RET 201 Model Solutions
November 2025

1. Learning Objectives:

3. The candidate will understand how to perform valuations and prepare disclosure information for retirement income plans under applicable accounting standards.

Learning Outcomes:

(3c) Demonstrate the sensitivity of financial measures to given changes in plan design.

Sources:

Duration and Convexity for Pension Liabilities, Pension Section News, Sep 2013

Commentary on Question:

Commentary listed underneath question component.

Solution:

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

(i) Modified Duration

(ii) Effective Duration

Show all work.

Commentary on Question:

Candidates struggled with part (a), especially with the modified duration calculation. Partial credit was awarded.

Refer to Excel spreadsheet for model solution.

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

Justify your response. No calculations required.

Commentary on Question:

Candidates generally understood the importance of convexity but most did not provide justification for their response (as instructed in the question).

Refer to Excel spreadsheet for model solution.

2. Learning Objectives:

2. The candidate will understand how to analyze/synthesize the factors that go into selection of actuarial assumptions used in pension valuations.

5. The candidate will understand the general principles applicable to the funding of retirement income plans and recommend a funding policy.

Learning Outcomes:

(2a) Evaluate appropriateness of current assumptions.

(2b) Describe and explain the different perspectives on the selection and development of assumptions, including financial economics.

(2c) Recommend appropriate assumptions and defend the selection.

(5b) Given a context, such as regulatory environment, plan asset composition, stakeholders' interests, sponsor goals, the candidate will be able to analyze and defend an appropriate funding policy for various types of retirement income plans, including:

- Single-employer plans
- Multi-employer plans
- Government-sponsored plans

Sources:

Selecting and Documenting Pension Assumptions Other Than Discount Rate, Investment Return, and Mortality, AAA, Jun 2023

Forecasting Investment Returns and Expected Return Assumptions for Pension Actuaries, AAA, Feb 2019

Risk Management and Public Plan Retirement Systems, AAA, Oct 2010

RET 201-118-25: CAPSA, Guideline No. 7, Pension Plan Funding Policy Guideline

RET 201-120-25: Funding Policy for the Public Sector Pension Plans

Commentary on Question:

Commentary listed underneath question component.

Solution:

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

2. Continued

Commentary on Question:
Candidates who did well on this subpart identified general considerations in the selection of economic assumptions as well as specific considerations in the selection of the 4 major economic assumptions: Expected Return on Investments, Salary Increase Assumption, Inflation, and Cost of Living Adjustments.

Economic assumptions directly influence contribution requirements, funding levels, and the perceived sustainability of the plan. Public plans must balance sustainability with long-term policy goals and political realities. When selecting economic assumptions for public sector pension plans, the following should be considered for each significant assumption.

Expected Return on Investments. Expected long-term returns should be based on plan's asset allocation, potential future changes in asset allocation, capital market assumptions, and historical performance.

Inflation. Inflation assumption affects salary growth, COLAs (cost-of-living adjustments), and investment returns and should align with inflation expectations used in other parts of the plans' financial modeling.

Salary Increase Assumption. Separate increases may be appropriate for employees in different industries, job classifications, or geographic locations and on different components of compensation. Consideration should be given to plan-specific and industry-specific historical data as well as anticipated changes.

Cost-of-Living Adjustments (COLAs). If benefits are indexed to inflation, COLA assumptions must match expected long-term inflation. If COLAs are discretionary, assumptions should reflect actual past practices or policy constraints.

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

Commentary on Question:
Generally, candidates struggled with this subpart. Most candidates did not fully explain the variety of challenges that public sector pension plans face. Most candidates successfully identified and explained two significant challenges: Operational Challenges and Multiple Principals with Conflicting Objectives.

There are various challenges that need to be considered when developing a funding policy for public sector pension plans including:

Sustainability vs. Affordability. Ensuring that the plan is sufficiently funded to meet future obligations without excessive reliance on future contributions while keeping contribution levels manageable for both employers and employees.

2. Continued

Contribution and Funded Status Volatility. Market fluctuations can cause large swings in required contributions. A sound funding policy must manage contribution volatility while maintaining adequate funding levels.

Evolving Plan Demographics. Aging populations, longer life expectancies, and a shrinking workforce can increase liabilities. While demographic factors in general change slowly over the short term, they are important drivers of long-term plan funding risk, particularly long-term longevity factors.

