LEVEL III SESSION 1--GUIDELINE ANSWERS

QUESTION SET 1: ECONOMICS

1. **A**
   LOS: Volume 1, Learning Module 2, *Discuss approaches to setting expectations for fixed-income returns.*

   Volume 1, Learning Module 2, *Discuss risks faced by investors in emerging market fixed-income securities and the country risk analysis techniques used to evaluate emerging market economies.*

   The term premium typically does not pertain specifically to the bond issue. On the other hand, the credit premium refers to the additional expected return required to compensate for potential default losses, over and above the expected level of such losses.

   Country A is an emerging market, and based on the measurements given (real GDP growth rate below 4%, debt-to-GDP ratio above 75%, foreign exchange reserves below 100% of short-term debt), it has additional risk.

   Currency premium is not a component of the building block approach for fixed income.

   Reference: 2024, Capital Market Expectations, L3, Volume 1, Learning Module 2, Section 3, Forecasting Fixed Income Returns, pp. 70-78.

   2024, Economics, L3, Volume 1, Learning Module 2, Section 4, Risks in Emerging Market Bonds, pp. 78-80.

2. **B**
   LOS: Volume 1, Learning Module 2, *Discuss approaches to setting expectations for equity investment market returns.*

   Volume 1, Learning Module 2, *Discuss risks faced by investors in emerging market equity securities.*

   Grinold–Kroner model: $E(R_e) \approx D/P + (\%\Delta E - \%\Delta S) + \%\Delta P/E$

   D/P = Dividend yield
   $\%\Delta E$ = Expected nominal earnings growth return
   $\%\Delta S$ = Expected net share repurchases
   $\%\Delta P/E$ = Expected percentage change in the P/E ratio

   $= 3.0\% + [1.0\% - (-0.5\%)] + 0.2\% = 4.7\%$

The forecast horizon is not a component in the Grinold–Kroner model.

Reference: 2024, Economics, L3, Volume 1, Learning Module 2, Section 5, Forecasting Equity Returns, pp. 81-84.

3. **C**
   LOS: Volume 1, Learning Module 2, *Explain how economic and competitive factors can affect expectations for real estate investment markets and sector returns.*

   Of the property types listed, retail malls—low productivity has the highest cap rate, making it more sensitive to changes in the economy. With Country B's central bank focused on slowing down the economy and reducing credit availability overall, more procyclical property types are likely to experience a significant change in expected returns.

   $E(R_{re})$ = Cap rate + NOI growth rate − %ΔCap rate

   Reference: 2024, Economics, L3, Volume 1, Learning Module 2, Section 6, Forecasting Real Estate Returns, pp. 90-93.

4. **C**
   LOS: Volume 1, Learning Module 2, *Discuss methods of forecasting volatility.*

   The available return data for such asset classes as private real estate, private equity, and hedge funds generally reflect smoothing of unobservable underlying "true" returns. The smoothing dampens the volatility of the observed data and distorts correlations with other assets. Thus, the raw data tend to understate the risk and overstate the diversification benefits of these asset classes.

   Volatility clustering (periods of high and low volatility) is not unique to public or private market asset classes.

   Shrinkage estimation is utilized to combine information in sample data, the sample VCV matrix, with an alternative estimate, the target VCV matrix. It is not specific to private markets.

   Reference: 2024, Economics, Part 2: Forecasting Asset Class Returns, L3, Volume 1, Learning Module 2, Section 8, Forecasting Volatility, pp. 105-110.

QUESTION SET 2: FIXED INCOME

1. **C**
    LOS: Volume 2, Learning Module 5, Section 3, *Evaluate strategies for managing a single liability.*

    In order to benefit from the upward parallel shift, an investor should shift to a barbell-like portfolio to gain convexity (due to increased dispersion of cash flows compared to bullet-like portfolios).

    Answer A is incorrect: selling convexity will not be beneficial in case of yield curve movements (it would rather make sense to sell convexity in case of a stable curve). Answer B is incorrect for the same reason: bullet-like portfolios have less convexity compared to barbell-like ones and therefore are less beneficial in case of parallel shifts of the curve.

    Reference: 2024, Fixed Income, Volume 2, Learning Module 5, Section 3, Managing the Interest Rate Risk of a Single Liability, p. 299.

2. **A**
    LOS: Volume 2, Learning Module 5, Section 3, *Evaluate strategies for managing a single liability.*

    If the curve is expected to remain stable, selling convexity (for example, by buying callable bonds and mortgage-backed securities) in order to obtain higher yield can be beneficial.

    Answer B is incorrect as gaining additional convexity will not be beneficial in case of a stable curve. Answer C is incorrect as decreasing the portfolio's duration (which will be associated with purchasing lower-yield bonds) would be beneficial in case of expected interest rate increases.

    Reference: 2024, Fixed Income, Volume 2, Learning Module 5, Section 3, Managing the Interest Rate Risk of a Single Liability, p. 299.

3. **B**
    LOS: Volume 2, Learning Module 5, Section 4, *Compare strategies for a single liability and for multiple liabilities, including alternative means of implementation.*

    In the case of an increase in curvature—with the middle-term rates increasing and the shorter-term and longer-term rates decreasing—the barbell portfolio will increase in value, while the bullet portfolio will decrease in value (assuming the same duration for both portfolios). Answers A and C are incorrect, as both the laddered and bullet portfolios will underperform compared to the barbell portfolio in the described scenario.

4.   **C**
LOS: Volume 2, Learning Module 5, Section 4, *Evaluate liability-based strategies under various interest rate scenarios and select a strategy to achieve a portfolio's objectives.*

In the barbell portfolio, the funds are allocated at the beginning and the end of the timeline, resulting in a substantially higher dispersion of cash flows. Laddered portfolios tend to have relatively high convexity as well (but lower than barbell portfolios) since their cash flows are spread evenly over the timeline. Among the three types of portfolios, the bullet will have the lowest dispersion and, therefore, the lowest convexity.

QUESTION SET 3: PORTFOLIO MANAGEMENT – TRADING

Part A
LOS: Volume 5, Learning Module 2, *Evaluate the execution of a trade.*

Volume 5, Learning Module 2, *Evaluate a firm's trading procedures, including processes, disclosures, and record keeping with respect to good governance.*

Recommendation 1 is incorrect.

Best execution isn't solely about consistently securing the optimal execution price at the lowest cost for all trades; it also entails striking the right balance among the various objectives of the fund. Some of the criteria that should be used to evaluate best execution are as follows:
- Urgency of an order
- Characteristics of the securities traded
- Characteristics of the execution venues used
- Investment strategy objectives
- Rationale for a trade

Recommendation 2 is incorrect.

Volume-weighted average price (VWAP) is used to achieve fair and reasonable prices over the trading period throughout the day when there is market noise. Market noise represents intraday volatility with price distortions throughout the day.

Time-weighted average price (TWAP) is used to achieve fair and reasonable prices over the trading period throughout the day when there is no market noise. Time-weighted average price (TWAP) is used when managers wish to eliminate the volatility and exclude potential trade price outliers.

Reference: 2024, Trade Strategy and Execution, L3, Volume 5, Learning Module 2, Section 9, Evaluating Trade Execution, pp. 158-159.

2024, Trade Strategy and Execution, L3, Volume 5, Learning Module 2, Section 10, Trade Governance, pp. 163-165.

Part B
LOS: Volume 5, Learning Module 2, *Explain how trade costs are measured and determine the cost of a trade.*

Step 1: Calculate average price

Avg. price =

[(220,000 × $32.80) + (140,000 × $32.92) + (350,000 × $33.08) + (125,000 × $33.24)] / 835,000

= $33.00

Step 2: Calculate arrival cost.

Arrival cost (bps) = Side × [(Avg. Price – Arrival Price) / Arrival Price] × 10,000 bps

= 1 × [($33.00 - $32.75) / $32.75] × 10,000 bps

= 77.36 bps

Reference: 2024, Trade Strategy and Execution, L3, Volume 5, Learning Module 2, Section 9, Evaluating Trade Execution, p. 158.

