

Exam RETDAC

Design & Accounting Exam – Canada

Date: Thursday, April 29, 2021

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This examination has 11 questions numbered 1 through 11 with a total of 100 points.

The points for each question are indicated at the beginning of the question. Questions 5 and 10 pertain to the Case Study.

2. 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 provided in this document.

Written-Answer Instructions

1. Each question part or subpart should be answered either in the Word document or the Excel file as directed. Graders will only look at work in the indicated file.
 - a) In the Word document, answers should be entered in the box marked ANSWER. The box will expand as lines of text are added. There is no need to use special characters or subscripts (though they may be used). For example, β_1 can be typed as beta_1 (and ^ used to indicate a superscript).
 - b) In the Excel document formulas should be entered. Performing calculations on scratch paper or with a calculator and then entering the answer in the cell will not earn full credit. Formatting of cells or rounding is not required for credit.
 - c) Individual exams may provide additional directions that apply throughout the exam or to individual items.
2. The answer should be confined to the question as set.
3. Prior to uploading your Word and Excel files, each file should be saved and renamed with your five-digit candidate number in the filename.
4. The Word and Excel files that contain your answers must be uploaded before time expires.

Recognized by the Canadian Institute of Actuaries.

Navigation Instructions

Open the Navigation Pane to jump to questions.

Press Ctrl+F, or click View > Navigation Pane:



GENERAL INSTRUCTIONS

- All questions indicate whether the response is to be answered in Word or Excel. Only the Word document will be graded for parts of a question with Word answer boxes; only the Excel spreadsheet will be graded for parts of a question with Excel instructions.
- When answering in Excel, “show your work” means
 - Calculation formulas must be used in the answer cells containing the work.
 - All work should be labeled.
- When answering in Excel:
 - Formatting and rounding is not required for credit.
 - Best practice is to write out the formulas in words, which demonstrates understanding and may result in earning partial credit.

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.

1.

(7 points)

- (a) (1 point) Describe the risks an actuary should disclose in a valuation report based on Actuarial Standard of Practice No. 51, Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions (ASOP 51).

ANSWER:

- (b) (1 point) Identify the methods for assessing the risks described in part (a) based on ASOP 51.

ANSWER:

Company XYZ has experienced significant cost fluctuation in their defined benefit pension plan and wishes to mitigate this volatility.

- (c) (2 points) Recommend two pension risk transfer strategies available to Company XYZ.

Justify your response. No calculations required.

ANSWER:

- (d) (3 points) Compare and contrast the accounting treatment of each strategy identified in part (c) under:

- (i) U.S. Accounting Standard ASC 715
- (ii) International Accounting Standard IAS 19, Rev. 2011

No calculations required.

ANSWER:

2.

(8 points) Company ABC acquired Company XYZ through a share purchase. Company ABC sponsors an open defined contribution pension plan (Plan A). Company XYZ sponsors an open defined benefit pension plan (Plan X). Both plans target the same replacement ratio for a career employee working 30 years.

The combined company is considering the following options with respect to current employees within their retirement plans:

- Option 1: No change to either plan; employees continue to accrue benefits in their respective plans.
- Option 2: Company XYZ employees accrue benefits in Plan A prospectively. Plan X is frozen for benefit accruals.
- Option 3: Company XYZ employees are given the choice to either continue to accrue benefits in Plan X or enroll in Plan A going forward and convert past service to Plan A. For employees who convert past service to Plan A, the lump sum value of their accrued pension in Plan X on the date of conversion becomes the initial account balance in Plan A.

In each option future employees will join Plan A. Assume all options are legally allowed in their jurisdiction.

- (a) (6 points) Analyze the impact of the three options on the following:
- (i) Accounting cost to the merged company
 - (ii) Administrative cost to the merged company
 - (iii) Disruption to current employees

ANSWER:

2. Continued

Company ABC selected Option 3.

(b) (2 points) Recommend which plan the following employees should choose:

(i) 30-year old with one year of service in Plan X

(ii) 55-year old with 25 years of service in Plan X

No calculations required. Justify your response.

ANSWER:

3.

(9 points)

- (a) (3 points) Describe the features of the Variable Payout Life Annuity (VPLA) option in the University of British Columbia Faculty Pension Plan (UBC FPP).

ANSWER:

- (b) (3 points) Describe three risks of the VPLA option from the perspective of plan participants.

