Exam RETDAC

Design & Accounting Exam – Canada

Date: Thursday, October 28, 2021

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This examination has 12 questions numbered 1 through 12 with a total of 100 points.

   The points for each question are indicated at the beginning of the question. Questions 2, 3, and 8 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.

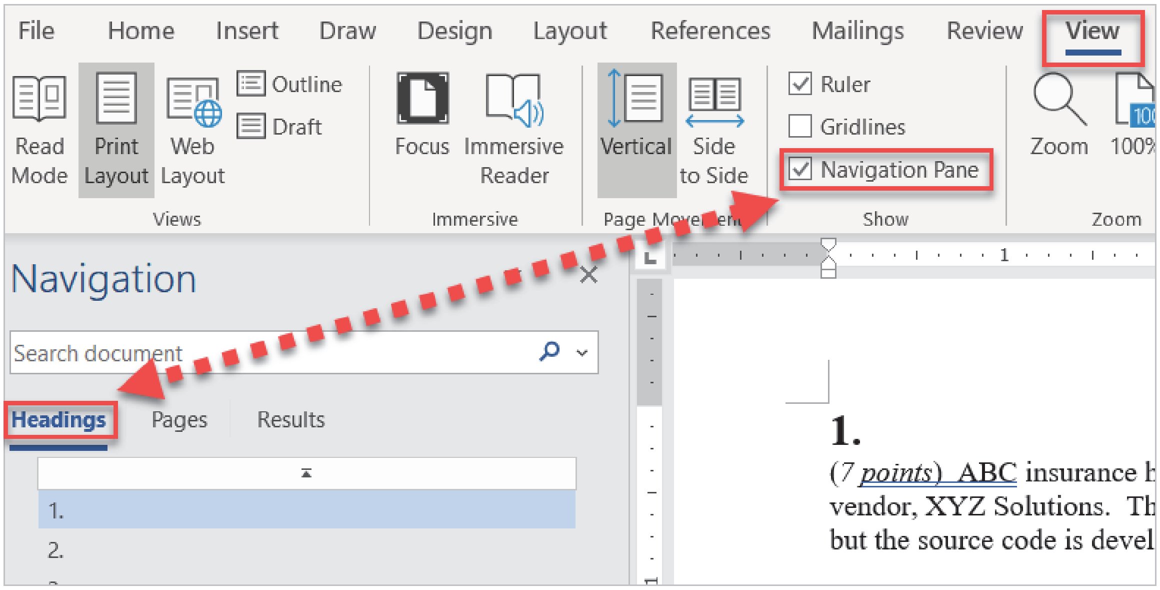
4. The Word and Excel files that contain your answers must be uploaded before the five-minute upload period expires.

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.

(*9 points*) Company ABC sponsors a defined benefit pension plan with the following objectives:

- Share retirement costs with employees
- Predictable company costs
- Attract younger employees
- Retain long service employees

The key provisions of the pension plan are below:

Provision	**Defined Benefit Plan**
Vesting	100% after 2 years of service
Pensionable Earnings	Base pay and overtime
Normal Retirement Eligibility	Age 65
Employee Contributions	5% of pensionable earnings
Benefit Formula	2% of final average pensionable earnings (last 36 consecutive months)
Early Retirement Eligibility	Age 55 and 10 years of service
Early Retirement Benefit	Accrued benefit reduced by 0.25% per month that early retirement precedes Normal Retirement
Termination Benefit	Actuarially equivalent to pension payable at Normal Retirement
Portability	Lump sum available on termination and retirement
Indexation	After pension commencement, pension benefits are indexed annually to inflation

(a) (*5 points*) Critique the plan provisions with respect to Company ABC's objectives.

Justify your response.

ANSWER:

1. **Continued**

Company ABC management distributes overtime hours with priority to long service employees and the associated pay can make up a significant portion of their earnings.

(b) (*2 points*) Evaluate how the overtime policy aligns with Company ABC's objectives for the defined benefit pension plan..

ANSWER:

(c) (*2 points*) Recommend two changes to the plan design if Company ABC wants to keep the overtime policy.

Justify your response.

ANSWER:

Question 2 pertains to the Case Study.

2.

(*7 points*) You are the actuary for a municipality in Gevrey that is considering adding a deferred retirement option plan (DROP Plan) to its defined benefit plan to help retain long-tenured employees. The current plan offers unreduced early retirement benefits to participants meeting certain age and service criteria.

(a) (*2 points*) Recommend a valuation assumption change that reduces the impact of the DROP on the actuarial gain or loss.

Justify your response.

ANSWER:

(b) (*4 points*) Recommend four plan design features that limit the increased cost and financial volatility of adding the DROP.

Justify your response.

ANSWER:

As an alternative to the DROP, the municipality is considering offering a phased retirement program to help retain long-tenured employees.

(c) (*1 point*) List criteria that would make an employee ineligible to collect retirement benefits while continuing to accrue benefits under the defined benefit plan.

