SOCIETY OF ACTUARIES
Funding & Regulation Exam - Canada

Exam RETFRC

MORNING SESSION

Date: Tuesday, October 28, 2014
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 6 questions numbered 1 through 6.

   b) The afternoon session consists of 6 questions numbered 7 through 12.

   The points for each question are indicated at the beginning of the question. Questions 4 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.

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Printed in the U.S.A.

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 new actuary for the ABC Company who sponsors a defined benefit pension plan. ABC has asked you to perform a funding valuation of the plan. You have received the membership data for the valuation from ABC.

(a) (*2 points*) List the professional standards requirements to consider in reviewing the data.

(b) (*3 points*) During the review process, data deficiencies have been identified.

Describe the appropriate actions when working with defective data.

(c) (*1 point*) List the information required to perform the funding valuation in addition to the membership data.

2. (*12 points*) ABC's Canadian operations are closing. As a result, ABC will be winding up their non-union pension plan that is in a surplus position.

(a) (*6 points*) Describe the process for winding up a registered pension plan in Ontario.

(b) (*6 points*) Describe the process to obtain approval from the Financial Services Commission of Ontario (FSCO) to distribute all of the surplus to ABC.

3. (*7 points*) Your client sponsors a non-contributory defined benefit pension plan.

You are given:

Plan Provisions:

Retirement benefit:	1.5% of average of final 3 years of earnings multiplied by years of service
Normal form of payment:	Life only, payable monthly in advance
Normal retirement age:	Age 65
Unreduced early retirement age:	Age 62, with 20 or more years of service
Early retirement reduction:	6% per year prior to age 62 with 20 or more years of service; Otherwise, 6% per year prior to age 65
Early retirement benefit:	Immediate pension, deferred pension or commuted value of pension
Maximum pension:	Pension may not exceed the maximum pension under the *Income Tax Act* applicable in the year of termination

Actuarial Assumptions:

Commuted value discount rate:	3.5% per annum
Income Tax Act Defined Benefit Dollar Limit for 2014:	$2,770 per year of service

Age	$\ddot{a}_x^{(12)}$	Maximum transfer value factors
55	18.8	10.4
56	18.5	10.6
57	18.2	10.8
58	17.8	11.0
59	17.5	11.3
60	17.2	11.5
61	16.8	11.7
62	16.4	12.0

3. **Continued**

<u>Participant Data as at December 31, 2014</u>:

Age:	56
Service:	20 years
Average of final 3 years of earnings:	$260,000
2013 Salary:	$260,000
2014 Salary:	$280,000

(a) (*4 points*) The member retires on December 31, 2014.

Calculate the member's immediate pension amount and the commuted value of the pension.

Show all work.

(b) (*1 point*) Calculate the portion of the member's commuted value that could be transferred to a registered tax-sheltered vehicle.

Show all work.

(c) (*2 points*) Describe the implications to the member of deferring retirement to December 31, 2015 assuming no change in salary or tax limits during 2015.

Question 4 pertains to the Case Study.

4. (*14 points*) You are the actuary for NOC and are reviewing the going concern mortality assumptions in light of the Revised Educational Note regarding the Selection of Mortality Assumptions for Pension Plan Actuarial Valuations issued by the Canadian Institute of Actuaries (CIA) in March 2014.

(a) (*1 point*) List your professional obligations with respect to the application of educational notes.

(b) (*7 points*) Describe the considerations for selecting an appropriate mortality assumption consisting of:

- the base table;
- the projection scale; and
- any other adjustments.

(c) (*6 points*) Recommend changes to the going concern mortality assumptions for the Full-Time Hourly Union Pension Plan and the Full-Time Salaried Pension Plan.

Justify your recommendations.

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5. (*10 points*) You are the actuary for a company that sponsors a defined benefit pension plan registered in Ontario and you are currently working on setting the economic assumptions for the January 1, 2014 valuation.

The pension plan provides post-retirement indexation equal to 50% of the change in Consumer Price Index. Pursuant to the directions from the plan administrator, the value of benefits arising from future indexation has been excluded from the solvency valuation.