Multiple Principals with Conflicting Objectives. Public sector pension plans face a unique moral hazard because of multiple agents (often management)/principals (often plan members/owners) and conflicting objectives.

Intergenerational Equity. Ensuring that each generation pays a fair share for the benefits accrued during their working years.

Plan Maturity and Liquidity. The risks related to having assets readily available to fund benefit payments when needed requires effective liquidity management.

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

Commentary on Question:

Generally, candidates struggled with this subpart. Candidates were expected to fully compare and contrast the funding policy objectives for a public sector pension plan vs. a private sector pension plan – covering both similarities and differences between public and private sector.

There are many similarities and differences in the funding policy objectives for a public sector pension plan and a private sector pension plan. Benefit security, funding adequacy, and cost stability are generally objectives of both. The table below illustrates some of the differences.

2. Continued

Funding Policy Objective	Public Sector Pension Plan	Private Sector Pension Plan
Funding Drivers	Driven by budget cycles, political considerations, and public priorities. The government is responsible for determining the acceptable overall level of funding risk, for setting funding risk targets, for determining strategies to mitigate funding risks and for any funding deficit or surplus.	Driven by corporate financial strategy, earnings management, shareholder interests and the financial position of the sponsor and competing organizational demands for cash.
Funding Flexibility	Often more flexible in adjusting contributions; may defer funding during fiscal stress.	Required to fund annually to meet minimum applicable pension legislation standards; less flexibility. May have legislative limits and plan provisions with respect to utilization of surplus assets.
Risk Tolerance	Generally higher risk tolerance due to long horizons and government backing.	Generally lower risk tolerance; corporations are more risk-averse due to balance sheet and cash flow impacts.

3. Learning Objectives:

1. The candidate will understand how to apply/synthesize the methods and models used to value pension benefits for various purposes.

Learning Outcomes:

(1d) Analyze and communicate the impact on cost stability of a variety of asset valuation methods.

Sources:

Guidance on Asset Valuation Methods, CIA Revised Educational Note, Feb 2024

Asset Valuation Methods under ERISA, Pension Forum, Sep 2002, Ch. 1, 3, 4 and 5 (regulations will not be tested)

Survey of Asset Valuation Methods for Defined Benefit Pension Plans (pp. 5-6 only)

Commentary on Question:

Commentary listed underneath question component.

Solution:

(b) Describe when it is appropriate to use book value as an asset valuation method.

Commentary on Question:

Most candidates struggled with the book value asset valuation methodology.

Some assets do not have a readily ascertainable fair market value, or fair market value might not be relevant, even if known. In those instances, it may be appropriate to use the book value, which is the price at which the asset was purchased.

A book value cost method would be most likely used when the majority of a plan's assets are fixed income or contracts from a financial institution.

(b) 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

Critique Company ABC's asset valuation method.

3. Continued

Commentary on Question:
Most candidates did well on this part.

The proposed 6-year smoothed market value may not be appropriate because it defers recognition over a period of more than 5 years. Asset valuation methods that smooth investment gains and losses should be consistent with the length of typical economic cycles, and an asset valuation method that delays recognition of investment-related gains or losses over a period of more than five years would typically not be appropriate.

The proposed corridor contains bias because it is asymmetrical. A corridor is one method that an actuary can use to constrain the asset value to within a percentage of the market value to ensure that the smoothed value does not unduly deviate from market value.

Although the corridor is biased, there are certain circumstances where an asset valuation method may contain a measure of conservatism and that may be appropriate. The actuary should follow best practice and provide the rationale for the inconsistency.

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

Commentary on Question:
Most candidates did well on this part. To receive full credit, justification was required for each recommendation.

1) Introduce smoothing or increase the smoothing period used in calculating the smoothed value of assets. This would help smooth gains/losses from investment returns over a longer time period, which will keep the asset value more stable.

A more stable asset value will mean more stable funded status and more stable contribution requirements (all else being equal).

2) Increase the corridor around the market value of assets. Increasing the corridor range allows the actuarial value of assets to be further away from the fair market value of assets, which will result in greater stability when the market value increases/decreases materially between measurement dates.

4. Learning Objectives:

3. The candidate will understand how to perform valuations and prepare disclosure information for retirement income plans under applicable accounting standards.

Learning Outcomes:

(3a) Perform calculations in accordance with applicable accounting standards, including:

- Annual accounting valuations
- Plan curtailment and termination/windup
- Plan mergers, acquisitions and spinoffs

Sources:

RET201-106-25: Accounting for Buy-ins

Commentary on Question:

Question was trying to test the candidate's knowledge of buy-in transactions and its implication on accounting valuation results.

