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**SOCIETY OF ACTUARIES**  
**Design & Accounting Exam – Canada**

# Exam RETDAC

## MORNING SESSION

**Date:** Thursday, April 27, 2017

**Time:** 8:30 a.m. – 11:45 a.m.

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### 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 8 questions numbered 1 through 8.
  - b) The afternoon session consists of 5 questions numbered 9 through 13.

The points for each question are indicated at the beginning of the question. Question 10 and 11 pertain to the Case Study.
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 RETDAC.
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.



**\*\*BEGINNING OF EXAMINATION\*\***  
**Morning Session**

**1.** (6 points)

- (a) (3 points) Identify information you will need to perform an accounting valuation for a post-retirement non-pension benefit (PRB) plan, based on the CIA Standards of Practice.
- (b) (3 points) Describe the differences between U.S. accounting standard ASC 715 and international accounting standard IAS 19, Rev. 2011 when accounting for an unfunded PRB plan.

2. (8 points) Company XYZ sponsors a retirement plan with five participants expected to each receive a one-time lump sum payment as follows:

	Payment Date	Amount
Participant 1	January 1, 2018	\$100,000
Participant 2	January 1, 2020	\$200,000
Participant 3	January 1, 2021	\$50,000
Participant 4	January 1, 2025	\$1,000,000
Participant 5	January 1, 2030	\$100,000

Calculate the following for the retirement plan as of January 1, 2017, assuming a discount rate of 5.0%:

- (a) (3 points) Macauley duration
- (b) (1 point) Modified duration
- (c) (3 points) Effective duration
- (d) (1 point) Convexity

Show all work.

3. (12 points) Company ABC operates in Country Z, with a salaried and hourly workforce. Salaried employees are eligible for a bonus program. Hourly employees are not eligible for the bonus program, but usually receive a significant amount of wages in overtime.

Country Z offers a social security program funded by a 5% payroll tax paid by the employer for earnings up to \$70,000 per year which provides a flat \$30,000 annual life annuity benefit at age 65.

Company ABC sponsors a defined contribution (DC) plan with employer contributions of 12% of base earnings plus bonus, but excluding overtime. The plan allows employees to make voluntary contributions and direct the investment of their accounts.

You are given the following information about two employees of Company ABC:

	Employee S	Employee H
Employee type	Salaried	Hourly
Age	50	42
Retirement age	65	65
Base salary in most recent year	\$100,000	\$60,000
Bonus in most recent year	\$25,000	\$0
Overtime in most recent year	\$0	\$10,000
Current DC account balance	\$225,000	\$130,000
Assumed future return	5%	5%
Assumed future wage, bonus and overtime increases	3%	2%
Price of a life annuity paying \$1,000 per year starting at age 65	\$13,000	\$13,000

- (a) (4 points) Calculate the projected replacement ratios at retirement for Employee H and Employee S from the DC plan.
- (b) (2 points) Compare and contrast the direct versus indirect method of integrating the DC plan with Social Security.
- (c) (6 points) Recommend an employer contribution formula to integrate the DC plan with Social Security using the direct method that results in the same replacement ratio at retirement age for Employee S and Employee H.

Show all work.

**4.** (5 points) Company ABC sponsors an open final average pay defined benefit pension plan subject to international accounting standard IAS 19, Rev. 2011. The CFO requested updated Defined Benefit Cost projections due to a current economic downturn, which the CFO expects will continue in the future.

- (a) (1 point) Identify assumptions that may be affected by the economic downturn.
- (b) (2 points) Evaluate four key assumptions from part (a) with respect to:
  - (i) Potential change in assumption
  - (ii) Impact on Defined Benefit Cost

No calculations are required.

The actuary sent the following email to the CFO:

*CFO –*

*As requested, the projected Defined Benefit Cost for Company ABC's pension plan is estimated to be: \$15 million in 2018, \$16 million in 2019, and \$13 million in 2020.*

*Our calculations are based on data provided by Company ABC as of January 1, 2017, rolled-forward in each projected year, based on assumptions documented in the January 1, 2017 report, sent earlier this year, with adjustments made for the current economic downturn.*

*Let us know if you would like to set up a time to discuss any questions.*

*-Actuary, FSA*

- (c) (2 points) Propose two disclosure statements that should be added to the email, taking into consideration the Canadian Institute of Actuaries Standards of Practice.

5. (8 points) Company ABC sponsors a Defined Contribution (DC) pension plan for all its employees.

The DC plan provisions are:

Member contributions	0% to 6% of salary
Company matching contributions	50% of member contributions

Company ABC is considering implementing one of two proposed plan designs for future service.

<b>Proposal #1: Amend DC plan</b>	
Member contributions	0% to 9% of salary
Company matching contributions	1/3 of member contributions

<b>Proposal #2: Convert to Defined Benefit (DB) plan</b>	
Member contributions	6% of salary
Career average DB benefit formula	1% of current year's salary for each year of service
Normal retirement age	Age 65
Normal form of pension	Life only pension

- (a) (2 points) Define an adverse amendment according to the *CAPSA Guideline No. 8: Defined Contribution Plans*.
- (b) (3 points) Critique each proposal taking into account adverse amendment guidelines according to *CAPSA Guideline No. 8*.
- (c) (3 points) Revise each proposal, if necessary, to avoid an adverse amendment.

Justify your response.

- 6.** (5 points) Company XYZ sponsors a non-registered retirement plan for a specified group of executive employees who file U.S. taxes. The plan is subject to Internal Revenue Code section 409A.

Company XYZ is considering terminating the non-registered retirement plan.

Describe the implications of terminating the non-registered retirement plan from the perspective of the employees who file U.S. taxes.



- 7.** (8 points) Company DEF sponsors a defined benefit pension plan. Company DEF is considering an annuity buyout for the retired members of the plan.
- (a) (2 points) Describe reasons why the annuity buyout premium may be different from the accounting liability for retired members.
  - (b) (4 points) Describe in words the impact of the annuity buyout on the 2017 Defined Benefit Cost and Other Comprehensive Income (OCI) under international accounting standard IAS 19, Rev. 2011 (IAS 19).  
  
No calculations are required.
  - (c) (2 points) Compare the accounting treatment of the annuity buyout under IAS 19 and CPA Handbook, Section 3462.

**8.** (8 points) Company ABC sponsors a stand-alone Defined Contribution pension plan for its employees. Company ABC would like to delegate the enrollment and record keeping services to an external service provider, DEF Administration.

- (a) (4 points) Describe the responsibilities of Company ABC and DEF Administration with respect to the maintenance of member records under the *Canadian Association of Pension Supervisory Authorities (CAPSA)* guidelines.

DEF Administration offers proprietary investment funds and decumulation products alongside its maintenance of member records services.

- (b) (2 points) Describe the potential conflicts of interest from the perspective of:

- (i) Company ABC
- (ii) DEF Administration

- (c) (2 points) Explain how the potential conflicts of interest can be mitigated from each company's perspective.

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

**USE THIS PAGE FOR YOUR SCRATCH WORK**

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