You have been given the following information:

Month End	**Government of Canada Marketable Bonds with maturities over 10 years (CANSIM Series V39062)**	**Government of Canada Real-Return Long-term Bonds (CANSIM Series V39057)**
December 2013	3.13%	1.25%

	Solvency Liabilities		**Hypothetical Wind-up Liabilities**	
Groups	**CANSIM rates + 70 bps**	**CANSIM rates + 71 bps**	**CANSIM rates + 70 bps**	**CANSIM rates + 71 bps**
Pensioners and Deferred Vested Members (assumed to be settled by annuity purchase)	40,785,000	40,755,000	46,905,000	46,870,000
Active Members Under Age 55 (assumed to be settled by commuted value)	36,300,000	36,245,000	47,190,000	47,115,000
Active Members Over Age 55 (assumed to be settled by annuity purchase)	62,250,000	62,180,000	79,060,000	78,965,000
Total	139,335,000	139,180,000	173,155,000	172,950,000

5. Continued

You have been given the following table based on the Canadian Institute of Actuaries Guidance in effect at December 31, 2013.

Illustrative block	**Duration based on CANSIM series +70 bps**	**Spread above CANSIM series**
High Duration	12.1	+80 bps
Medium Duration	9.9	+70 bps
Low Duration	7.6	+50 bps

(a) (*4 points*) Calculate the annuity purchase rate that would be used to calculate the liabilities assumed to be settled though the purchase of annuities for:

(i) the solvency valuation; and

(ii) the hypothetical wind-up valuation.

Show all work.

You have now finalized the actuarial valuation as at January 1, 2014 and the results reveal that the next valuation is not due until January 1, 2017.

(b) (*4 points*) Describe in words how to calculate the solvency incremental cost.

(c) (*2 points*) Compare and contrast the solvency incremental cost and the going-concern normal cost.

6. (*11 points*) You are the actuary for an Ontario registered contributory defined benefit pension plan that is not a Designated Plan under the Income Tax Act (ITA). You are performing a January 1, 2014 funding valuation.

You are given the following:

Plan Provisions:

Normal Retirement Benefit:	1.5% of final earnings per year of credited service
Normal Form of Payment:	Life only pension guaranteed for 5 years
Employee Required Contribution Rate:	6.0% of earnings
Credited rate of interest on employee contributions:	6.0% per annum
Early Retirement Reduction:	0.25% per month that early retirement precedes age 62
Income Tax Act Defined Benefit Dollar Limit:	$2,770 per year of credited service

Actuarial Assumptions and Methods:

	Going Concern	Solvency/Wind-up
Discount Rate:	6.0% per annum	3.2% per annum
Income Tax Act Defined Benefit Dollar Limit:	$2,770 per year of credited service in 2014, indexed at 3.0% per annum thereafter	$2,770 per year of credited service
Salary Increases:	3.0% per annum	N/A
Assumed Retirement Age:	Age 62	Age that provides the maximum value
Other Decrements:	None	None
Liability Valuation Method:	Projected unit credit pro-rated on service	Unit credit
Asset Valuation Method:	Market value	Market value
Estimated Wind-up Expense:	N/A	$50,000

6. Continued

Annuity factors:

	At 6.0%	At 3.2%
$\ddot{a}_{62}^{(12)}$	11.9	15.6
$\ddot{a}_{63}^{(12)}$	11.7	15.0
$\ddot{a}_{80}^{(12)}$	7.0	9.7
$\ddot{a}_{81}^{(12)}$	6.7	9.4

Participant Data at January 1, 2014:

	Employee A	Employee B
Status:	Active	Retired
Age:	62	80
Service:	15 years	N/A
2013 earnings:	$250,000	N/A
2014 earnings:	$257,500	N/A
Accumulated contributions with interest:	$225,000	N/A
Monthly pension:	N/A	$2,000 payable under the normal form

Financial Information:

Market value of assets at January 1, 2014: $550,000

Previously established amortization schedules:

Type	Annual Amortization Schedules	Start Date	Date of Last Payment
Going concern	$5,000	January 1, 2013	December 31, 2027
Solvency	$10,000	January 1, 2012	December 31, 2016
Solvency	$25,000	January 1, 2013	December 31, 2017

QUESTION CONTINUED ON NEXT PAGE

6. **Continued**

(a) (*5 points*) Calculate the minimum required and maximum permissible employer contributions for 2014. Assume the plan sponsor does not elect the one year deferral of new special payments.

(b) (*1 point*) Calculate Employee A's required employee contributions in 2014.

(c) (*5 points*) During 2014, the pension fund earned 4%, no decrements occurred and all other experience was as expected. The minimum required employer and employee contributions calculated in (a) and (b) respectively were made on January 1, 2014. There are no assumption changes at January 1, 2015.

Calculate the going concern experience gains and losses by source as at January 1, 2015.

Show all work.

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

USE THIS PAGE FOR YOUR SCRATCH WORK

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