Solution:

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

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

(ii) U.S. Accounting Standards ASC 715

Commentary on Question part:

Candidates generally did well on part a, especially with respect to noting the similarities.

	IAS19	US GAAP
Similarities	Buy-in not considered settlement	
Balance sheet impact	- Asset reduced to reflect value of underlying DBO - No impact on the DBO	- The policy is a plan asset, measured at "fair value" - PBO unchanged, or potentially valued on the same basis as the policy value
P&L impact	- No immediate impact, however, lower asset value	- Possible asset loss to amortize if "fair value" less

	will feed through to a higher net interest charge in future years	than premium paid, plus impact on subsequent EROA

4. Continued

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

Commentary on Question part:
Candidates generally did well on part b with most naming at least 2 considerations.

1. What is the current interest rate environment, and is it a good time to enter into a buy-in transaction?
    a. Annuity market pricing
    b. Accounting implications on financial statement
2. Is management hoping to enter into a buy-in transaction with the intent of converting the contract to a buy-out in the near term?
3. What are the plan provisions? Does the plan offer indexed benefits? Pension increase in accordance with CPI or RPI?

(c) Describe the impact of an annuity buy-in transaction under IAS19 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 & Loss

Commentary on Question part:
Candidates generally did well on part c.

(i) FVA after the buy-in is set equal to the value of the DBO it covers
(ii) DBO is unchanged.
(iii) Since premium paid is greater than the value of DBO, the resulting loss in assets will flow through OCI
(iv) No immediate direct impact on defined benefit cost in the current year.

5. Learning Objectives:

3. The candidate will understand how to perform valuations and prepare disclosure information for retirement income plans under applicable accounting standards.

Learning Outcomes:

(3a) Perform calculations in accordance with applicable accounting standards, including:

- Annual accounting valuations
- Plan curtailment and termination/windup
- Plan mergers, acquisitions and spinoffs

Sources:

Pension Mathematics for Actuaries, Anderson, Arthur W., 3rd Edition, 2006, Ch. 2

RET201-105-25: IFRS and US GAAP: Similarities and Differences, Ch. 5 only

RET201-111-25: FASB Accounting Standards Codification Topic 715 (excluding all subsections ending in 00, 20, 60 & 65, and 20-S00, 20-S50, 20-S55, 20-S99, 30-55, 60-55, 70-55 & 80-55)

Commentary on Question:

Commentary listed underneath question component.

Solution:

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

Show all work.

Commentary on Question:

This part was very well done, many candidates received full credit.

Refer to excel spreadsheet for model solution.

(b) 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.

5. Continued

Commentary on Question:
Common mistakes include:

- *not reflecting the actual cash flows when calculating the PBO gains/losses*
- *not reflecting the change in the value of 10% corridor after amendment*
- *only including the unrecognized gains/losses but not the unrecognized prior service cost in the AOCI*

Refer to excel spreadsheet for model solution.

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

No calculations required.

Commentary on Question:
Many candidates recognized that the past service costs would be recognized immediately under IAS 19. The question was also looking for candidates to recognize the impact on the P&L under IAS 19 – some candidates mentioned immediate recognition in Defined Benefit Cost, which includes OCI as well.

Refer to excel spreadsheet for model solution.

6. Learning Objectives:

4. The candidate will recognize and appropriately reflect the role of retirement plan investments in managing plan sponsor risk and make recommendations.

Learning Outcomes:

(4b) Evaluate how factors including cash flow requirements, various plan designs and various economic environments affect setting investment strategy.

(4c) Describe strategies and techniques for asset/liability management.

(4d) Provide advice and analysis to plan sponsors regarding the mitigation of investment risks.

Sources:

RET 201-114-25: Liability-Responsive Asset Allocation, Russell Research

RET 201-116-25: Practical De-Risking Solutions: Asset Duration and Interest Rate Risk

RET 201-117-25: Pension Plan Immunization Strategies: How Close Can You Get?

Commentary on Question:

Part a of this question is meant to be a recall of what a hedge ratio means – candidates did fairly well on this. Part b is trying to test the candidate's understanding of the reasons why a perfect hedge is difficult – candidates were not as successful on part b. Part c is testing the candidate's knowledge of best practices for designing a glide path strategy based on the plan's funded status and design. Candidates generally did very well on part c.

