SOCIETY OF ACTUARIES

Retirement Benefits Canada – Design & Pricing

Exam DP-RC

Morning Session

Date: Thursday, November 3, 2011
Time: 8:30 a.m. – 11:45 a.m.

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This examination has a total of 120 points. It consists of a morning session (worth 60 points) and an afternoon session (worth 60 points).

   a) The morning session consists of 7 questions numbered 1 through 7.

   b) The afternoon session consists of 7 questions numbered 8 through 14.

   The points for each question are indicated at the beginning of the question. Questions 2, 3 and 7 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 DP-RC.

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. (*5 points*) Your client has asked you to conduct a valuation of a plan using the same membership data that was used in a valuation previously completed by another actuarial firm. The prior valuation and your valuation both have the same calculation date.

(a) (*3 points*) Describe the professional guidelines with respect to conducting membership data reviews and validations that should be performed prior to using this data.

(b) (*2 points*) Your review has uncovered a number of membership data issues. In order to complete your valuation, describe the actions and steps you need to undertake to resolve these issues and the applicable professional standards.

Question 2 pertains to the Case Study.

2. (*13 points*) In order to become more competitive in the future, NOC is considering freezing the Salaried Full-Time Pension Plan and providing future retirement benefits through a defined contribution plan.

NOC's key objectives are to:

- Encourage greater cost sharing for retirement benefits
- Provide competitive retirement benefits
- Minimize impact on late career employees

NOC's key competitors provide the following retirement programs:

	Company 1	Company 2	Company 3
Employer base contributions	4% of earnings	None	None
Employer matching contributions	50% on first 6% of employee contributions	100% on first 6% of employee contributions	25% on first 8% of employee contributions, plus discretionary match on up to an additional 6% of employee contributions based on profits

(a) (*3 points*) Discuss the implications of the plan freeze for:
(i) NOC; and
(ii) the salaried employees.

(b) (*7 points*) Compare and contrast the following two design alternatives in light of NOC's objectives:
(i) Extend the Part-Time DC Pension Plan to the salaried employees.
(ii) Implement a DC pension plan providing an employer contribution of:

- 3% of earnings for employees with under 5 years of service,
- 4% of earnings for employees with over 5 years of service but less than 10 years of service; and
- 5% of earnings for employees with 10 or more years of service

Plus

- 50% matching contributions on employee contributions up to a maximum 3% employer contribution after 5 years of service.

2. Continued

(c) (*3 points*) Critique the following two transition approaches.

(i) Grandfather all members who are retirement eligible at transition.

(ii) Members age 45 and over at transition receive an additional 2% contribution for up to 7 years.

Question 3 pertains to the Case Study.

3. (*8 points*) In 2011, NOC has implemented the following cost containment measures in order to control its salaried employees' payroll costs.

- No new hires until 2017,
- Salary freeze for current workers through 2015, and
- An early retirement window until 2015 which would allow workers with a minimum of 20 years of service to retire as early as age 50 with a reduction in pension of 0.25% per month from age 60.

Compare and contrast the considerations in setting the following assumptions for the NOC Full-Time Salaried Pension Plan for a point-in-time closed group valuation versus a stochastic 10-year open group projection valuation.

(i) Salary Increases
(ii) Termination Scale
(iii) Retirement Scale
(iv) New Entrant Profile

4. (*7 points*) You are the consulting actuary for an employer who sets up a new non-contributory defined benefit pension plan on January 1, 2011 that will recognize employees' past service. You are given:

Plan Provisions:

Retirement Benefit:	\$35 per month times years of service
Form of Payment:	Life only, payable monthly in advance
Normal Retirement Age:	Age 65
Earliest Retirement Age:	Age 55
Early Retirement Benefit:	Accrued pension, reduced by 3% per year that retirement precedes age 65
Other Ancillary Benefits:	None

Assumptions and Cost Method:

Interest rate:	5.5% per year
Retirement Age:	Age 62
Pre-retirement Decrements:	None
Cost Method:	Attained Age Normal

Annuity Factors:

$\ddot{a}_{55}^{(12)}$	14.0
$\ddot{a}_{62}^{(12)}$	12.0

Financial Information:

Assets at January 1, 2011	\$0
Assets at January 1, 2012	\$12,000

The company contributed \$15,000 on January 1, 2011.

