SOCIETY OF ACTUARIES

Retirement Plan Valuation

Exam RET 201

Date: Thursday, November 20, 2025

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This examination has 8 questions numbered 1 through 8 with a total of 50 points.

   The points for each question are indicated at the beginning of the question.

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.

2. The answer should be confined to the question as set.

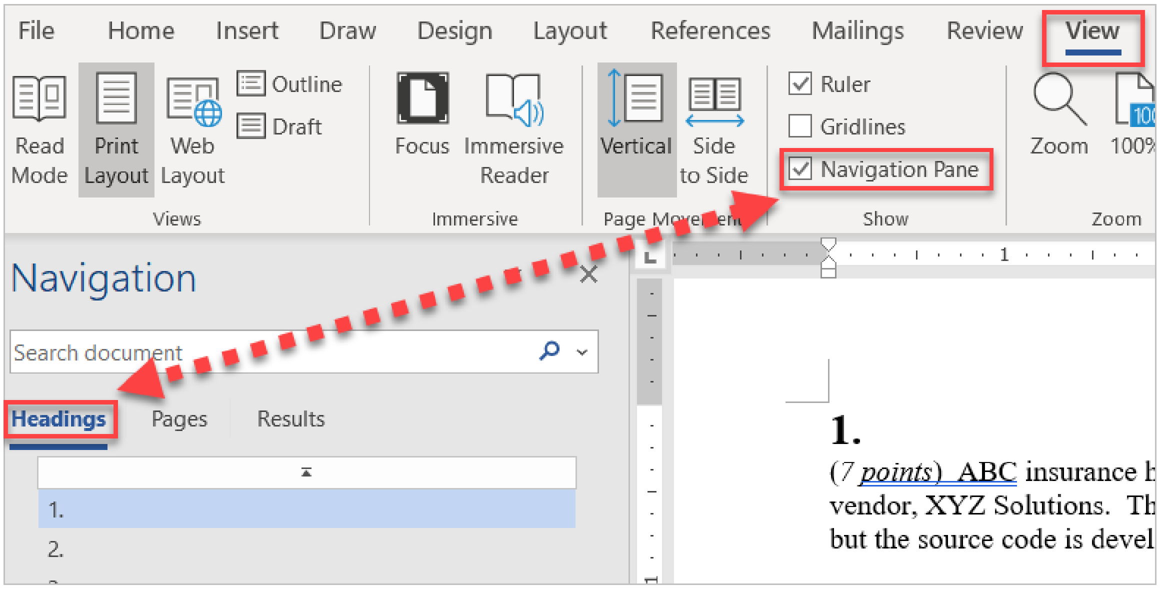
3. Prior to uploading your Word and Excel files, each file should be saved and renamed with your unique candidate number in the filename. To maintain anonymity, please refrain from using your name and use your candidate number instead.

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

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 all work” means
  - Calculation formulas must be used in the answer cells containing the work.
  - All work should be labeled.

1.

(*3 points*) You are provided with the following information for a defined benefit pension plan:

Year	**Spot Rate**	**Projected Cash Flow**
1	3.5%	2,500,000
2	4.0%	2,800,000
3	4.5%	3,900,000
4	5.0%	4,000,000
5	5.5%	5,300,000
6	6.0%	5,100,000

The effective rate of interest given the above spot rates and cash flows is 5.25%.

(a) (*2 points*) Calculate the estimated liability at an interest rate of 5.75% using the following methods:

(i) Modified Duration

(ii) Effective Duration

Show all work.

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

(b) (*1 point*) Describe the importance of convexity when estimating the liability.

Justify your response. No calculations required.

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

2.

(*8 points*)

(a) (*3 points*) Describe the considerations when selecting economic assumptions for public sector pension plans.

ANSWER:

(b) (*2 points*) Summarize the challenges that need to be considered when developing a funding policy for public sector pension plans.

ANSWER:

(c) (*3 points*) Compare and contrast funding policy objectives for a public sector pension plan and a private sector pension plan.

ANSWER:

3.

(*4 points*)

(a) (*1 point*) Describe when it is appropriate to use book value as an asset valuation method.

ANSWER:

Company ABC sponsors a defined benefit pension plan and uses the following asset valuation method:

- 6-year smoothed market value with delayed recognition of investment-related gains and losses
- The actuarial value of assets is subject to a corridor ranging from 90% to 105% of the fair market value of assets

(b) (*2 points*) Critique Company ABC's asset valuation method.

ANSWER:

(c) (*1 point*) Recommend two ways to reduce volatility when using a smoothed asset valuation method. Justify your response.

ANSWER:

4.

(*9 points*)

(a) (*4 points*) Compare and contrast the accounting treatment of an annuity buy-in transaction under the following accounting standards:

(i) International Accounting Standard IAS 19, Rev 2011 (IAS 19)

(ii) U.S. Accounting Standard ASC 715

ANSWER:

(b) (*2 points*) Describe three considerations for a plan sponsor deciding whether to pursue an annuity buy-in transaction.