Part C
LOS: Volume 5, Learning Module 2, *Explain how trade costs are measured and determine the cost of a trade.*

Implementation Shortfall (IS) = Execution Cost + Opportunity Cost + Fees

1. Execution Cost = $\Sigma\ s_j \times p_j - \Sigma s_j \times p_d$
   = [(−10,000 × $83.08) + (−40,000 × $82.93) + (−15,000 × $82.67) + (−5,000 × $82.23) − (−70,000 × $83.56)
   = $50,000
2. Opportunity Cost = $(S - \Sigma s_j)(p_n - p_d)$
   = (−100,000 − (−70,000)) × ($81.74 − $83.56)
   = $54,600

3. Commission is $0.01 per unit = 70,000 × $0.01 = $700

   No other fees are indicated.

IS = $50,000 + $54,600 + $700 = $105,300

The implementation shortfall is expressed in basis points as follows:

Implementation shortfall (bps) = [Implementation shortfall ($) / Total shares ($P_d$)] × 10,000 bps

= [$105,300 / (100,000 × $83.56)] × 10,000 bps

= 126 bps

Reference: 2024, Trade Strategy and Execution, L3, Volume 5, Learning Module 2, Section 8, Trade Cost Measurement, pp. 150-151.

QUESTION SET 4: FIXED INCOME

Part A
LOS: Volume 2, Learning Module 4, Section 7, *Discuss the use of leverage, alternative methods for leveraging, and risks that leverage creates in a fixed-income portfolio.*

The degree to which the leverage increases/decreases the return is proportional to the amount borrowed and the percentage by which the investment return differs from the cost of borrowing.

The formula for leveraged return is as follows:

$$R_p = R_I + \frac{V_b}{V_E}(R_I - R_B) \Rightarrow V_b = V_E \frac{(R_p - R_I)}{(R_I - R_b)}$$

By applying the formula, we can solve for V_b = $7.2 million.

$$\$12 \text{ million} \times \frac{(11\% - 8\%)}{(8\% - 3\%)} = \$7.2 \text{ million}$$

Reference: 2024, Fixed Income, Volume 2, Learning Module 4, Section 7, Leverage, p. 265.

Part B
LOS: Volume 2, Learning Module 4, Section 7, *Discuss the use of leverage, alternative methods for leveraging, and risks that leverage creates in a fixed-income portfolio.*

One way to achieve leverage via derivatives is with *futures contracts*, which allow counterparties to gain exposure to a large quantity of an underlying asset without having to transact in the underlying asset. Futures contracts can be purchased on a margin deposit, and the formula for futures leverage is: leverage = (notional value – margin) / margin.

Another derivative instrument that allows investors to gain leverage is a *swap agreement*. In an interest rate swap one counterparty (the fixed-rate payer) will gain short exposure to a fixed-rate bond and a long exposure a floating-rate bond, while the other counterparty (the fixed-rate receiver) will gain a long exposure to a fixed-rate bond and a short exposure to a floating-rate bond. Collateral will be the only initial capital required to enter into a swap position.

Reference: 2024, Fixed Income, Volume 2, Learning Module 4, Section 7, Leverage, p. 266.

Part C
LOS: Volume 2, Learning Module 4, Section 7, *Discuss the use of leverage, alternative methods for leveraging, and risks that leverage creates in a fixed-income portfolio.*

While both repurchase agreements and securities lending are the form of collateralized borrowing, these instruments have different mechanics.

Difference 1: In a repo agreement, a security owner agrees to sell a security for a specific price while simultaneously agreeing to repurchase this security at a predetermined future date (measured in days) and at a higher price.

For securities lending, the borrower, often a short seller, provides cash as collateral and pays the lender a fee based on a percentage of the borrowed securities' value. However, if the securities loan is initiated for financing purposes, the lending fee might be negative. In such cases, the securities lender compensates the borrower for utilizing their cash. Security lenders also earn an extra return by reinvesting the cash collateral.

Difference 2: The main purpose of a repo is short-term borrowing. The main purpose of securities lending is to facilitate short sales; albeit it can also serve for short-term borrowing. Moreover, repurchase agreements have a specified maturity date and time, while securities lending agreements can be open-ended.

Reference: 2024, Fixed Income, Volume 2, Learning Module 4, Section 7, Leverage, p. 267.

Part D
LOS: Volume 2, Learning Module 4, Section 7, *Discuss the use of leverage, alternative methods for leveraging, and risks that leverage creates in a fixed-income portfolio.*

"Haircut" is the amount by which the collateral's value exceeds the repo principal amount. Knowing the collateral value ($125 million) and the "haircut" (2%), we can calculate the principal amount: $125 million × (100% − 2%) or $122.5 million. Dollar interest would be equal to principal amount multiplied by the five-day repo rate:

$122.5 million × 3.5% × 5 / 360 = $59,549

Reference: 2024, Fixed Income, Volume 2, Learning Module 4, Section 7, Leverage, pp. 266-267.

QUESTION SET 5: DERIVATIVES

1.   **A**
      LOS: Volume 2, Learning Module 2, *Demonstrate the use of derivatives in asset allocation, rebalancing, and inferring market expectations.*

      Acme Generators' original allocation and target allocation details are presented below.

	Original Allocation	Original Portfolio	Target Allocation	Target Portfolio	Difference
Equity Portfolio	65%	$130,000,000	50%	$100,000,000	($30,000,000)
Bond Portfolio	35%	$70,000,000	50%	$100,000,000	$30,000,000

      To synthetically rebalance $30 million into the bond portfolio with a modified duration of 5.85 using Bond Index futures contracts, Acme Generators will need to buy:

      $$BPVHR = \{(BPV_T - BPV_P) / BPV_{CTD}\} \times \text{Conversion Factor}$$

      where:
      BPVHR = Basis Point Value Hedge Ratio
      BPV_T = Target Basis Point Value = 5.85
      BPV_P = Cash Basis Point Value = 0
      BPV_{CTD} = Cheapest to Deliver Bond's Basis Point Value = $99.72

      $$BPV_T = MDUR_T \times 0.01\% \times MV_P$$

      $$= 5.85 \times 0.0001 \times \$30,000,000 = \$17,550$$

      $$BPVHR = \{(BPV_T - BPV_P) / BPV_{CTD}\} \times \text{Conversion Factor}$$

      $$= \{(\$17,750 - 0) / \$99.72\} \times 0.9546$$

      $$= 168 \text{ contracts}$$

      Acme Generators should buy 168 Bond Index futures contracts to achieve the desired allocation.

      Reference: 2024, Derivatives, L3, Volume 2, Learning Module 2, Section 8, Using Derivatives in Asset Allocation, pp. 113-117.

2.   **B**
      LOS: Volume 2, Learning Module 2, *Demonstrate the use of derivatives in asset allocation, rebalancing, and inferring market expectations.*

Acme Generators' original allocation and target allocation details are presented below.

	Original Allocation	Original Portfolio	Target Allocation	Target Portfolio	Difference
Equity Portfolio	65%	$130,000,000	50%	$100,000,000	($30,000,000)
Bond Portfolio	35%	$70,000,000	50%	$100,000,000	$30,000,000

To synthetically rebalance $30 million out of the equity portfolio with a beta of 1.21, using Equity Index futures contracts, Acme Generators will need to sell:

$$N_f = \{(\beta_T - \beta_S)/\beta_f\} \times \{S/F\}$$

where:
N_f = number of Equity Index futures contracts
β_T = target beta (0)
β_S = stock beta (1.20)
β_f = futures beta (1.0)
S = market value of equity position ($30,000,000)
F = value of futures contract = $f_s \times m$
f_s = Equity Index futures contract price (12500)
m = multiplier (10)

No. of Equity Index futures to sell = {(0 − 1.20) / 1.0} × {$30,000,000 / (12500 × 10)}
= 288 contracts

Acme Generators should sell 288 Equity Index futures contracts to achieve the desired allocation.

Reference: 2024, Derivatives, L3, Volume 2, Learning Module 2, Section 8, Using Derivatives in Asset Allocation, pp. 113-117.

