SOCIETY OF ACTUARIES
Retirement Benefits United States – Design & Pricing

Exam DP-RU

Date: Thursday, May 2, 2013
Time: 8:30 a.m. – 12:15 p.m.

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This examination has a total of 70 points.

   This exam consists of 9 questions, numbered 1 through 9.

   The points for each question are indicated at the beginning of the question. Question 7 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 Exam DP-RU.

6. Be sure your written-answer envelope is signed because if it is not, your examination will not be graded.

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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

1. (*5 points*) You are the actuary for a defined benefit pension plan.

The fair market value of assets is currently used for purposes of the actuarial valuation. Given the recent volatility in the investment market, your client would like to moderate the volatility of contributions by considering an alternative asset valuation method.

You are considering the following asset valuation method:

- Smoothed market value method without phase-in;
- Averaging over 4 years;
- Deferred recognition (on a linear basis) of all investment gains/losses based on the difference between the expected return on assets and the actual investment gains/losses over the averaging period;
- An expected return on assets of 8% per annum; and
- Cash flows are assumed to occur in the middle of the year.

(a) (*2 points*) Describe the considerations in choosing an asset valuation method.

(b) (*3 points*) Given the company's objective, evaluate the appropriateness under actuarial standards of practice of adopting the proposed asset valuation method, including any issues that should be addressed.

2. (*8 points*)

(a) (*2 points*) Describe the two main approaches to managing intergenerational risks in pension plans.

(b) (*4 points*) Compare and contrast the intergenerational risk sharing characteristics of the following three plans from the employees' and employer's perspective.

(i) Career average defined benefit plan with conditional indexation.

(ii) Defined benefit plan where employee and employer contribution rates are fixed but benefits and indexation are linked to funded status ("Collective Defined Contribution Plan").

(iii) Hybrid plan.

(c) (*2 points*) Recommend the pension plan design in (b) that will provide the greatest potential for sustainable risk sharing among plan members. Justify your answer.

3. (*6 points*)

(a) (*4 points*) Describe the input parameters required by the Society of Actuaries' Long Term Healthcare Trend Resource Model.

(b) (*2 points*) Describe modifications to the input parameters under the following scenarios:

(i) Increase in future co-pays and deductibles paid by the retiree.

(ii) Medical advancements which significantly increase drug costs.

4. (*8 points*)

(a) (*5 points*) Describe the following risks in accumulating and preserving defined contribution retirement savings faced by employees:

(i) Contributions.

(ii) Leakage.

(iii) Fees.

(iv) Drawdown of benefits.

(b) (*3 points*) You are given the following plan design:

Employee contributions:	Voluntary up to 10% of base pay
Employer contributions:	3% of 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.

5. (*9 points*)

(a) (*3 points*) In an asset-only framework, macro attribution analysis is used to evaluate an asset manager's investment performance.

Describe the following components of macro attribution analysis:

(i) Risk-free asset.

(ii) Asset categories.

(iii) Net contributions.

(b) (*3 points*) In an asset-liability framework, a liability benchmark can be used to measure plan performance.

(i) (*1 point*) Define a liability benchmark.

(ii) (*2 points*) Describe how to create a liability benchmark.

(c) (*3 points*) Compare and contrast a liability benchmark with an asset-only benchmark.

6. *(9 points)* The CEO of ABC Company wishes to implement a deferred compensation plan for ABC's senior management team.

The CEO's key objectives are as follows:

- Attraction and retention of executives;
- Financial planning flexibility for the executives; and
- Administrative simplicity.

(a) (*3 points*) Describe the key plan provisions that should be included in a deferred compensation plan.

(b) (*2 points*) Describe the implications Section 409A has on deferred compensation plans.

(c) (*4 points*) Using the plan provisions identified in (a), recommend a deferred compensation plan design that:

- Meets the CEO's objectives; and
- Is Section 409A compliant.

Justify your answer.

Question 7 pertains to the Case Study.

7. (*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.

8. (*7 points*) You have been hired by a local politician to provide education on the funding challenges facing public pension plans.

(a) (*3 points*) Explain the key causes of the current funding problems facing public pension plans.

(b) (*2 points*) Assess the merits of pre-funded and pay-as-you-go funding policies for public pension plans.

(c) (*2 points*) Describe the constraints that limit significant change from taking place in public pension plans.

9. (*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.

****END OF EXAMINATION****

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