SOCIETY OF ACTUARIES

Design & Accounting Exam – U.S.

Exam RETDAU

Date: Friday, April 26, 2024

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This examination has 10 questions numbered 1 through 10 with a total of 80 points.

   The points for each question are indicated at the beginning of the question. Question 1, 2 and 3 pertains 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.

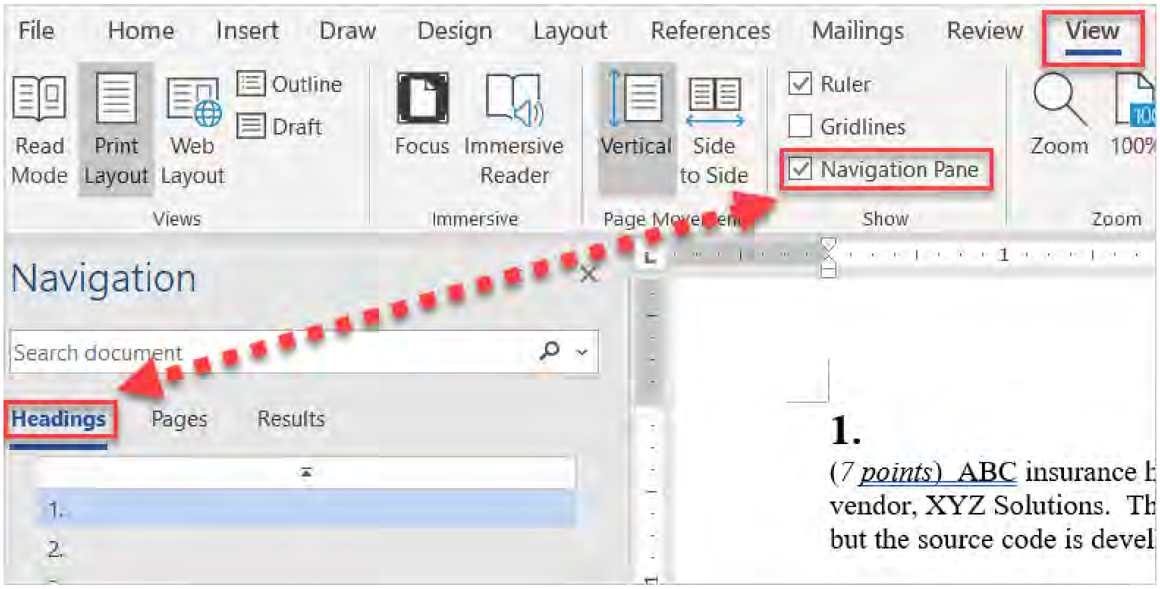
4. The Word and Excel files that contain your answers must be uploaded before time expires.

8770 W. Bryn Mawr Avenue, Suite 1000
Chicago, IL 60631-3516

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.

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 the 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.

Question 1 pertains to the Case Study.

1.

(*5 points*)

(a) (*3 points*) Describe the factors that should be considered when setting an expected return on assets assumption under U.S. Accounting Standard ASC 715.

ANSWER:

You are the actuary for NOC's pension plan. NOC's Chief Financial Officer has asked you to use an expected return on assets assumption of 9.50% for the 2025 Net Periodic Pension Cost.

(b) (*2 points*) Propose a course of action as an actuary in response to the request.

ANSWER:

2.
(*8 points*)

(a) (*2 points*) Describe the types of adjustments that may be required to be made to the pension plan data if used for the covered population of a retiree group benefits program under Actuarial Standard of Practice (ASOP) No. 6 – Measuring Retiree Group Benefit Obligations and Determining Retiree Group Benefits Program Periodic Costs or Actuarially Determined Contributions.

ANSWER:

(b) (*4 points*) Describe the considerations in determining whether the demographic and economic assumptions developed for pension benefit obligations are appropriate for retiree group benefits obligations under ASOP No. 6.

ANSWER:

Question 2c pertains to the Case Study.

NOC has noticed a trend of participants living longer.

(c) (*2 points*) Explain the effects of the trend on the following for the National Oil Retiree Health Benefit Program:

(i) Liabilities

(ii) Service cost

(iii) Claims cost

ANSWER:

Question 3 pertains to the Case Study.