3. **A**
LOS: Volume 2, Learning Module 2, *Demonstrate how equity swaps, forwards, and futures can be used to modify a portfolio's risk and return.*

On the first settlement date:

1. Beryl Hedge Fund would receive the agreed-upon floating interest rate in the swap contract and
2. Beryl Hedge Fund would pay any gains on the QQQ position or receive any negative returns on the QQQ position.

Notional amount of the swap = 40% of $500 million = $200 million

Floating interest rate that Beryl Hedge Fund will receive is 4.50% – 0.50% = 4.00%

= $200 million × 4.00% × 180 / 360 = $4,000,000
Portfolio value at the first settlement date is $480 million.

Portfolio return = (480 – 500)/100 = – 4%

Portfolio value decreased by 4% by the first settlement date, so Beryl Hedge Fund will receive 4% of the equity swap's notional value.

= $200 million × 4% = $8 million = $8,000,000

Net amount received by Beryl Hedge Fund at the settlement date is

= $4,000,000 + $8,000,000 = $12,000,000

Reference: 2024, Derivatives, L3, Volume 2, Learning Module 2, Section 4, Managing Equity Risk, pp. 100-102.

4. **B**
   LOS: Volume 2, Learning Module 2, *Demonstrate how interest rate swaps, forwards, and futures can be used to modify a portfolio's risk and return*.

Gem Insurance will try to deliver the cheapest-to-deliver bond to maximize the difference between the amount received by selling the futures contract and amount paid to deliver the cheapest-to-deliver bond.

The cost of acquiring the bond = Market Price + Accrued Interest

Both market price and accrued interest are reflected in the dirty price. Hence the cost of acquiring the bond is

Bond Purchase Value = (Dirty Price / 100) × Contract Size

Principal Invoice Amount received to deliver each bond is calculated as

= (Futures Settlement Price / 100) × Conversion Factor × Contract Size

	Bond A	Bond B	Bond C
Cash Dirty Price	131.25	134.5	138.75
Bond Purchase Value	131,250	134,500	138,750
Futures Settlement Price	135.74	135.74	135.74
Conversion Factor	0.8925	0.9375	0.9525
Contract Size	100,000	100,000	100,000
Amount Received in Futures Contract	121,147.95	127,256.25	129,292.35
Amount Received – Bond Purchase Value	(10,102.05)	(7,243.75)	(9,457.65)

Based on the calculations in the table, the cheapest-to-deliver bond is Bond B, since the loss on delivering Bond B is less than the loss incurred with Bond A or Bond C.

Reference: 2024, Derivatives, L3, Volume 2, Learning Module 2, Section 2, Managing Interest Rate Risk with Forwards and Futures, pp. 90-92, Example 4.

QUESTION SET 6: EQUITY INVESTMENTS

Part A
LOS: Volume 3, Learning Module 5, *Analyze factor-based active strategies, including their rationale and associated processes.*

Possible drawbacks of the hedged portfolio approach are:
- Only the top and bottom quantiles are used.
- This approach assumes linearity between the factor and future stock returns. In fact, the payoff pattern between factor exposures and future stock returns is becoming increasingly non-linear.
- Portfolios under this approach tend to be concentrated—potentially in the same stocks for other portfolio managers implementing this approach for the same factor.
- Short sales may be impossible and/or expensive to execute.
- The result may not be a pure factor exposure as other risk factors are likely to be present.

Reference: 2024, Equity Investments, L3, Volume 3, Learning Module 5, Section 5, Factor-Based Strategies: Overview, pp. 245-246.

Part B
LOS: Volume 3, Learning Module 5, *Analyze factor-based active strategies, including their rationale and associated processes.*

Going long Q_1 and shorting Q_5 clearly does not deliver the greatest net return. Going long Q_2 and shorting Q_5 would produce a more favorable result.

Reference: 2024, Equity Investments, L3, Volume 3, Learning Module 5, Section 5, Factor-Based Strategies: Overview, pp. 246-247, Exhibit 9.

Part C
LOS: Volume 3, Learning Module 5, *Analyze factor-based active strategies, including their rationale and associated processes.*

The principal risk with going long the Q_2 quantile and shorting the Q_5 quantile is that this relationship between Q_2 and Q_5 may not persist into the future, thereby compromising the value of the strategy.

Reference: 2024, Equity Investments, L3, Volume 3, Learning Module 5, Section 5, Factor-Based Strategies: Overview, pp. 246-247.

Part D
LOS: Volume 3, Learning Module 5, *Describe active strategies based on statistical arbitrage and market microstructure.*

In successful pairs-trading that operates under the presumption of mean-reversion, the best pair would be the two securities demonstrating a strong historical correlation between them. In this case, it is the Stock C-Stock E pair. The least effective pair would be the two securities with a minimal historical correlation. In this case, it is the Stock B-Stock D pair, which exhibits a correlation of 0.0, indicating that the price movement of the pair tends to be random.

In any mean-reversion strategy, the biggest risk is that the pair continues to diverge or remains static instead of converging to historical levels.

Reference: 2024, Equity Investments, L3, Volume 3, Learning Module 5, Section 9, Other Active Strategies, pp. 262-265.

QUESTION SET 7: DERIVATIVES

Part A
LOS: Volume 2, Learning Module 2, *Demonstrate the use of volatility derivatives and variance swaps.*

The value of a variance swap at time *t* is given by the formula:

$$\text{VarSwap}_t = \text{Variance notional} \times PV_t(T) \times$$
$$\left\{ \frac{t}{T} \times \left[\text{RealizedVol}(0,t) \right]^2 + \frac{T-t}{T} \times \left[\text{ImpliedVol}(t,T) \right]^2 - \text{Strike}^2 \right\}$$

Volatility strike on existing swap = 21
Variance strike on existing swap = (Volatility)^2 = 21^2 = 441

Variance Notional = Vega Notional / (2 × Strike) = \$22,000,000/ (2 × 21) = \$523,810
Realized Volatility = 27^2 = 729
Implied Volatility = 23^2 = 529

t = 6 months
T = 12 months

Present value interest factor (PVIF) after six months (discounting for six months where the annual interest rate is 4.75%)

PV$_t$(T) = 1 / [1 + (4.75% × (6/12))] = 0.977

Var Swap = \$523,810 × 0.977 × {(6/12) × 729 + (6/12) × 529 – 441}

= \$523,810 × 0.977 × 188

= \$96,211,238.10 = \$96,211,238

Given that AJ Capital is long the variance swap, the mark-to-market value is positive for AJ Capital.

Reference: 2024, Derivatives, L3, Volume 2, Learning Module 2, Section 6, Volatility Derivatives: Variance Swaps, pp. 108-110, Example 12.

Part B
LOS: Volume 2, Learning Module 3, *Compare active currency trading strategies based on economic fundamentals, technical analysis, carry-trade, and volatility.*

Volume 2, Learning Module 3, *Describe how changes in factors underlying active trading strategies affect tactical trading decisions.*

Recommendation 1 is incorrect.

A long straddle is buying both an at-the-money (ATM) put and an ATM call. The ATM call option has a delta of +0.5 and ATM put option has a delta of –0.5.

Net delta of straddle = +0.5 – 0.5 = 0

Hence, the long straddle is delta neutral.

This delta-neutral long straddle is only profitable in *more volatile markets*, when either the put or the call go sufficiently in-the-money (ITM) to cover the upfront cost of the two option premiums paid. It is *not profitable* in a range bound volatile market.

The call option that is sufficiently ITM will have a delta closer to 1, and the option that is out-of-the-money (OTM) will have a delta closer to 0.

Similarly, the put option that is sufficiently ITM will have a delta closer to –1 and the option that is out-of-the-money (OTM) will have a delta closer to 0.

Statement 2 is correct.

During stable economic conditions or range bound volatility markets, traders want to hedge or speculate by taking net-short volatility positions. Most options expire out-of-the money, and the option writer retains the option premium without having to deliver the underlying currency pair.

During unstable economic conditions, traders often hedge their positions using net-long volatility options to avoid uncertainty.

Reference: 2024, Derivatives, L3, Volume 2, Learning Module 3, Section 8, Volatility Trading, p. 173.

