Level III Exam Questions

The CFA Level III exam introduces a type of essay question called constructed response to test your ability to apply judgment and also contains item set vignettes (you can learn more about the exam format and more here). These constructed response questions are open-ended. You must write your own answer; there are no options to choose from. Here is an example of a constructed response question related to fixed income.

Level III Constructed Response

Algonquin Enterprises is a US company that recently raised a substantial quantity of cash from the sale of a redundant factory site and would like to use this cash to retire a set of debt liabilities. Summary statistics for the liabilities, which range in maturity from five to eight years, are given in Exhibit 1-1:

Exhibit 1-1: Debt liabilities to be retired

Market value	$624 million
Duration	6.35
Convexity	53.56

Algonquin's treasury department is considering three possible methods that could be used: a bond tender offer, whereby the liabilities are repurchased on the open market, which they hope will lead to an upgrade from the company's current A- rating to AA. However, the tender offer would need to be at a price reflecting the improvement in rating; cash flow matching using government bonds, which would allow for defeasement of the assets and liabilities; or duration matching using high-quality corporate bonds.

A. Identify and explain one advantage and one disadvantage of the duration matching approach compared to the cash flow matching approach.

Three different portfolios of investment-grade corporate bonds, ranging in maturity from 3 years to 10 years, have been proposed for the duration matching approach. Each portfolio has a market value of $650 million, which will be adequate for the funding of the liabilities. Exhibit 1-2 shows relevant information for these portfolios:

Exhibit 1-2: Portfolios for Duration Matching Strategy

	Portfolio P	Portfolio Q	Portfolio R
Duration	6.09	6.37	6.11
Convexity	50.07	53.64	56.29

B. Identify and justify with two reasons which of the three portfolios (P, Q, or R) should be chosen if the duration matching strategy is adopted.

Algonquin is currently pursuing a contingent immunization strategy with another set of liabilities. These liabilities have a current market value of $78.96 million and a BPV of $36,374. The associated T-Note portfolio has a market value of $83.15 million and a BPV of $41,458. Additionally, 140 contracts of the five-year T-Note futures have been sold. The futures have a par value of $100,000 and an estimated BPV of $51.0745.

C. Assuming that any remaining duration gap is intentional, state with justification the likely view held by Algonquin's treasury department on the future five-year T-Note interest rate.

Level III Answers and Explanation

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A: The duration-matching approach is likely to be cheaper than the cash flow matching approach, partly because it will use corporate bonds, which are likely to pay higher yields than the government bonds used in the cash flow matching strategy. Also, the duration matching approach only hedges against a small parallel change in the yield curve and is thus less exact, hence riskier, than the cash flow matching approach, so should be cheaper. The extra risk is the main disadvantage of the duration matching approach.

B: Portfolio Q has the nearest duration to the liability, but we have to take account of the different values of assets and liabilities, so the correct target is to match BPVs.

The BPV of the liabilities is $624 million × 6.35 × 0.0001 = $396,240

For the portfolios:

BPVP = $650 million × 6.09 × 0.0001 = $395,850

BPVQ = $650 million × 6.37 × 0.0001 = $414,050

BPVR = $650 million × 6.11 × 0.0001 = $397,150

On the basis of duration matching, P and R would both be acceptable.

We also require that the convexity of the assets be no less than that of the liabilities (53.56). P has too low a level of convexity, meaning that portfolio R should be recommended.

C: The duration gap is the difference between the asset and liability BPVs.

Duration gap = $41,458 - $36,374 = +$5,084.

To close the duration gap, 5,084 ÷ 51.0745 = 100 (rounded) futures should be sold. Algonquin has sold 140 futures, thus has over-hedged the gap so that factoring in the futures:

Asset (net of futures) BPV < Liability BPV.

This is a position that will benefit from a rise in the five-year interest rate (assets will fall by less than liabilities, and the surplus will increase).