ANSWER:

- (c) (3 points) Recommend actions a plan sponsor could take to minimize the risks identified in part (b) above.

Justify your response.

ANSWER:

4.

(8 points)

- (a) (4 points) Compare and contrast a Multi-Employer Pension Plan's (MEPP) risk sharing structure to the risk sharing structure of the following :
- (i) Single employer defined contribution pension plan
 - (ii) Single employer defined benefit pension plan

ANSWER:

- (b) (4 points) Propose three investment strategies to mitigate risks in a MEPP.

Justify your response.

ANSWER:

Question 5 pertains to the Case Study.

5.

(14 points) NOC sponsors an unfunded Supplemental Retirement Plan (SRP) for its CEO. The SRP restores the annuity benefit not payable from the National Oil Pension Plan.

CEO Employee Data:

Date of Birth	1/1/1971	
Date of Hire	1/1/2011	
Earnings History	2016	\$800,000
	2017	\$850,000
	2018	\$900,000
	2019	\$950,000
	2020	\$1,000,000

SRP assumptions under International Accounting Standard IAS 19, Rev. 2011 (IAS 19) as of December 31, 2020:

Retirement age	62.0
Pre-retirement decrements	None
Future Salary Scale	3.00%
Discount Rate	3.75%
Age 62 Annuity Factor at 3.75%	15.2

(a) (5 points) Calculate the 2021 Defined Benefit Cost for the SRP under IAS 19.

Show all work.

The response to this part is to be provided in the Excel spreadsheet.

5. Continued

NOC has decided to freeze benefit accruals in both the National Oil Pension Plan and the SRP effective March 31, 2021.

SRP assumptions as of March 31, 2021 under IAS 19:

Discount Rate	3.25%
Age 62 Annuity Factor at 3.25%	16.1
Earnings through March 31, 2021	\$257,500

All other assumptions remain the same. No other gains, losses, or assumption changes occurred during 2021.

- (b) (5 points) Calculate the revised 2021 Defined Benefit Cost, including the change to Other Comprehensive Income, for the SRP under IAS 19 reflecting the plan freeze.

Show all work.

The response to this part is to be provided in the Excel spreadsheet.

- (c) (4 points) Compare and contrast the accounting treatment of the plan freeze under IAS 19 and U.S. Accounting Standard ASC 715.

No calculations required.

ANSWER:

6.

(10 points) Company ABC sponsors a defined benefit pension plan. The assets of the pension plan are invested according to the following investment strategy:

Asset Class	Portfolio Allocation	Arithmetic Return	Geometric Return	Standard Deviation
Bond	40%	3.2%	3.0%	5.5%
Equity	60%	7.7%	6.6%	18.0%

The correlation between bonds and equities is 25%.

(a) (2 points) Calculate the following for the pension plan portfolio:

(i) Arithmetic return

(ii) Geometric return

Show all work.

The response to this part is to be provided in the Excel spreadsheet

Company ABC used the following assumptions to determine financial disclosure information under U.S. Accounting Standard ASC 715.

Expected Return on Plan Assets	6.00%
Discount Rate	6.00%
Salary Scale	1.00%
Inflation	2.00%
Retirement Age	60
Termination Assumption	none
Mortality Table	90% of the 2014 Private Canadian Pensioner Mortality Table (CPM2014 Pri)
Mortality Improvement Scale	none

The pension plan provides an unreduced benefit at age 60.

(b) (4 points) Critique each of the assumptions used to calculate the financial disclosure information.

ANSWER:

6. Continued

- (c) (2 points) Describe the economic assumption disclosures that an actuary must communicate in an actuarial report under Actuarial Standard of Practice No. 27, Selection of Economic Assumptions for Measuring Pension Obligations.

ANSWER:

Company ABC has decided to adopt a new investment strategy and will phase it in over three years.

- (d) (2 points) Explain three approaches to determine the expected return on plan assets.

ANSWER:

7.

(10 points) Company A offers a retirement savings plan that has the following two options for their Canadian employees:

Feature	Option A	Option B
Type of Arrangement	Registered Retirement Savings Plan (RRSP)	Tax-Free Savings Account (TFSA) and bank account
Eligibility	1 year	Immediate
Annual Employee Contribution	Between \$1,000 and 50% of the Maximum Allowable Amount under the Income Tax Act (ITA)	7% of salary after income tax up to \$16,000
Contributions in Excess of Maximum Allowable Amount under the ITA	None	Invested in bank account earning guaranteed interest of 2% per year
Employer Matching Contribution	100% match	75% match

- (a) (4 points) Compare and contrast the design features of each option with respect to generating retirement savings.