Part C
LOS: Volume 2, Learning Module 3, *Describe the use of cross-hedges, macro-hedges, and minimum-variance-hedge ratios in portfolios exposed to multiple foreign currencies.*

Minimum-Variance Hedge Ratio

$h = \rho(R_{EUR}; R_{EUR/USD}) \times \{\sigma(R_{EUR}) / \sigma(R_{EUR/USD})\}$

$= 0.723 \times (1.87\%/2.16\%) = 0.626$

Hedge position = 0.626 × USD 897 million = USD 561.46 million

Hedge position = USD 561 million or USD 562 million

Chain Investments has a holding of USD 897 million. Chain Investments should short the USD in a forward contract to hedge the risk of exchange rate fluctuations.

The standard market quote for this currency pair is USD/EUR, where EUR is the base currency. To short USD, Chain Investments should buy EUR, hence a long position in the USD/EUR forward contract.

The minimum-variance hedge is to go long a USD/EUR forward contract with a notional size of USD 561.46 million (approximately USD 561 or 562 million).

Reference: 2024, Derivatives, L3, Volume 2, Learning Module 3, Section 11, Hedging Multiple Foreign Currencies, pp. 198-202, Example 8.

QUESTION SET 8: PORTFOLIO MANAGEMENT – PRIVATE WEALTH

Part A
LOS: Volume 4, Learning Module 5, *Describe an economic (holistic) balance sheet.*

Statement 1 is false. Economic balance sheets include human capital plus the present value of all future liabilities.

Statement 2 is false. Human capital has an inverse relationship with traditional financial assets.

Reference: 2024, Private Wealth Management, L3, Volume 4, Learning Module 5, Section 4, The Individual Balance Sheet, pp. 378-381.

Part B
LOS: Volume 4, Learning Module 5, *Recommend and justify appropriate strategies for asset allocation and risk reduction when given an investor profile of key inputs.*

Robyn Faun experienced stable income due to her specialization in a high-demand field. In contrast, Colin Faun faced significant income fluctuations because he worked for a startup that traded commodities. The inherent instability of startup companies, coupled with the cyclical nature of the commodity industry, could potentially affect Colin's future earnings."

Given that a significant source of income for the Fauns could be impacted by adverse commodity markets, a consideration should be made to adjust asset allocation recommendations accordingly, with a possible emphasis on low volatility bond-like investments.

Reference: 2024, Private Wealth Management, L3, Volume 4, Learning Module 5, Section 12, The Effect of Human Capital on Asset Allocation and Risk Reduction, pp. 430-431.

Part C
LOS: Volume 4, Learning Module 5, *Describe the basic elements of a life insurance policy and how insurers price a life insurance policy.*

At the first meeting with the Fauns at the start of their careers, life insurance would be appropriate as the clients have young children, a new mortgage, and the high present value of future earnings. The primary purpose of life insurance is to replace the present value of future earnings in the event of an untimely death.

The Fauns, now in their 70s and retired with significantly lower future earnings, have no debt, and their children are grown and financially independent. There is less of a need for life insurance; however, some may still be appropriate for estate planning.

Reference: 2024, Private Wealth Management, Volume 4, Learning Module 5, Section 7, Life Insurance Pricing, Policy Cost, and Amount Needed, p. 401.

Part D
LOS: Volume 4, Learning Module 5, *Discuss the relative advantages and disadvantages of fixed and variable annuities.*

An immediate fixed income annuity would be recommended based upon the following:

- The Fauns have expressed concern about fees, and the variable annuity will charge higher fees.
- The market outlook supports a flat and oscillating market, which could cause the growth of the variable annuity to be lower than expected.
- Interest rates are at recent highs with an expectation to decline, presenting a potential higher rate than would be available in the future.
- The Fauns are labeled as conservative investors, and the variable annuity carries more risk than the fixed annuity.

Reference: 2024, Private Wealth Management, L3, Volume 4, Learning Module 5, Section 10, Advantages and Disadvantages of Fixed and Variable Annuities, pp. 412-416.

QUESTION SET 9: FIXED INCOME

1. **C**
   LOS: Volume 2, Learning Module 4, Section 8, *Discuss differences in managing fixed-income portfolios for taxable and tax-exempt investors.*

   Long-term capital gains are typically taxed at a lower rate compared to short-term capital gains.

   Reference: 2024, Fixed Income, L3, Volume 2, Learning Module 4, Section 8, Fixed-Income Portfolio Taxation, p. 271.

2. **C**
   LOS: Volume 2, Learning Module 4, Section 8, *Discuss differences in managing fixed-income portfolios for taxable and tax-exempt investors.*

   Capital losses can typically be carried forward into the future but cannot generally be used to offset gains from other income sources.

   Reference: 2024, Fixed Income, L3, Volume 2, Learning Module 4, Section 8, Fixed-Income Portfolio Taxation, p. 271.

3. **B**
   LOS: Volume 2, Learning Module 4, Section 8, *Discuss differences in managing fixed-income portfolios for taxable and tax-exempt investors.*

   Taxes are typically paid on income that has been received (either realized capital gains or received coupon payments).

   A is incorrect as investors typically have control over the timing of capital gains. It is up to the investors' discretion to decide when to sell.

   Reference: 2024, Fixed Income, L3, Volume 2, Learning Module 4, Section 8, Fixed-Income Portfolio Taxation, p. 271.

4. **B**
   LOS: Volume 2, Learning Module 4, Section 8, *Discuss differences in managing fixed-income portfolios for taxable and tax-exempt investors.*

   While a tax-exempt investor will be motivated to sell Position A, they will do it due to their belief that, in the future, the market value of the position will go down and thus they will only be able to sell it at a lower price. A tax-exempt investor would be indifferent with regard to tax loss harvesting strategy as they do not pay taxes on capital gains. Meanwhile, a taxable investor will be motivated to sell Position B in order to realize capital losses, which can then be used to offset realized capital gains from other positions.

Reference: 2024, Fixed Income, L3, Volume 2, Learning Module 4, Section 8, Fixed-Income Portfolio Taxation, p. 272.

QUESTION SET 10: PORTFOLIO MANAGEMENT – INSTITUTIONAL

Part A
LOS: Volume 5, Learning Module 1, *Discuss common characteristics of institutional investors as a group.*

Five common defining characteristics of institutional investors include the following:
- Scale (i.e., asset size): The issue of scale is relevant for institutional investors because it may impact investment capabilities, access to investment strategies, liquidity, trading costs, and other key aspects of the investment process.
- Long-term investment horizon: Institutional investors generally have a long-term investment horizon that is often determined by a specific liability stream, such as   the benefit obligation of a pension plan, the spending policy of an endowment, or   other obligations.
- Regulatory frameworks: Institutional investors must contend with multiple regulatory frameworks that frequently vary by jurisdiction and complexity and are often evolving.
- Governance framework: Institutional investors typically implement their investment programs through an investment office that often has a clearly defined governance model.
- Principal–agent issues: As institutional investors manage assets on behalf of others, principal–agent issues must be recognized and managed appropriately.

Reference: 2024, Institutional Investors, L3, Volume 5, Learning Module 1, Section 1, Institutional Investors: Common Characteristics, p. 5.

Part B
LOS: Volume 5, Learning Module 1, *Describe considerations affecting the balance sheet management of banks and insurers.*

Shareholder Equity = Assets – Liabilities = A – L = \$34,000 – \$31,000 = \$3,000
(\$ millions)

Modified duration of equity:
Using D_E^* = Modified duration of equity, D_A^* = modified duration of assets, and D_L^* = modified duration of liabilities:

D_A^* = (value-weighted average of asset categories' modified durations)
= [(600)(0) + (24,000)(12.5) + (4,200)(2.0) + (5,200)(6.2)]/(600 + 24,000 + 4,200 + 5,200)
= (342,640) / (34,000) = 10.02

D_L^* = (value-weighted average of liability categories' modified durations)
= [(17,100)(16.5) + (8,700)(8.0) + (5,200)(6.2)]/(17,100 + 8,700 + 5,200)

= (383,990) / (31,000) = 12.39

$D_E{}^* = (A/E)D_A{}^* − (A/E − 1)D_L{}^*(\Delta i/\Delta y)$

   = (34000 / 3000)(10.02) – (34000 / 3000 – 1)(12.39)(0.86) = 3.45 ≈ 3.5 ± 0.1

Reference: 2024, Institutional Investors, L3, Volume 5, Learning Module 1, Section 20, Banks and Insurers: Balance Sheet Management and Investment Considerations, pp. 80-83.