3.

(*8 points*) NOC is implementing a phased retirement program.

(a) (*2 points*) Describe the advantages and disadvantages of offering a phased retirement program from NOC's perspective.

ANSWER:

(b) (*3 points*) Compare and contrast the potential impacts of the following phased retirement schedules from NOC's perspective:

(i) 75% of full time during phased retirement

(ii) 25% of full time during phased retirement

ANSWER:

Gevrey enacts a law allowing for in-service distributions at age 62.

(c) (*3 points*) Describe the advantages and disadvantages of incorporating an in-service distribution option in the National Oil Pension Plan.

ANSWER:

4.

(*9 points*)

(a) (*4 points*) Explain the risks associated with cash balance plans from the perspective of the following:

(i) Plan sponsors

(ii) Plan participants

ANSWER:

(b) (*3 points*) Critique the use of the following assumptions in a cash balance plan:

(i) 100% of participants take a lump sum immediately upon termination or retirement

(ii) Age 62 single point retirement age

(iii) An interest crediting rate 50 basis points lower than the discount rate

ANSWER:

Company XYZ sponsors a cash balance plan. A participant will be retiring as part of a voluntary separation program in 2 years.

You are given the following information about the participant:

Current Cash Balance Account	\$150,000
Sum of Cash Balance Credits	\$135,000
Next Year Salary	\$75,000
Final Year Salary Increase	5%
Cash Balance Pay Credit	6%
Annuity Conversion Factor	10.5

- Pay credits are made at the end of the year.
- The plan uses actual return on plan assets to calculate interest credits each year.

4. Continued

(c) (*2 points*) Calculate the replacement ratio assuming an asset return of -15% in year 1 and 4% in year 2.

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

5.

(*8 points*) Company ABC sponsors a defined benefit pension plan and reports under U.S. Accounting Standard ASC 715 (ASC 715). The plan was improved for active members effective January 1, 2024.

You are provided the following information:

	As of January 1, 2024	As of December 31, 2024
Discount Rate	5.30%	4.50%
Expected Return on Assets	6.00%	6.00%
Projected Benefit Obligation	$695,000,000	$815,000,000
Market Value of Assets	$805,000,000	$795,000,000
2024 Service Cost (before interest)	$23,000,000	
2024 Expected Benefit Payments	$25,000,000	
2024 Expected Contributions	$22,000,000	
Timing of Benefit Payments and Contributions	Mid-Year	
Unrecognized (Gain)/Loss	$125,000,000	
Prior Service Cost/(Credit)	$33,000,000	
Amortization Method	10% corridor	
Average Future Working Lifetime	12	
Average Inactive Life Expectancy	20	

The Prior Service Cost was established effective January 1, 2024.

(a) (*3 points*) Calculate the 2024 Net Periodic Pension Cost under ASC 715.

Show all work.

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

(b) (*2 points*) Calculate the Accumulated Other Comprehensive Income as of December 31, 2024.

Show all work.

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

Company ABC offers a lump sum window to retirees with all payments made on December 31, 2024. You are given the following additional information:

Value of Lump Sum Payments	$233,500,000
Reduction in Projected Benefit Obligation	$200,000,000

5. Continued

(c) (*3 points*) Calculate the following:

(i) Revised 2024 Net Periodic Pension Cost

(ii) Funded status at December 31, 2024

(iii) Accumulated Other Comprehensive Income at December 31, 2024

Show all work.

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

6.

(*9 points*)

(a) (*3 points*) Analyze how the following affect benefit levels in a target benefit plan:

(i) Asset mix

(ii) Using a risk-free discount rate to value liability

(iii) Using a best estimate discount rate to value liability

ANSWER:

(b) (*2 points*) Describe the advantages and disadvantages of a "no-action range" in a target benefit plan where benefit adjustments, positive or negative, are not implemented.

ANSWER:

(c) (*4 points*) Describe the advantages and disadvantages of a public sector target benefit plan from the employer's perspective.

ANSWER:

7.