No calculations required.

ANSWER:

7. Continued

You are provided with the following information for a new hire:

Current age	50
Planned retirement age	65
Life expectancy at age 65	20 years
Current annual salary	\$300,000
Current RRSP maximum annual dollar limit	\$27,830
Current TFSA maximum annual contribution	\$6,000
Investment rate of return	5%
Annual salary increase	3%
Annual RRSP and TFSA limits increase	2%
Average income tax rate before retirement	35%
Average income tax rate after retirement	25%
Timing of contributions	End of year

The employee will contribute the minimum required to receive the maximum company matching contribution.

- (b) (6 points) Assess which option provides the higher expected annual retirement income for the new hire.

Show all work.

The response to this part is to be provided in the Excel spreadsheet.

8.

(7 points)

- (a) (2 points) Describe considerations when calculating a commuted value for a former single employer defined benefit pension plan member with reduced life expectancy.

ANSWER:

- (b) (2 points) Describe the disclosure requirements when communicating pension commuted values under Canadian Institute of Actuaries Consolidated Standards of Practice.

ANSWER:

You are given the following assumptions for a defined benefit pension plan:

Interest Rate	3.75%
Pre- and Post-Retirement Mortality	1983 Group Annuity Mortality Table (GAM83)
Spousal age difference	Males 3 years older than females

- (c) (3 points) Assess whether each assumption listed above would be appropriate to determine the following:
- (i) Commuted value for a terminated employee
 - (ii) Defined Benefit Obligation under International Accounting Standards IAS 19, Rev 2011

ANSWER:

9.

(9 points)

- (a) (1 point) List the factors actuaries should take into account in the selection of mortality and mortality improvements, according to Actuarial Standard of Practice No. 35, Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations.

ANSWER:

You are provided the following information:

	Design	Covered Population	Gender mix of employees	Number of Employees	Number of Retirees
Plan A	Unit benefit defined benefit plan	Hourly union	85% male	20,000	27,500
Plan B	Final average pay defined benefit plan	Salaried non-union	50% male	18,000	25,000
Plan C	Career average pay plan with a lump sum option	Physicians	50% male	2,000	30

- (b) (6 points) Describe the considerations for setting the mortality assumption for the following:
- (i) Plan A
 - (ii) Plan B
 - (iii) Plan C

ANSWER:

9. Continued

You are provided the following data from Plan A's 2017-2020 annuitant experience study.

	Male	Female
Actual deaths during period	1,650	201
Expected deaths during period, based on standard mortality table	1,500	233
Number of deaths on a counts-weighted basis for full credibility	1,537	1,537

- (c) (2 points) Calculate the multipliers to be applied to the standard mortality table base rates based on the plan experience and credibility theory for the following:
- (i) Males
 - (ii) Females

Show all work.

The response to this part is to be provided in the Excel spreadsheet

Question 10 pertains to the Case Study.

10.

(8 points) NOC is considering amending the Pension Plan to a higher benefit multiplier and amending the Retiree Health Benefit Program to add a disability benefit.

- (a) (4 points) Evaluate the impact of the proposed plan changes on the demographic assumptions.

ANSWER:

On February 1, 2021 NOC announces they are changing the following, effective July 1, 2021:

- Increasing the Pension Plan multiplier to 2.25% for all prior and future service
- Providing benefits in the Retiree Health Benefit Program at age 65 for those participants who become disabled at any age

- (b) (4 points) Describe the implications of these changes on the 2021 Defined Benefit Cost under International Accounting Standards IAS 19, Rev 2011 for the following plans:

- (i) Pension Plan
- (ii) Retiree Health Benefit Program

No calculations required.

ANSWER:

11.

(10 points)

- (a) (4 points) Explain how the advantages of converting a defined benefit pension plans to a defined contribution plan may not translate to the public sector.

ANSWER:

- (b) (6 points) Describe how taxpayer risks are affected by the following in public sector pension plans:

- (i) Plan design features
- (ii) Contribution policy
- (iii) Governance structure

ANSWER:

****END OF EXAMINATION****