Part C
LOS: Volume 5, Learning Module 1, *Describe considerations affecting the balance sheet management of banks and insurers.*

Using Equation 9 on p. 87,

$\sigma^2_{\Delta E/E} = (A / E)^2 \, \sigma^2_{\Delta A/A} + (A / E − 1)^2 \, \sigma^2_{\Delta L/L} − 2(A / E)(A / E − 1) \, \rho \, \sigma_{\Delta A/A} \, \sigma_{\Delta L/L}$

   = (34,000 / 3,000)^2(0.034)^2 + (34,000 / 3,000 – 1)^2 (0.042)^2 – 2(34,000/3,000)(34,000/3,000 – 1)(0.94)(0.034)(0.042) = 0.02244

So
$\sigma_{\Delta E/E} = \sqrt{(0.02244)}$ = 0.1498 = 14.98% ≈ 15.0% ± 0.1%

Reference: 2024, Institutional Investors, L3, Volume 5, Learning Module 1, Section 21, Banks and Insurers: Investment Strategies and Asset and Liability Volatility, pp. 87-88.

Part D
LOS: Volume 5, Learning Module 1, *Describe considerations affecting the balance sheet management of banks and insurers.*

Estimated effect of each fixed income category:
- Investment-grade: Estimated reduction in regulatory capital of (0.95)(1200) = $1,140 million due to exchange of investment-grade securities for mutual fund shares, since all such shares are excluded from regulatory capital by regulation

- Specialized: Estimated reduction in regulatory capital of (0.15)(4200) = $630 million due to exchange of the 15% of these assets that were qualifying for mutual fund shares that are excluded

- Variable annuities: No change in regulatory capital since the company does not bear any of the investment risk of these assets. They are associated with specific client accounts and are not available for the company to cover other liabilities.

Reference: 2024, Institutional Investors, L3, Volume 5, Learning Module 1, Section 19, Banks and Insurers: Investment Objectives, pp. 77-79.

2024, Institutional Investors, L3, Volume 5, Learning Module 1, Section 22, Banks and Insurers: Implementation of Portfolio Decisions, pp. 94-98.

QUESTION SET 11: EQUITY INVESTMENTS

1. **B**
    LOS: Volume 3, Learning Module 3, *Describe the roles of equities in the overall portfolio.*

    Best-in-class is a form of positive screening that attempts to identify the companies that score most favorably with regard to ESG-related risks and/or opportunities.

    Reference: 2024, Equity Investments, L3, Volume 3, Learning Module 3, Section 1, Introduction and the Role of Equities in a Portfolio, p. 152.

2. **C**
    LOS: Volume 3, Learning Module 3, *Describe how a portfolio manager's investment universe can be segmented.*

    Cheng has segmented her investment universe by economic activity by focusing on the luxury goods market subset of retail goods. This market-oriented approach targets the same demographic of wealthy and ultra-wealthy consumers.

    Cheng has not segmented her market by geography; she doesn't seek market exposure outside of the narrow niche that she has defined. Cheng has not restricted her investments to Europe with the exclusion of others. It just so happens that the major luxury brands are headquartered in Europe.

    Cheng has also not engaged in segmentation by size and style as her holdings are across company sizes/market capitalizations. Cheng also does not seek out mispriced securities, which would be necessary to impose a value tilt on the portfolio.

    Reference: 2024, Equity Investments, L3, Volume 3, Learning Module 3, Section 2, Equity Investment Universe, pp. 153-159.

3. **B**
    LOS: Volume 3, Learning Module 4, *Discuss considerations in choosing a benchmark for a passively managed equity portfolio.*

    Because Cheng is concerned with the possible adverse impact an out-of-favor brand might have on her performance, an equally weighted index tends to minimize single-stock concentration risk. Moreover, equally weighted indexes tend to randomize factor mispricings. Cheng does not seek out mispriced securities, but her portfolio performance will benefit as mispriced securities move toward their intrinsic values.

A price-weighted index is not practically used by portfolio managers because of the complexity of the index computation. A fundamentally weighted index assumes that market prices are mispriced, and the index attempts to capitalize on those mispricings. Cheng assumes that the securities in the luxury goods market are fairly priced, and she does not pursue mispricings.

Reference: 2024, Equity Investments, L3, Volume 3, Learning Module 4, Section 2, Index Construction Methodologies, pp. 184-189.

4. **C**
   LOS: Volume 3, Learning Module 4, *Compare factor-based strategies to market-capitalization-weighted indexing.*

Diversification-oriented strategies include equally weighted indexes, which are appropriate for Cheng, given her concern regarding single-stock risk. Equal weighting has a low amount of single-stock risk.

Return-oriented factor-based strategies (e.g., fundamentally weighted strategies) focus on capturing mispricings in the market, but Cheng assumes that the securities with which she deals are fairly priced and she does not look for mispriced securities.

Risk-oriented strategies with their focus on reducing downside volatility and overall portfolio risk have some merit, but there is no evidence that Cheng is interested in either volatility weighting or using a mean-variance optimizer.

Overall, diversification-oriented strategies appear to be a better fit with Cheng's current approach.

Reference: 2024, Equity Investments, L3, Volume 3, Learning Module 4, Section 2, Index Construction Methodologies, pp. 184-189.

LEVEL III SESSION 2--GUIDELINE ANSWERS

QUESTION SET 1: EQUITY INVESTMENTS

Part A
LOS: Volume 3, Learning Module 5, *Analyze bottom-up strategies, including their rationale and associated processes.*

The forward P/Es and PEGs of the companies and their sector P/Es are:

	P/E	PEG	Sector P/E
Company 1	$48/$4 = 12	12/3 = 4	12
Company 2	$28/$2 = 14	14/5 = 2.8	28
Company 3	$30/$10 = 3	3/–2 = neg.	15
Company 4	$36/$4 = 9	9/10 = 0.9	10

Company 2 has a forward P/E of 14, which is considerably lower than its sector's average and is a candidate for a relative value strategy. Companies 1 and 4 have forward P/Es, which are close to their sector averages, while Company 3 has a negative three-year EPS growth forecast.

Reference: 2024, Equity Investments, L3, Volume 3, Learning Module 5, Section 3, Bottom-Up Strategies, pp. 238-239, Example 2.

Part B
LOS: Volume 3, Learning Module 5, *Analyze bottom-up strategies, including their rationale and associated processes.*

Company 1's forward P/E is consistent with its sector P/E, suggesting that it is valued similarly to its industry average while having the greatest dividend yield of the four companies.

Reference: 2024, Equity Investments, L3, Volume 3, Learning Module 5, Section 3, Bottom-Up Strategies, pp. 238-239, Example 2.

Part C
LOS: Volume 3, Learning Module 5, *Analyze bottom-up strategies, including their rationale and associated processes.*

Company 3 has a forward P/E of only 3, which is far below its sector average and low in absolute terms. It is a possible candidate for a deep value strategy if unique company factors do not remove it from consideration. This company's situation and outlook should be closely researched and monitored.

Reference: 2024, Equity Investments, L3, Volume 3, Learning Module 5, Section 3, Bottom-Up Strategies, pp. 238-239, Example 2.

Part D
LOS: Volume 3, Learning Module 5, *Analyze bottom-up strategies, including their rationale and associated processes.*

Company 4 has the lowest PEG ratio of the companies, excluding Company 3 with its negative growth outlook, indicating a favorable valuation relative to growth.

Reference: 2024, Equity Investments, L3, Volume 3, Learning Module 5, Section 3, Bottom-Up Strategies, pp. 238-239, Example 2.