(*9 points*)

(a) (*3 points*) Describe the advantages and disadvantages of the following pension risk transfer strategies from the perspective of an employer:

(i) Annuity buy-in

(ii) Annuity buy-out

ANSWER:

(b) (*2 points*) Explain why an annuity buy-out premium may exceed the projected benefit obligation (PBO) under U.S. Accounting Standard ASC 715.

ANSWER:

(c) (*4 points*) Describe the advantages and disadvantages of adding a permanent lump sum option at retirement to a defined benefit pension plan from the perspective of the following:

(i) Employer

(ii) Plan participants

ANSWER:

8.

(*10 points*) You are provided with the following related to the most recent valuation of the pension plan for Company ABC at January 1, 2023:

Discount rate	6.00%
Expected return on assets for ASC 715	5.50%
Salary increase assumption	3.00%
Liability Duration	12
Service Cost Duration	20
Projected/Defined Benefit Obligations	$25,650,000
Market Value of Assets	$26,200,000
2023 Service Cost (before interest)	$670,000
2023 Expected Benefit Payments	$1,180,000
2023 Expected Contributions	$1,540,000
Unrecognized (Gain)/Loss under ASC 715	$2,200,000
Average Future Working Lifetime	14

Company ABC:

- reports under both International Accounting Standard IAS 19, Rev. 2011 (IAS 19) and U.S. Accounting Standard ASC 715 (ASC 715)
- uses a projection of the most recently completed valuation results for financial reporting
- ASC 715 amortization method: 10% corridor; amortized over average future working lifetime
- Market-related Value of Assets equals Fair Market Value of Assets under ASC 715

Assume benefit payments and contributions are paid midway through the year and increase each year by the salary increase assumption.

The following are the assumptions in effect for the plan under IAS 19 and ASC 715 at January 1, 2024:

Discount rate	4.30%
Expected Return on Assets for ASC 715	5.50%
Market Value of Assets	$24,300,000
Average Future Working Lifetime	13

8. Continued

(a) (*7 points*) Calculate the following:

(i) 2024 Defined Benefit Cost under IAS 19

(ii) 2024 Net Periodic Pension Cost (NPPC) under ASC 715

Show all work.

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

Company ABC is closing one of its plants, eliminating 30% of its workforce, effective December 1, 2024. Lump sum payments related to this event are not paid in 2024.

(b) (*3 points*) Describe how the values in part (a) would change for this scenario.

No calculations required.

ANSWER:

9.

(*6 points*)

(a) (*2 points*) Propose supplemental executive retirement plan provisions that plan sponsors can consider to address the following goals:

(i) Midcareer recruiting

(ii) Retention

Justify your response.

ANSWER:

Company ABC is recruiting an executive who is 8 years from retirement.

Company ABC is considering offering the executive an 8-year contract with one of the following options:

Option 1: Base salary of $650,000 with 60% target annual bonus paid each year

Option 2: Base salary of $700,000 with 0% target annual bonus plus:

- a total supplemental retirement benefit of $3,000,000, payable in 5 equal annual installments
- the benefit does not vest until retirement
- the benefit is not funded

(b) (*4 points*) Describe the advantages and disadvantages of the options from the perspective of:

(i) Company ABC

(ii) The executive

ANSWER:

10.

(*8 points*)

(a) (*3 points*) Describe three risks faced by a retiree in a capital accumulation plan.

ANSWER:

(b) (*3 points*) Critique the following decumulation strategies of a capital accumulation plan:

(i) Constant withdrawal amount

(ii) Dynamic withdrawal amount

(iii) Draw-to-target

ANSWER:

You are provided with the following information:

Member Information

Current age	55
Age at retirement	62
Service at retirement	7
Pensionable earnings at age 55	$100,000
Annual salary increase	2.0%

Defined Benefit Plan

Annual lifetime pension	0.75% of final 3-year average earnings multiplied by years of service
Early retirement reduction	0.25% per month prior to age 65

Defined Contribution Plan

Employee contributions	3.00% of pensionable earnings
Assumed annual rate of return	6.00%
Timing of contributions	Mid-year
Annuity factor at age 62	17

10. Continued

(c) (*2 points*) Calculate the required employer contribution rate under the defined contribution plan to provide the member with the same replacement ratio as a percentage of 3-year average earnings under the defined benefit plan.

Show all work.

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

****END OF EXAMINATION****