ANSWER:

Question 3 pertains to the Case Study.

3.

(*9 points*) NOC is considering changing the frequency of the National Oil Pension Plan valuation from every year to every two years. In the years between valuations, results of the prior valuation would be adjusted forward one year using generally accepted actuarial techniques.

(a) (*3 points*) Describe considerations under Actuarial Standard of Practice No. 4 Measuring Pension Obligations and Determining Pension Plan Costs or Contributions (ASOP 4) when assessing the reasonableness of this change.

ANSWER:

NOC decides to implement an automatic contingent cost of living adjustment (COLA) provision. The COLA provision will adjust benefits annually as follows:

- If the investment return on plan assets exceeds the asset return assumption, benefits will be adjusted by the actual inflation rate
- Otherwise, no COLA will be granted

(b) (*3 points*) Describe the considerations under ASOP 4 when determining how to value the new benefit provision.

ANSWER:

NOC's CFO believes that inflation will not exceed 1% for the foreseeable future and directs the actuary to assume that COLAs will be 1% per annum in years granted.

(c) (*3 points*) Recommend how the actuary should respond to this directive.

Justify your response.

ANSWER:

4.

(*12 points*) Company ABC wants to close and freeze their defined benefit (DB) plan. They want to replace future DB plan accruals with a new defined contribution (DC) plan. Company ABC has stated the following goals for the new DC plan:

- Provide the same lump sum value at retirement that the DB plan would provide if it was not frozen
- Provide the same DC contribution for all employees equal to a flat percent of pay over an employee's career
- Does not increase the accounting cost of annual accruals of the DB plan, as a percentage of base pay

You are given the following information:

Defined Benefit Plan formula	2% of final year base pay for each year of service
Early Retirement	Reduced 3% per year for retirement before age 65
Number of active plan participants	100
Average participant age	50
Average participant service	15
Average participant base pay	$100,000

Company ABC has instructed you to use following assumptions for this analysis:

- All employees retire at age 60
- Future salary increases: 0%
- Return on assets for future DC contributions: 6%
- No pre-retirement decrements
- Form of payment is 100% lump sum at retirement
- Lump sum conversion factor at age 60: 15
- Discount rate: 3.0%
- Contributions are made at the beginning of year

(a) (*2 points*) Calculate the Service Cost under International Accounting Standard IAS 19, Rev 2011 as a percentage of base pay for the existing DB plan for the average participant.

Show all your work.

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

4. Continued

(b) (*4 points*) Calculate the flat DC contribution as a percentage of base pay for the average participant necessary to restore the lump sum value lost due to the DB plan freeze.

Show all your work.

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

Company ABC wants to implement the DC plan and provide all employees the same DC contribution percentage using the methodology described in part (b) above.

(c) (*6 points*) Critique the appropriateness of this suggested design based on the stated goals of Company ABC.

ANSWER:

5.

(*6 points*) Compare and contrast the considerations when designing an early retirement incentive program for the following:

(i) Public sector pension plan

(ii) Private sector pension plan

ANSWER:

6.

(*9 points*) Company XYZ sponsors a non-registered defined contribution Supplemental Executive Retirement Plan (SERP) for one of its executives. Contributions to the SERP are 18% of each year's pensionable earnings.

The company is considering two options to secure the SERP:

Option 1: Funded retirement compensation arrangement (RCA)

Option 2: Securing the notional account value with a letter of credit

(a) (*3 points*) Describe the advantages and disadvantages of the two funding options from the perspective of Company XYZ.

ANSWER:

You are given the following:

Year	1	2	3	4
Pensionable Earnings	\$200,000	\$220,000	\$230,000	\$250,000
Rate of Return (per annum)	4.0%	6.0%	-2.0%	5.0%

The cost of the letter of credit is 1.75% of the notional account value at the end of each year.

Assume contributions are made in the middle of the year, all returns are fully realized in the year earned, and there are no disbursements from the plan.

(b) (*6 points*) Calculate the balance of the RCA and refundable tax account at the end of Year 4 under each of the following:

(i) Option 1

(ii) Option 2

Show all work.

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

7.

(*7 points*)

(a) (*2 points*) Define a Multi-Employer Plan (MEP) and a Specified Multi-Employer Plan (SMEP) under the Income Tax Act.

ANSWER:

(b) (*4 points*) Describe the advantages and disadvantages of the following from the employer's perspective:

(i) Joining a MEP

(ii) Sponsoring a single employer pension plan

ANSWER:

(c) (*1 point*) Explain the calculation of the Pension Adjustment for the following:

(i) a defined benefit MEP

(ii) a defined benefit SMEP

ANSWER:

Question 8 pertains to the Case Study.

8.

(*10 points*) NOC is restructuring and has offered a voluntary retirement incentive program with enhanced early retirement subsidies to its employees.

400 employees accepted the offer to retire at July 1, 2021.

