
SOCIETY OF ACTUARIES
Retirement Benefits Canada – Design & Pricing

Exam DP-RC

AFTERNOON SESSION

Date: Thursday, May 2, 2013

Time: 1:30 p.m. – 4:45 p.m.

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This afternoon session consists of 7 questions numbered 8 through 14 for a total of 60 points. The points for each question are indicated at the beginning of the question. Question 11 pertains 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.

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****
Afternoon Session
Beginning with question 8

8. (9 points)

- (a) (4 points) Compare and contrast the methodologies used to determine a going-concern discount rate and an accounting discount rate.
- (b) (5 points) Based on the Canadian Institute of Actuaries' (CIA) Accounting Discount Rate Assumption for Pension and Post-Employment Benefit Plans Educational Note:
 - (i) (2 points) Describe the main issues identified in setting the accounting discount rate in Canada.
 - (ii) (3 points) Describe the three alternatives reviewed by the CIA including the rationale for the recommended approach.

9. (10 points) NewCo has recently acquired OldCo. The President of NewCo is interested in introducing a sustainable defined benefit pension plan that minimizes funding volatility and provides a basic level of retirement income.

You are given the following information for the existing registered non-contributory defined benefit plans:

	OldCo Plan	NewCo Plan
Retirement benefit:	1% career average benefit	1.5% final average benefit
Early retirement provisions:	Generous subsidies	No subsidies
Post-retirement indexation:	1% per annum	None
Portability at retirement:	Available	None
Plan membership information:	200 actives, 400 pensioners	5,000 actives, 1,000 pensioners
Target asset allocation:	50% equity, 50% fixed income	20% equity, 80% fixed income

- (a) (5 points) Assess NewCo and OldCo's current pension arrangements in light of NewCo's objectives.
- (b) (5 points) Based on your analysis in (a), propose a plan design for the merged company that aligns with the President's objectives. Justify your recommendation.

10. (8 points)

(a) (3 points) You are given the following for a defined benefit pension plan:

- Plan membership consists of 12,000 actives and 60,000 inactives (terminated vested participants, disabled participants, retired participants, and beneficiaries);
- There is no assumption for pre-retirement mortality; and
- The post-retirement mortality assumption is a static 2005 unisex group life insurance mortality table.

Critique the current mortality assumptions.

(b) (5 points) Describe the process and considerations for selecting appropriate mortality assumptions.

Question 11 pertains to the Case Study.

- 11.** (10 points) NOC's CFO is concerned with interest rate risk in the Full-Time Salaried Pension Plan and is considering liability driven investment (LDI) strategies.
- (a) (4 points) Critique the following assertions regarding LDI strategies:
- (i) The interest rate risk in most pension liabilities is an uncompensated risk, so it is always a good idea to reduce it as much as possible.
 - (ii) An LDI strategy can completely eliminate interest rate risk.
 - (iii) Interest rate risk can be hedged by analyzing the timing of future benefit payment cash flows and matching the fixed income exposure to that timing.
- (b) (6 points) Given the CFO's concern, describe an appropriate LDI strategy for the Salaried Pension Plan for each of the following funding strategies:
- (i) Immediate full funding.
 - (ii) Fully funding the plan over a five year period.

12. (8 points)

- (a) (5 points) Describe the following risks in accumulating and preserving retirement savings faced by capital accumulation plan participants:
- (i) Contributions.
 - (ii) Leakage.
 - (iii) Fees.
 - (iv) Drawdown of benefits.
- (b) (3 points) You are given the following savings plan design:

Employee contributions:	Voluntary up to 10% of base pay
Employer contributions:	3% base pay plus 100% match on employee contributions up to 3% of base pay
Investment options:	Range of 25 different funds in various asset classes
Employee loans:	Permitted without restriction
Form of distribution:	Lump sum

Propose changes to the plan design to help mitigate the risks described in (a).

Justify your proposal.

- 13.** (8 points) Your client is a company headquartered in the U.S. It is transferring a senior executive to its Canadian subsidiary. The compensation for this individual will be \$300,000 of base pay with a target bonus of \$300,000. Your client is interested in salary deferral arrangements in Canada.
- (a) (4 points) Compare and contrast the following deferred compensation arrangements:
- Employee Profit Sharing Plan (EPSP);
 - Supplemental Executive Retirement Plan (SERP) funded through a Split-dollar Retirement Compensation Arrangement (RCA); and
 - Notional Defined Contribution SERP.
- (b) (4 points) Your client is considering an Individual Pension Plan (IPP) for the senior executive. Describe the challenges of sponsoring an IPP in Canada.

14. (7 points) Your client sponsors a non-contributory defined benefit pension plan.

You are given:

Plan Provisions:

Retirement benefit:	2% of final year's salary times years of service
Salary increase rate:	Life only, payable monthly in advance
Normal retirement age:	Age 60
Vesting:	2 years of service

Actuarial Assumptions and Methods:

Interest rate:	6% per annum
Salary increase rate:	4% per annum
Retirement age:	Age 60
Pre retirement decrements:	None
Actuarial cost method:	Projected unit credit, pro-rated on service
Asset method:	Market value of assets

Annuity Factors:

$$\ddot{a}_{60}^{(12)} = 12.0$$

Participant Data as at January 1, 2013:

	Employee A	Employee B
Age:	30	50
Service:	0 years	20 years
2013 Salary:	\$50,000	\$100,000

Financial Information:

Market value of assets as at January 1, 2013: \$350,000

14. Continued

On July 1, 2013 a contribution of \$40,000 is made to the plan. During 2013, the fund earns a rate of return of 0%. At December 31, 2013, Employee A terminates and Employee B receives a salary increase of 10%.

- (a) (3 points) Calculate the total normal cost and the unfunded accrued liability of the plan at January 1, 2013.
- (b) (1 point) Calculate the unfunded accrued liability of the plan at January 1, 2014.
- (c) (2 points) Calculate the gains and losses by source for 2013.
- (d) (1 point) Reconcile the change in normal cost from January 1, 2013 to January 1, 2014.

Show all work.

****END OF EXAMINATION****
Afternoon Session

USE THIS PAGE FOR YOUR SCRATCH WORK