Solution:

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

Model Solution:

A hedge ratio of 14% means when liabilities move by $100 due to a change in interest rates, assets will only move by $14.

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

Model Solution:

There are several reasons why a plan with a 100% hedge ratio could still experience funded status volatility including:

1. Curve mismatch – this occurs when the plan is not fully hedged against nonparallel movements in the yield curve.

6. Continued

2. Basis mismatch – the occurs when the yield used as a discount rate is based on an asset different from those in the investment portfolio (for example using Treasuries to hedge a liability measured with corporate bond yields.
3. Lack of diversification in the bonds, increasing the risk of downgrade or default which could result in a lower yield to the portfolio.
4. Retirement, mortality, or benefit option election experience different than expected.

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

Justify your response.

Model Solution:

1. May want to hold 10%-20% equity at 100% funded to diversify the portfolio and provide some returns to cover imprecise hedging. Should consider raising highest trigger point to 110% funded instead of 100% to allow for the possibility of adverse experience to have a little cushion. This is especially true since the plan is not frozen.
2. May want narrower trigger bands than 10% funded status bands to avoid large asset allocation shifts at a single point in time.
3. "one way" vs. "two way" movement. For example, "two-way" allows the opportunity to recover market drops (i.e., buying equities low), while it also increases transaction costs and slows the progression down the glide path.
4. Instead of putting contributions in the equity fund, would recommend putting directly into increasing the bond fund, or perhaps in proportion to the current FI/return seeking split in the glide path. The size of the contribution relative to the assets will influence the best approach.
5. Consider more frequent monitoring and quicker delivery of monitoring report to avoid missing opportunities
6. Since the asset/liability study is to be done once every 3 years, the capital market assumptions should at least be reviewed annually to see if the market outlook has changed enough to warrant further study.

7. Learning Objectives:

1. The candidate will understand how to apply/synthesize the methods and models used to value pension benefits for various purposes.

Learning Outcomes:

(1b) Perform periodic valuations of ongoing plans, calculating normal cost and actuarial accrued liability, using a variety of cost methods.

Sources:

Pension Mathematics for Actuaries, Anderson, Arthur W., 3rd Edition, 2006 – Chapter 2
RET201-103-25: Actuarial Equivalence Calculations

Commentary on Question:

Overall candidates performed well on this question.

Solution:

(c) 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.

Commentary on Question:

Many candidates received full or close to full credit for this part.

Refer to excel spreadsheet for model solution.

(d) Calculate the pension payable from the DB Plan assuming the member retires at age 60.

Show all work.

Commentary on Question:

About half of the candidates were able to correctly calculate the early retirement reduction based on actuarial equivalence.

Refer to excel spreadsheet for model solution.

8. Learning Objectives:

2. The candidate will understand how to analyze/synthesize the factors that go into selection of actuarial assumptions used in pension valuations.

Learning Outcomes:

(2b) Describe and explain the different perspectives on the selection and development of assumptions, including financial economics.

Sources:

Pension Actuary's Guide to Financial Economics and Pension Arbitrage Example, SOA/AAA, 2006

RET201-104-25: Use of Financial Economics in Pension Actuarial and Investment Practice

RET201-105-25: IFRS and US GAAP: Similarities and Differences (Chapter 5)

Commentary on Question:

This question required candidates to make a multitude of points covering different aspects of accounting disclosures. Many candidates responded with basic comparisons and did not elaborate with sufficient contrasting points.

Solution:

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

8. Continued

Some elements of financial economics have been incorporated into accounting standards and others have not.

Financial Economics	US Accounting Standards ASC 715
Measure the plan's assets at fair market value	Plan assets should be measured at fair market value for balance sheet recognition and disclosure purposes
Assets and liabilities appear directly on plan sponsor's balance sheet	Pension liabilities and pension assets do not appear directly on the plan sponsor's balance sheet
Measure the pension plan liability and service cost without salary projections	PBO and service cost are measured using projected salaries for most purposes
Use a discount rate that reflects the riskiness of cash flows	Liability discount rate generally consistent. However, expense includes EROA which is measured using return on assets assumption that includes a risk premium (inconsistent with financial economics)
Gains and losses and impact of plan amendments should be recognized immediately in other income	US accounting standards permit amortization of gains and losses using corridor approach, and plan amendments can be amortized over a period of time
Components of pension expense should be shown separately. For example, service cost would be a charge against operating income.	Pension expense is reported as a single number on the income statement