ANSWER:

(c) (*3 points*) Describe the impact of an annuity buy-in transaction under IAS 19 where the premium paid is greater than the value of the covered defined benefit obligation (DBO) on the following:

(i) Fair Value of Assets

(ii) DBO

(iii) Other Comprehensive Income

(iv) Defined Benefit Cost recognized in Profit and Loss

ANSWER:

5.

(*8 points*) Company XYZ sponsors a defined benefit pension plan and reports under U.S. Accounting Standard ASC 715 (ASC 715).

You are provided with the following information as of January 1, 2025:

Projected Benefit Obligation:	
Active	$22,500,325
Inactive	$18,465,100
Fair Value of Assets	$38,315,000
Service Cost	$523,000
Discount Rate	5.25%
Expected Return on Assets	5.45%
2025 Expected Benefit Payments	$2,400,000
2025 Expected Contributions	$725,000
Unrecognized Prior Service Cost	$0
Unrecognized (Gains)/Losses	($9,543,300)
Amortization Method	10% corridor
Average Future Working Lifetime	14.0

(a) (*2 points*) Calculate the 2025 Net Periodic Pension Cost under ASC 715.

Show all work.

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

On January 1, 2025, Company XYZ amended the plan, effective immediately, to increase the flat dollar benefit amount from $50 to $55 per month per year of credited service for all active members and all years of credited service.

You are provided with the following additional information as of December 31, 2025:

Projected Benefit Obligation:	
Active	$27,099,000
Inactive	$16,732,000
Fair Value of Assets	$36,474,000
Discount Rate	5.25%
2025 Actual Benefit Payments	$2,750,000
2025 Actual Contributions	$775,000
Average Future Working Lifetime	13.5

5. Continued

Assume there are no changes to the expected contributions or expected benefit payments for fiscal year 2025.

(b) (*5 points*) Calculate the following under ASC 715:

(i) Revised 2025 Net Periodic Pension Cost

(ii) Accumulated Other Comprehensive Income at December 31, 2025

Show all work.

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

(c) (*1 point*) Describe how the treatment of the plan amendment would be different under International Accounting Standard IAS 19, Rev. 2011.

No calculations required.

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

6.

(*8 points*)

(a) (*1 point*) Describe what a hedge ratio of 14% means for a pension plan.

ANSWER:

(b) (*3 points*) Explain why a pension plan with a 100% hedge ratio could still experience volatility in its funded status.

ANSWER:

6. Continued

Company XYZ sponsors a defined benefit pension plan that is closed to new entrants. Current active members continue to accrue benefits. The funded status is 70%.

Company XYZ is proposing the following glide path strategy and administration framework:

Funded Status	**% Equity**	**% Fixed Income**
100%	0%	100%
90%	20%	80%
80%	40%	60%
70%	60%	40%
60%	80%	20%

One-way or two-way glide path	Company XYZ will re-risk portfolio if funded status declines
Frequency of monitoring (measurement date)	Biannually
Monitoring report	Available one week following measurement date
Asset/Liability study frequency	Every 3 years
Rebalancing date	15^{th} of the month following the measurement date
Plan contributions	Deposited into equity fund until the next monitoring report is completed

(c) (*4 points*) Critique Company XYZ's proposed glide path strategy and administration framework.

Justify your response.

ANSWER:

7.

(*5 points*) Company ABC sponsors a non-contributory defined benefit pension plan (DB Plan) with the following provisions:

Eligibility	Immediate
Vesting	Immediate
Normal Retirement Age	65
Early Retirement Age	55
Normal Retirement Benefit	1.8% of 3-year final average earnings multiplied by years of credited service
Normal Form	Life only
Early Retirement Reduction	Actuarial equivalence
Portability	No lump sum on termination or retirement

You are provided the following information regarding the actuarial assumptions:

Discount Rate	5.75% per year
Salary Increase Rate	3.25% per year
Decrement Timing	Beginning of year
Retirement Rate	100% at age 65
Termination Rates	10% each year prior to age 50, and 5% each year from ages 50 to 54
$\ddot{a}_{65}^{(12)}$	12.5
$\ddot{a}_{60}^{(12)}$	14.0

Information as of January 1, 2025 for the sole participant in the DB Plan:

Age	42
Credited Service	3 years
2025 Projected Salary	$200,000
2024 Earnings	$185,000
2023 Earnings	$172,000
2022 Earnings	$160,000

7. **Continued**

(a) (*4 points*) Calculate the DB Plan liability as of January 1, 2025 using the following cost methods:

(i) Unit Credit

(ii) Projected Unit Credit

Show all work.

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

(b) (*1 point*) Calculate the pension payable from the DB Plan assuming the member retires at age 60.

Show all work.

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

8.

(*5 points*) Compare and contrast the principles of financial economics to the standards of U.S. Accounting Standard ASC 715 with respect to pension plans.

ANSWER:

****END OF EXAMINATION****