QUESTION SET 2: ETHICAL AND PROFESSIONAL STANDARDS

1.   **B**
      LOS: Volume 6, Learning Module 2, *Demonstrate a thorough knowledge of the CFA Institute Code of Ethics and Standards of Professional Conduct by interpreting the Code and Standards in various situations involving issues of professional integrity.*

      Not reporting his findings to his supervisor would be a violation of the Standards. This would be a misrepresentation of performance, and Orton should elevate the issue to his supervisor for further remediation.

      Reference: 2024, Ethical and Professional Standards, L3, Volume 6, Learning Module 2, Section 3, Standard I(A): Application of the Standard, pp. 25-26.

2.   **C**
      LOS: Volume 6, Learning Module 5, *Explain the meaning of "discretionary" in the context of composite construction and, given the description of the relevant facts, determine whether a portfolio is likely to be considered discretionary.*

      The identified portfolio may not be included in any composite because it is non-discretionary. A non–fee-paying account may be included in a composite, so long as it is discretionary and segregated.

      Reference: 2024, Ethical and Professional Standards, L3, Volume 6, Learning Module 5, Section 6, Composites: Qualifying Portfolios and Defining Investment Strategies, pp. 326-328.

3.   **B**
      LOS: Volume 6, Learning Module 2, *Demonstrate a thorough knowledge of the CFA Institute Code of Ethics and Standards of Professional Conduct by interpreting the Code and Standards in various situations involving issues of professional integrity.*

      By relying solely on positive reports from colleagues, Walton did not conduct sufficient, reasonable, and diligent efforts to determine that the research was sound. Third-party research can be relied upon, as long as due diligence is undertaken to ensure that it is objective and reasonably based.

      Reference: 2024, Ethical and Professional Standards, L3, Volume 6, Learning Module 2, Section 6, Standard V(A): Application of the Standard, pp. 135-138.

4. **C**
    LOS: Volume 6, Learning Module 2, *Demonstrate a thorough knowledge of the CFA Institute Code of Ethics and Standards of Professional Conduct by interpreting the Code and Standards in various situations involving issues of professional integrity.*

    Walton violated the Standards by mentioning specifically an area of the exam (interest-rate swaps) that was covered on the exam. General comments about how easy or tricky he thought parts of the exam were would not be considered a violation.

    Reference: 2024, Ethical and Professional Standards, L3, Volume 6, Learning Module 2, Section 61, Standard VII(A): Application of the Standard, pp. 174-176.

QUESTION SET 3: PORTFOLIO MANAGEMENT – ASSET ALLOCATION

1. **C**
   LOS: Volume 1, Learning Module 4, *Describe and evaluate the use of mean-variance optimization in asset allocation.*

   Resampled mean–variance optimization combines Markowitz's mean–variance optimization framework with Monte Carlo simulation and, all else equal, leads to more-diversified asset allocations. In contrast to reverse optimization, the Black-Litterman model, and constraints, resampled mean–variance optimization is an attempt to build a better optimizer that recognizes that forward-looking inputs are inherently subject to error.

   Reference: 2024, Asset Allocation, L3, Volume 1, Learning Module 4, Section 6, Adding Constraints beyond Budget Constraints, Resampled MVO and Other Non-Normal Optimization Approaches, pp. 221-222.

2. **A**
   LOS: Volume 1, Learning Module 4, *Explain absolute and relative risk budgets and their use in determining and implementing an asset allocation.*

   Volume 1, Learning Module 4, *Describe how client needs and preferences regarding investment risks can be incorporated into asset allocation.*

   Although its name suggests that risk budgeting is all about risk, risk budgeting is really using risk in relation to seeking return. The goal of risk budgeting is to maximize return per unit of risk—whether overall market risk in an asset allocation setting or active risk in an asset allocation implementation setting.

   Reference: 2024, Asset Allocation, L3, Volume 1, Learning Module 4, Section 8, Short-Term Shifts in Asset Allocation, pp. 340-342.

3. **C**
   LOS: Volume 1, Learning Module 5, *Recommend and justify a liability-relative asset allocation.*

   All of the three listed liability-relative approaches are appropriate for conservative investors (investors who are more interested in protecting the surplus than growing their assets). However, integrated asset–liability portfolios are the only listed approach that can handle multiple periods.

   Reference: 2024, Asset Allocation, L3, Volume 1, Learning Module 4, Section 12, Approaches to Liability-Relative Asset Allocation, pp. 249-250, Exhibit 31, Example 8.

4. **C**

   LOS: Volume 1, Learning Module 5, *Discuss factors affecting rebalancing policy.*

   Volatility of the rest of the portfolio is inversely related to optimal corridor width. The higher the volatility, the narrower is the optimal corridor. Higher volatility makes large divergences from the strategic asset allocation more likely.

   Transaction costs and correlation with the rest of the portfolio are both positively related to optimal corridor width.

   Reference: 2024, Asset Allocation, L3, Volume 1, Learning Module 4, Section 20, Portfolio Rebalancing in Practice, p. 276, Exhibit 48.

QUESTION SET 4: FIXED INCOME

Part A
LOS: Volume 2, Learning Module 5, Section 4, *Evaluate liability-based strategies under various interest rate scenarios and select a strategy to achieve a portfolio's objectives.*

To fully hedge the portfolio, the manager needs to achieve BPV_P of 0.

$BPV_P = MDUR_P \times 0.01\% \times MV_P => \$252mm \times 7 \times 0.01\% = \$176,400$

$BPV_{CTD} = MDUR_{CTD} \times 0.01\% \times MV_{CTD} => 5.5 \times 0.01\% \times \$95.5 / \$100 \times 100,000 = \$52.53$

BPV hedge ratio $= -BPV_p / BPV_{CTD} \times CF => \$176,400 / \$52.53 \times 0.97$
= 3,258 futures contracts (rounded up) required to sell in order to fully hedge the portfolio.

Reference: 2024, Fixed Income, Volume 2, Learning Module 5, Section 4, Managing the Interest Rate Risk of Multiple Liabilities, pp. 317-320.

Part B
LOS: Volume 2, Learning Module 5, Section 4, *Evaluate liability-based strategies under various interest rate scenarios and select a strategy to achieve a portfolio's objectives.*

$BPV = MDUR \times 0.01\% \times MV$

BPV for the liabilities: $\$82.4$ million $\times 5.10 \times 0.01\% = \$42,024$
BPV for the assets: $\$77.7$ million $\times 4.20 \times 0.01\% = \$32,634$

Reference: 2024, Fixed Income, Volume 2, Learning Module 5, Section 4, Managing the Interest Rate Risk of Multiple Liabilities, p. 319.

Part C
LOS: Volume 2, Learning Module 5, Section 4, *Evaluate liability-based strategies under various interest rate scenarios and select a strategy to achieve a portfolio's objectives.*

As modified duration (as well as the BPV metric) of the firm's liability is 5.1, which is greater than the duration of 4.2 of the bond portfolio used for the immunization purposes, Rios needs to buy bond futures in order to gain additional exposure to interest rates.

Number of futures = (BPV$_{liabilities}$ − BPV$_{assets}$) / BPV$_{futures}$ => ($42,024 − $32,634) / $88.12 = 107 futures contracts (rounded up to the nearest integer) required to buy to close the duration gap.

Reference: 2024, Fixed Income, Volume 2, Learning Module 5, Section 4, Managing the Interest Rate Risk of Multiple Liabilities, p. 319.

QUESTION SET 5: ETHICAL AND PROFESSIONAL STANDARDS

1.   **A**
     LOS: Volume 6, Learning Module 2, *Recommend practices and procedures designed to prevent violations of the Code and Standards.*

     Members and candidates may show past performance of funds managed at a prior firm as part of a performance track record. It is required that the necessary disclosures are made, outlining where the performance took place and the person's specific role in achieving that performance.

     Reference: 2024, Ethical and Professional Standards, L3, Volume 6, Learning Module 2, Section 29, Standard III(D): Application of the Standard, pp. 101-102.

2.   **C**
     LOS: Volume 6, Learning Module 4, *Determine whether an asset manager's practices and procedures are consistent with the Asset Manager Code.*

     The chief compliance officer should report directly to the CEO or board of directors, not the CIO.

