants on and after January 1, 2017 will join the DC component.
- Existing Plan members are allowed to convert all past service benefits to the DC component on a one-time only basis and join the DC component for future service.

All members age 45 and under elected to convert.

Explain the impact of these changes on the following going concern assumptions for the January 1, 2017 valuation:

(i) Termination

(ii) Retirement

(iii) Salary increases

Questions 3 and 4 pertain to the Case Study.
Each question should be answered independently.

4. *(7 points)* You are the new actuary for NOC. You have been provided with a draft actuarial valuation report for the NOC Full–Time Hourly Union Pension Plan as at January 1, 2016 prepared by the prior actuary. The data summaries in the draft report are identical to the summaries in the case study.

NOC's CFO is asking you to certify the January 1, 2016 valuation report because the prior actuary is not able to do so.

(a) (*3 points*) Describe how you would use the Age/Service table to verify the active going concern liabilities and normal cost.

(b) (*1 point*) List the other active and inactive data items in addition to age and service that would be required to verify the total going concern liabilities and normal cost.

(c) (*3 points*) Explain if you would be prepared to certify the valuation report, taking into consideration professional standards.

5. (*10 points*) XYZ Company sponsors a defined benefit pension plan registered in Ontario.

You have been asked to implement the following asset smoothing method for the funding valuation at the beginning of Year 4:

- The Adjusted Value of Assets is set equal to the Market Value of Assets with a linear recognition of realized gains and losses over a 4 year period.
- The Adjusted Value of Assets is constrained by a corridor such that it is no less than 95% of the Market Value of Assets, and no greater than 110%.

(a) (*2 points*) You are given the following pension fund asset reconciliation for the XYZ plan:

	(in $000s)		
	Year 1	**Year 2**	**Year 3**
Market value at beginning of year	$8,100	$8,300	$7,100
Net cash flow	(400)	(400)	(400)
Unrealized gains / (losses)	100	(200)	(100)
Realized gains / (losses)	500	(600)	(800)
Market value at end of year	$8,300	$7,100	$5,800

Calculate the Adjusted Value of Assets at the beginning of Year 4.

Show all work.

(b) (*3 points*) Assess the appropriateness of the above smoothing asset valuation method, taking into consideration the Canadian Institute of Actuaries' guidance on asset valuation methods.

(c) (*3 points*) Describe the regulatory and professional standards that need to be considered when implementing asset smoothing for solvency purposes.

(d) (*2 points*) Describe the actuarial professional standards you must consider when changing asset valuation methods from one actuarial valuation report to the next.

6. (*10 points*)

(a) (*4 points*) Explain how the funding of a target benefit pension plan is impacted by the following features:

(i) Contribution rate

(ii) Investment policy

(iii) Benefit/funding policy

(b) (*6 points*) Explain how each of the following can impact the funding of a target benefit pension plan and reduce the risk of negative accrued benefit adjustments:

(i) Contribution flexibility

(ii) A countercyclical risk buffer

(iii) Dynamic margins

(iv) Projection valuation methods

7. (*6 points*) You are the actuary for Plan B, a defined benefit pension plan registered in Ontario. Your client has acquired a division of another company, which sponsors Plan A, a defined benefit pension plan also registered in Ontario. Both companies have entered into an agreement to transfer assets and liabilities from Plan A to Plan B for the members of the acquired division.

The assets and liabilities of the plans as at January 1, 2017, before the asset transfer, are as follows:

(in $millions)	**Plan A**	**Plan B**
Solvency liabilities	$520	$300
Going concern liabilities	$500	$220
Market value of assets	$450	$250

You are given the following for an effective date of transfer of January 1, 2017:

		After Transfer	
(in $millions)	**Transferred liabilities**	**Plan A**	**Plan B**
Solvency liabilities	$150	$370	$450
Going concern liabilities	$140	$360	$360

(a) (*1 point*) Calculate the amount of assets to be transferred under the Asset Transfer Regulation at the effective date.

Show all work.

(b) (*3 points*) Assess if this transfer meets the requirements to obtain the Superintendent's consent.

Show all work.

(c) (*2 points*) Describe the conditions that must be met with respect to the members' benefits transferred to Plan B.

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

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