

Exam RETRPIRM

Date: Friday, November 4, 2022

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This examination has 6 questions numbered 1 through 6 with a total of 40 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.

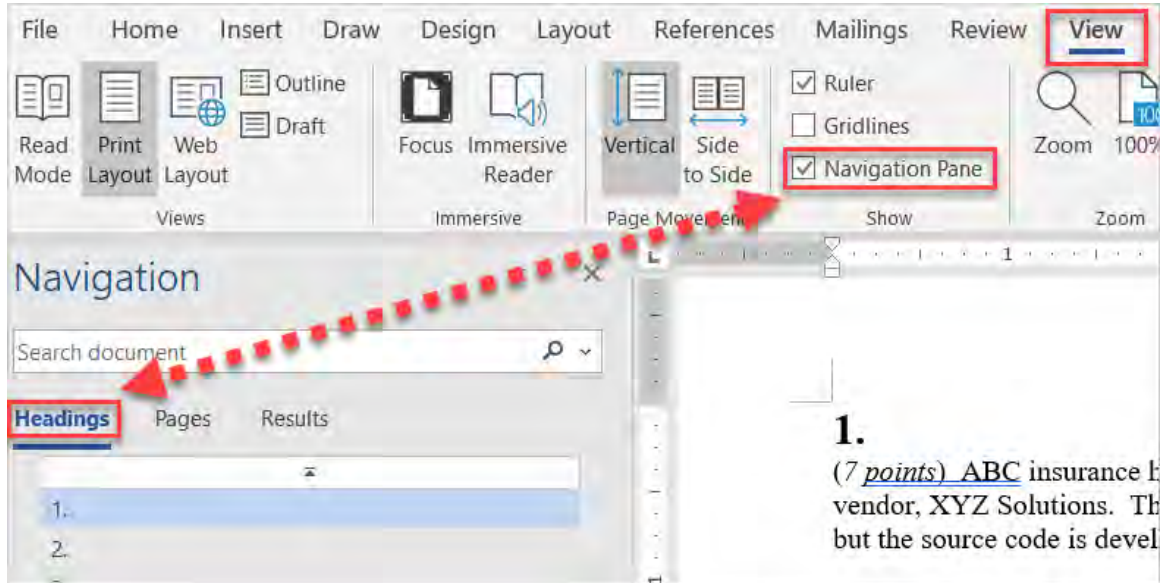
Written-Answer Instructions

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 five-digit candidate number in the filename.
4. The Word and Excel files that contain your answers must be uploaded before time expires.

Navigation Instructions

Open the Navigation Pane to jump to questions.

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



1.

(8 points) Company XYZ sponsors a defined benefit pension plan and is reviewing its liability-driven investment strategy.

You are given:

	Value	Effective Duration	Key rate durations				
			D1	D2	D3	D4	D5
Total Plan Liabilities	\$ 66,000,000	16	1.0	1.5	2.5	4.0	7.0
Current Portfolio	\$ 66,000,000	16	2.0	2.0	3.0	4.0	5.0

- (a) (2 points) Describe four uses of key rate durations.

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

- (b) (3 points) Calculate the effect of the following yield curve shifts, provided in basis points (bps), on the plan's financial position:

	D1	D2	D3	D4	D5
Shift 1	+50 bps	+50 bps	+50 bps	+50 bps	+50 bps
Shift 2	0 bps	+5 bps	+10 bps	+15 bps	+25 bps
Shift 3	-25 bps	-10 bps	0 bps	-10 bps	-25 bps

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

- (c) (3 points) Company XYZ is considering adjustments to its liability-driven investment strategy by investing in bonds with embedded options.

Describe the impact this may have on duration matching.

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

2.

(6 points)

- (a) (3 points) Compare and contrast the following strategies for a single employer pension plan:
- (i) An immunization investment strategy
 - (ii) Purchasing buy-in annuities

ANSWER:

- (b) (3 points) Describe three key considerations when designing an investment glide path strategy for a single employer pension plan.

ANSWER:

3.

(5 points)

(a) (3 points) Describe how addressing the following elements in a defined benefit governance structure can create value for stakeholders:

- (i) Investment beliefs
- (ii) Risk management
- (iii) Investment time horizon
- (iv) Mission
- (v) Agency issues

ANSWER:

(b) (2 points) Defined contribution plan governance should address the structural flaws that make these plans less efficient than defined benefit plans at delivering retirement financial security.

Describe three of these flaws.

ANSWER:

4.

(9 points)

- (a) (1 point) Recommend an approach to consolidating pension positions into a balance sheet analysis that is appropriate on an economic basis.

Justify your recommendation.

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

You have been hired by Company MNO to evaluate companies for a potential acquisition.

You are given:

- The US pension buy out index shows that the pension buy out liability is 110% of Projected Benefit Obligation (PBO).
- Company B has announced a pension buy out deal, priced in accordance with the buy-out index pricing, that will conclude before the potential acquisition.
- Company D utilizes a dynamic asset liability matching strategy to hedge its pension liability on a PBO basis with a strategy that hedges out 80% of the interest rate risk.

- (b) (4 points) Calculate the debt to equity ratios, long-term debt to equity ratios and asset to equity ratios for each Company by filling out the table in Excel.

(\$ millions)	Total Asset	Total Liability	Equity	Long-term debt	Pension asset	PBO
Company A	50.50	40.60	9.90	20.10	6.57	8.70
Company B	200.30	160.40	39.90	30.20	30.60	27.80
Company C	10.50	9.80	0.70	0.50	0.42	0.29
Company D	800.80	600.90	199.90	150.90	240.24	210.32
Company E	100.70	90.20	10.50	10.70	5.04	5.61

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

- (c) (1 point) Recommend the acquisition of either Company B or Company E, taking into account the risk involved for Company MNO.

Justify your recommendation.

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

4. Continued

The following is given for Company XYZ:

- Current equity allocation: 45%
- PBO: \$33.0 million
- Operating assets: \$52.1 million
- Pension asset: \$38.3 million
- Equity beta: 2.1
- Debt: \$35.0 million

- (d) (3 points) Calculate the change in equity capital and debt-to-equity ratio for Company XYZ if the pension plan's equity allocation were changed to 30%, 15% or 0%, by filling out the table in Excel.

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

5.

(7 points)

- (a) (4 points) Describe potential barriers associated with de-risking through the purchase of a group annuity buy-out.

ANSWER:

- (b) (3 points) Describe the advantages and disadvantages of group annuity buy-outs for:

- (i) Plan members; and
- (ii) Plan sponsors.

ANSWER:

6.*(5 points)*

- (a) *(3 points)* Critique the following elements of the investment policy statement provided below:

Plan Type	Closed and frozen defined benefit pension plan for a law firm
Plan Liability	30% actives 70% retirees
Plan Administrator	ABC Plan Administrators
Investment Consultant	Plan sponsor
Investment Managers	Different manager for each asset class
Monitoring	Quarterly reporting
Asset Allocation Policy Objectives	- Diversify within asset classes - Generate long-term investment returns - Pursue above-market returns in down markets
Performance Measurement	Measured in aggregate for the whole portfolio
Rebalancing	Rebalanced to target on a daily basis

Asset Allocation:

Asset Class	Target	Minimum	Maximum
Core fixed income	25%	20%	30%
Domestic Public Equity	35%	30%	40%
Private Equity	15%	10%	15%
Real Estate	15%	10%	15%
Cash	10%	5%	10%

ANSWER:

- (b) *(2 points)* Describe the fiduciary obligations when delegating pension investment services.

ANSWER:

****END OF EXAMINATION****