     Records may be stored in either digital or paper form. Review by independent third parties does not violate the Code of Conduct.

     Reference: 2024, Ethical and Professional Standards, L3, Volume 6, Learning Module 4, Section 29, Appendix 6:D. Risk Management, Compliance and Support,   pp. 288-291.

3.   **A**
     LOS: Volume 6, Learning Module 2, *Demonstrate a thorough knowledge of the CFA Institute Code of Ethics and Standards of Professional Conduct by interpreting the Code and Standards in various situations involving issues of professional integrity.*

     Trent's approach to allocating shares is a violation because he is treating his friend's accounts differently by initially withholding allocating to them. As fee-paying clients, they are entitled to the same treatment as any other client.

     Reference: 2024, Ethical and Professional Standards, L3, Volume 6, Learning Module 2, Section 56, Standard VI(B): Application of the Standard, p. 167.

4.   **C**
     LOS: Volume 6, Learning Module 2, *Explain requirements of the GIPS standards with respect to presentation and reporting.*

A core element of a GIPS Composite Report is composite and benchmark annual (not quarterly) returns for all years.

Reference: 2024, Ethical and Professional Standards, L3, Volume 6, Learning Module 5, Section 8, Presentation and Reporting Requirements for Composites, pp. 333-334.

QUESTION SET 6: PORTFOLIO MANAGEMENT – PERFORMANCE EVALUATION

1. **A**
    LOS: Volume 5, Learning Module 3, *Calculate and interpret the Sortino ratio, the appraisal ratio, upside/downside capture ratios, maximum drawdown, and drawdown duration.*

    The upside capture ratio is calculated by taking the geometric average of the positive returns for both the portfolio and the benchmark. The ratio is the geometric average of the portfolio over the geometric average of the benchmark.

    The downside capture ratio is calculated by taking the geometric average of the negative returns for both the portfolio and the benchmark. The ratio is the geometric average of the portfolio over the geometric average of the benchmark.

    The capture ratio is the upside capture divided by the downside capture.

	Performance		Upside Return		Downside Return	
t	Fund	Benchmark	Fund	Benchmark	Fund	Benchmark
1	1.6%	2.0%	1.6%	2.0%	–	–
2	–1.3%	–1.5%	–	–	–1.3%	–1.5%
3	2.0%	2.5%	2.0%	2.5%	–	–
4	1.1%	1.2%	1.1%	1.2%	–	–
5	–2.0%	–3.0%	–	–	–2.0%	–3.0%
6	1.5%	1.6%	1.5%	1.6%	–	–
					–	
Geometric Average			1.55%	1.83%	1.65%	–2.25%

    Upside Capture   (1.55% / 1.83%) = 84.7%

    Downside Capture (–1.65% / –2.25%) = 73.3%

    Capture Ratio / Return Profile   (84.7% / 73.3%) = 1.16 > 1 = Convex

    A capture ratio greater than 1 indicates positive asymmetry or a convex return profile.

    Reference: 2024, Portfolio Performance Evaluation, Level 3, Volume 5, Learning Module 3, Section 11, Performance Appraisal: Capture Ratios and Drawdowns, pp. 244-245, Exhibit 18.

2. **B**
    LOS: Volume 5, Learning Module 3, *Describe problems that arise in benchmarking alternative investments.*

Only Statement 2 is correct. Private equity investors typically calculate an IRR based on the cash flows since the inception of the investment and the ending valuation of the investment.

Statement 1 is incorrect. Hedge funds do not represent a separate asset class. The characteristics of hedge funds make it clear that broad market indexes are unsuitable as hedge fund benchmarks.

Reference: 2024, Portfolio Performance Evaluation, Level 3, Volume 5, Learning Module 3, Section 9, Benchmarking Alternative Investments, pp. 234- 236.

3.   **C**
      LOS: Volume 5, Learning Module 3, *Discuss considerations in selecting a risk attribution approach.*

Answer C is correct. Top-down approaches focus first on macro decisions, such as allocations to economic sectors, and then on security selection within sectors.

Answer A and Answer B are appropriate for bottom-up investment decision-making processes.

Reference: 2024, Portfolio Performance Evaluation, Level 3, Volume 5, Learning Module 3, Section 5, Risk Attribution, p. 215, Exhibit 9.

4.   **C**
      LOS: Volume 5, Learning Module 3, *Interpret the output from fixed income attribution analyses.*

Based on the overweight of high yield (45% versus 30% benchmark weight), it is likely the firm expected credit spreads to narrow.

B is incorrect. High-yield investment spreads are a combination of interest rate expectations and default rates. Given the higher default rates for high-yield bonds and the overweight versus the benchmark, it is most likely that the firm expected default rates to fall.

A is incorrect. Given that the portfolio has a higher duration than the benchmark, (8.17 compared with 6.99 for the benchmark), the firm most likely expected interest rates to fall.

Reference: 2024, Portfolio Performance Evaluation, Level 3, Volume 5, Learning Module 3, Section 4, Fixed Income Attribution, pp. 210-211, Exhibit 6.

QUESTION SET 7: PORTFOLIO MANAGEMENT – PRIVATE WEALTH

Part A
LOS: Volume 4, Learning Module 3, *Evaluate a private client's risk tolerance.*

Risk tolerance questionnaires require significant judgment on the part of the wealth manager. They are an imperfect measure of risk tolerance but can be used as a part of the process. Hackett's answers input in the system can be subjective, and the system selecting the objective solely based upon the questionnaire might not have considered all the appropriate factors.

It is unclear whether risk tolerance questionnaires are predictive of investor behavior. Recommending an investment or asset allocation for a client based upon the questionnaire requires significant judgment on the part of a wealth manager. In fact, academic studies indicate a high degree of subjectivity in the client questionnaire approach. This subjectivity increases the potential for the wealth manager's own views on risk to become an influential factor in making investment decisions for a client. Other studies demonstrate how the structuring of questions affects investor responses. For example, presenting a loss in either percentage or dollar terms can lead to different responses from the same individual. Similarly, a question that involves a small dollar loss on a small portfolio may generate a different response than a question involving a large dollar loss on a large portfolio, even if the percentage losses are the same.

Reference: 2024, Private Wealth Management, L3, Volume 4, Learning Module 3, Section 4, Private Client Risk Tolerance, pp. 213-215.

Part B
LOS: Volume 4, Learning Module 3, *Discuss the parts of an investment policy statement (IPS) for a private client.*

Hackett has upcoming expenses for his children's education and possible vacation house. In addition, the client is nearing retirement and may need to withdraw funds in order to transition into retirement.

Reference: 2024, Private Wealth Management, L3, Volume 4, Learning Module 3, Section 8, Investment Policy Statement, p. 229.

Part C
LOS: Volume 4, Learning Module 3, *Evaluate the success of an investment program for a private client.*

Brokerage	Allocation	Expected Return		Actual Return
Large Cap Equity	37.5%	8.0%		10.0%
Small/Mid Cap Equity	7.5%	10.0%		11.0%
Int. Developed Equity	20.0%	13.0%		14.0%
Corporate Bonds	20.0%	5.0%		3.0%
Government Bonds	15.0%	3.0%		1.0%
Total Portfolio		7.80%		8.13%

Expected return = 0.375 × 8.0 + 0.075 × 10.0 + 0.20 × 13.0 + 0.20 × 5.0 + 0.15 × 3.0 = 7.80%

Actual return = 0.375 × 10.0 + 0.075 × 11.0 + 0.20 × 14.0 + 0.20 × 3.0 + 0.15 × 1.0 = 8.13%

The equity segments have outperformed fixed income over this period, and although fixed income has underperformed, the overall portfolio has outperformed its expected return target.

Reference: 2024, Private Wealth Management, L3, Volume 4, Learning Module 3, Section 12, Evaluating the Success of an Investment Program, pp. 244-246.

Part D
LOS: Volume 4, Learning Module 3, *Discuss how levels of service and range of solutions are related to different private clients.*

Warner's recommendation to bring another colleague from the high-net-worth department can offer Hackett additional services and options. With Hackett's increase in wealth, estate planning needs, concentrated stock, and retirement all might benefit from additional customized portfolios offered to the mass affluent segment.