Participant Data as at January 1, 2011:

	Age	Service
Member A	54	24 years
Member B	40	5 years

(a) (*3 points*) Determine the accrued liability and normal cost as at January 1, 2011.

(b) (*2 points*) On December 31, 2011, Member A retires. Calculate the accrued liability and normal cost as at January 1, 2012.

(c) (*2 points*) Reconcile the change in the normal cost by source.

Show all work.

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5. (*9 points*) You are the actuary for an Ontario registered defined benefit pension plan in a large deficit position.

You are given:

January 1, 2011:

Market Value of Assets	$ 600,000
Going Concern Liabilities	$ 750,000
Solvency Liabilities	$ 900,000

Additional Information:

Annual Benefit Payments	$ 10,000
Wind-up Expense Assumption	$ 30,000
Going Concern Interest Rate	6.0%
Solvency Interest Rate	4.5%
Going Concern Normal Cost (BOY)	$ 50,000
Solvency Incremental Cost	$ 75,000

Special Payments in Last Valuation (January 1, 2010):

Type	Start Date	End Date	Monthly Amount
Going Concern	January 1, 2009	December 31, 2023	$600
Solvency	January 1, 2007	December 31, 2011	$500
Solvency	January 1, 2009	December 31, 2013	$5,000

Funding Policy: Employer contributions will equal two times Going Concern Normal (BOY) plus any required special payments, subject to minimum statutory requirements.

(a) (*3 points*) Calculate the minimum and maximum statutory contributions for 2011.

(b) (*1 point*) Calculate the 2011 employer contribution.

(c) (*4 points*) The company contributed the contribution determined in part (b) on January 1, 2011 and the asset return in 2011 was 15%.

Determine the estimated funded position of the plan as at January 1, 2012 and the 2012 employer contribution.

5. **Continued**

You are given the following information as at January 1, 2013:

Market Value of Assets:	\$910,000
Going Concern Liabilities:	\$800,000
Solvency Liabilities:	\$875,000
Going Concern Normal Cost:	\$60,000

(d) (*1 point*) Calculate the 2013 employer contribution.

Show all work.

6. (*11 points*)

(a) (*1 point*) List the key design characteristics of employer-supported retirement plans now prevalent in the Netherlands.

(b) (*7 points*) For each of:

- The Netherlands plan in part (a),
- Canadian defined benefit plans, and
- Defined contribution plans,

Compare and contrast the following plan characteristics:

(i) Investment risk
(ii) Benefit portability
(iii) Plan governance

(c) (*3 points*) Describe the considerations in implementing the design characteristics in part (a) for single employer defined benefit pension plans in Canada.

Question 7 pertains to the Case Study.

7. (*7 points*) The Director of HR of NOC would like to entice early retirement through an early retirement window in 2011 in the Hourly Union Pension Plan with the following features for members who retire during the early retirement window:

(i) Participants with a spouse may elect a 100% joint & survivor benefit without reduction.

(ii) Increase in Normal Retirement Benefit of $5 per month times years of service.

(iii) Unreduced pension at age 58 with 20 years of service, otherwise reduced by 0.25% per month from age 60.

(iv) Temporary bridge benefit of $65 per month times years of service, unreduced for early retirement.

The maximum C/QPP benefit for 2011 is $960.00 per month. The maximum OAS benefit is $524.23. The 3-year average YMPE in 2011 is $47,267.

The following two participants are eligible to retire under the early retirement window:

	Participant A	Participant B
Age (at retirement date):	55	58
Age of Spouse:	N/A – not married	45
Service:	15	15
3-year Highest-Average Indexed Compensation:	$40,000	$65,000

Calculate the maximum lifetime and bridge benefits that may be paid to Participant A and Participant B and identify which of the enhancements under the proposed early retirement window are in excess of the Permissible Benefits as defined in the *Income Tax Act.*

****END OF EXAMINATION****
MORNING SESSION

USE THIS PAGE FOR YOUR SCRATCH WORK

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