You are given the following (dollars in thousands):

Actual Benefit Payments, 1/1/2021 – 6/30/2021	$19,000
Expected Benefit Payments, 7/1/2021 – 12/31/2021	$21,000
Actual Benefit Payments, 7/1/2021 – 12/31/2021	$21,500
Actual Contributions in 2021	$35,849
Other actuarial gains or losses during 2021	None
Asset gain/loss at the end of the year	$0
Information as of 7/1/2021:	
Discount Rate	4.00%
Market Value of Assets	$700,000
Total Plan Defined Benefit Obligation (DBO) reflecting immediate decrement of the 400 employees who accepted offer	$1,200,000
Total Plan DBO reflecting enhanced benefit of the 400 employees who accepted offer	$1,210,000
Full year Service Cost for the remaining employees	$51,580

Assume this is a 2021 event and all contributions and benefit payments are uniformly distributed.

(a) (*7 points*) Calculate the revised 2021 Defined Benefit Cost, including the change to Other Comprehensive Income, under International Accounting Standard IAS 19, rev. 2011 (IAS 19).

Show all work.

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

8. Continued

(b) (*3 points*) Compare and contrast the accounting treatment of the retirement incentive program under IAS 19 and U.S. Accounting Standard ASC 715.

No calculations required.

ANSWER:

9.

(*8 points*) Company XYZ sponsors a defined benefit pension plan. Company XYZ is winding up the plan with the following actions:

- Amend the plan in 2020 to wind up the plan effective December 31, 2021
- Fully fund the plan at the asset distribution date
- Distribute all plan assets on June 30, 2023

(a) (*3 points*) Describe the effect on the 2021 Net Periodic Pension Cost (NPPC) under U.S. Accounting Standard ASC 715 (ASC 715) if Company XYZ's pension plan prior to the termination was structured as:

(i) Open and ongoing

(ii) Closed to new entrants

(iii) Frozen for all participants

ANSWER:

(b) (*4 points*) Compare and contrast the calculation of the following:

(i) 2022 NPPC under ASC 715

(ii) 2022 Defined Benefit Cost under International Accounting Standard IAS 19 (IAS 19)

ANSWER:

(c) (*1 point*) Explain how the 2023 NPPC under ASC 715 would be calculated.

ANSWER:

10.

(*9 points*) Company XYZ has an employer funded defined benefit pension plan and is considering two different plan options:

Plan Provision	**Option 1**	**Option 2**
Annual lifetime pension	1.40% of final average pensionable earnings up to $50,000; and 2.00% of final average pensionable earnings above $50,000 multiplied by years of pensionable service	1.80% of final average pensionable earnings for all earnings multiplied by years of pensionable service
Post-retirement indexation	Indexed at 50% of inflation	Indexed at 2% per year
Early retirement reduction	0.25% per month prior to age 60	0.50% per month prior to age 65
Normal form of pension	If married, 60% joint survivor pension without reduction If not married, single life annuity	Single life annuity for all members Joint survivor pension available on an actuarially equivalent basis

(a) (*3 points*) Describe the differences in the following risks between Option 1 and Option 2 from the perspective of Company XYZ:

(i) Longevity risk

(ii) Inflation risk

(iii) Retirement risk

ANSWER:

10. **Continued**

You are given the following information about two employees who may participate in the pension plan:

	Employee A	Employee B
Expected final average pensionable earnings at retirement	$150,000	$45,000
Expected age at retirement	62	58
Marital status	Not married	Married
Service at Retirement	15 years	25 years

(b) (*4 points*) Evaluate each plan provision independently under Option 1 and Option 2 from the perspective of:

(i) Employee A

(ii) Employee B

Justify your response.

ANSWER:

(c) (*2 points*) Calculate the replacement ratio provided by the pension plan as a percentage of final average earnings at retirement for Employee A assuming all service was earned under:

(i) Option 1

(ii) Option 2

Show all work.

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

11.

(*7 points*)

(a) (*2 points*) Describe how Actuarial Standard of Practice No. 27, Selection of Economic Assumptions for Measuring Pension Obligations, applies to the selection of the discount rate assumption under International Accounting Standards IAS 19, Rev 2011 (IAS 19) for a defined benefit pension plan.

ANSWER:

(b) (*2 points*) Describe the unique considerations when setting the discount rate assumption under IAS 19 for a Variable Annuity Plan.

ANSWER:

(c) (*3 points*) Describe the interaction between the hurdle rate and inflation in a Variable Annuity Plan.

ANSWER:

12.

(*7 points*)

(a) (*4 points*) Describe the information that should be provided to a member in a registered defined contribution pension plan that offers variable benefits according to CAPSA Guideline No. 8: Defined Contribution Plans.

ANSWER:

(b) (*3 points*) Describe the advantages and disadvantages of providing income estimation tools to variable benefit plan members regarding their withdrawals from the following perspectives:

(i) Plan member

(ii) Plan sponsor

ANSWER:

****END OF EXAMINATION****