Reference: 2024, Private Wealth Management, L3, Volume 4, Learning Module 3, Section 14, Private Client Segments, pp. 249-250.

QUESTION SET 8: ALTERNATIVE INVESTMENTS

Part A
LOS: Volume 4, Learning Module 2, *Discuss approaches to asset allocation to alternative investments.*

Any one of the following approaches along with its description would receive credit.

- Monte Carlo simulation. Monte Carlo simulation may be used to generate return scenarios that relax the assumption of normally distributed returns. A simulation can be applied to estimate the long-term risk profile and return potential of various asset allocation alternatives. In particular, McGowen can evaluate whether various asset allocation alternatives would satisfy the investor's ultimate investment objectives.

- Optimization techniques. Mean–variance optimization (MVO) often over-allocates to alternative asset classes. This is partly due to underestimating risks stemming from infrequent or outdated pricing and the inherent assumption that returns follow a normal distribution. McGowen may address this bias toward alternatives by establishing limits on the allocations to alternatives. An optimization method such as mean–CVaR optimization, which can incorporate downside risk or take into account skew, may be used to enhance the asset allocation process.

- Risk factor-based approaches. Risk factor-based approaches to alternative asset allocation can be applied to develop more robust asset allocation proposals.

Reference: 2024, Alternative Investments, L3, Volume 4, Learning Module 2, Section 9, Asset Allocation Approaches and Statistical Properties and Challenges, pp. 141-142.

Part B
LOS: Volume 4, Learning Module 2, *Discuss the importance of liquidity planning in allocating to alternative investments.*

Below is a comprehensive calculation of the projected NAV at the end of next year.

The expected NAV at the end of next year is $35,753,200. The expected distribution at the end of this year is $13.56 million [($40 million × 1.13) × 30%]. The NAV at the end of next year is, therefore, ($40 million × 1.13) × (1 − 0.30) × 1.13 = $35,753,200.

Reference: 2024, Alternative Investments, L3, Volume 4, Learning Module 2, Section 13, Liquidity Planning, Example 8.

Part C
LOS: Volume 4, Learning Module 2, *Discuss considerations in monitoring alternative investment programs.*

Any two of the following issues along with their descriptions would receive credit.

- *Style drift*: Fund documents often give managers wide latitude as to their investment options and parameters, but it is incumbent upon the investor to understand where the fund manager has a competitive advantage and skill and confirm that the investments being made are consistent with the manager's edge.
- *Risk management*: The investor should understand the manager's risk management philosophy and processes and periodically confirm that the fund is abiding by them. Where a fund makes extensive use of leverage, a robust risk management framework is essential.
- *Client/asset turnover*: A critical part of the ongoing due diligence process should include a review of clients and assets. A significant gain or drop in either may be a sign of an underlying problem. An unusual gain in assets could make it difficult for the investment professionals to invest in suitably attractive investments, potentially handicapping future performance. Conversely, significant client redemptions may force the money manager to sell attractive assets to raise cash. This could hurt the returns of non-redeeming clients and/or leave the remaining clients with illiquid holdings that might make it difficult for them to redeem in the future.
- *Client profile*: Investors will want to gauge the profile of the fund manager's other clients. You may have a strong conviction in a money manager's skills, but the actions of others may affect your ability to reap the benefits of those skills. If many other clients elect to redeem, the manager may invoke the gates allowed by the fund's documents or, at the extreme, liquidate the fund at what might be the worst possible moment. Even if a money manager weathers massive outflows, profitability and the ability to retain key talent may be at risk.
- *Service providers:* Investors will want to ensure that the fund manager has engaged independent and reputable third-party service providers, including administrators, custodians, and auditors. It is good practice to periodically verify that these relationships are intact and working well. A change in a service provider can uncover early warning flags deserving of further investigation.

Reference: 2024, Alternative Investments, L3, Volume 4, Learning Module 2, Section 15, Monitoring the Investment Program, pp. 177-179.

Part D
LOS: Volume 4, Learning Module 2, *Discuss considerations in monitoring alternative investment programs.*

James's statement about time-weighted returns being the preferred performance measurement to use in evaluating private investments is not accurate.

For call-down strategies, such as private equity, private real estate, and real assets, tracking and calculating performance might require different systems and methodologies. Private equity, credit, and real estate returns are typically reported using

internal rates of return (IRRs) rather than time-weighted returns (TWR) as is common in the liquid asset classes. IRRs are sensitive to the timing of cash flows into and out of the fund. Two managers may have similar portfolios but very different return profiles depending on their particular capital call and distribution schedule. Investors must understand the ways in which a manager can bias their reported IRR.

Reference: 2024, Alternative Investments, L3, Volume 4, Learning Module 2, Section 15, Monitoring the Investment Program, pp. 176-177.

QUESTION SET 9: PORTFOLIO MANAGEMENT – MANAGER SELECTION

1. **A**
    LOS: Volume 5, Learning Module 4, *Evaluate a manager's investment philosophy and investment decision-making process.*

    A consistent and repeatable approach is essential but should not ignore operational concerns that could have long-term deleterious effects on performance if not addressed. Uncommon ways of passing the investment philosophy test include "managers that *measure the success of the steps of the process and not just the ultimate outcome*" (p. 285, emphasis added).

    B is incorrect because a repeatable and consistently implemented process is an essential trait of an investment manager.

    C is incorrect since professional background and character are important considerations when hiring and retaining an investment manager.

    Reference: 2024, Investment Manager Selection, L3, Volume 5, Learning Module 4, Section 6, The Manager's Investment Philosophy, pp. 283-287.

2. **A**
    LOS: Volume 5, Learning Module 4, *Evaluate a manager's investment philosophy and investment decision-making process.*

    Volume 5, Learning Module 4, *Evaluate the costs and benefits of pooled investment vehicles and separate accounts.*

    The Small Cap Value SMA's features would appear to satisfy the requirements of the sovereign wealth fund's mandate as well as DuPère's liquidity concerns.

    A is incorrect. While the PIPE's fee structure appears to align manager and client interests as it shares in both upside and downside performance, it does not address DuPère's liquidity concerns since it operates like a private equity investment.

    B is incorrect. The Small Cap Value Fund of Funds' side letter feature and soft lockup do not address the CIO's liquidity concerns. Additionally, the performance-based fee shares only in upside performance, which fails to address DuPère's concern about proper alignment of manager-client interests.

    Reference: 2024, Investment Manager Selection, L3, Volume 5, Learning Module 4, Section 7, The Manager's Investment Decision-Making Process, pp. 287-290.

Investment Manager Selection, L3, Volume 5, Learning Module 4, Section 8, Operational Due Diligence, pp. 290-296, EORQ 24-25.

3. **A**

LOS: Volume 5, Learning Module 4, *Evaluate the costs and benefits of pooled investment vehicles and separate accounts.*

The Small Cap Value SMA overall would appear to be the most liquid of the three vehicles that Mahoney proposes because it holds marketable securities.

B is incorrect because the PIPE vehicle is an alternative investment that operates like a private equity offering and is therefore less liquid.

C is incorrect because the side letter would afford investors less access to the fund than an SMA tailored to the investor's specific needs.

Reference: 2024, Investment Manager Selection, L3, Volume 5, Learning Module 4, Section 8, Operational Due Diligence, pp. 290-296, EORQ 24-25.

4. **A**

LOS: Volume 5, Learning Module 4, *Describe the three basic forms of performance-based fees.*

Given DuPère's concerns regarding the alignment of incentives, a non-performance-driven fee schedule would appear to be the best solution.

Reference: 2024, Investment Manager Selection, L3, Volume 5, Learning Module 4, Section 9, Management Fees, pp. 290-296, EORQ 24-25.

QUESTION SET 10: PORTFOLIO MANAGEMENT – ASSET ALLOCATION

1.   **B**
       LOS: Volume 1, Learning Module 3, *Explain how asset classes are used to represent exposures to systematic risk and discuss criteria for asset class specification.*

       Assets within an asset class should be relatively homogeneous. If an adviser combines very different investments, such as distressed credit and US Treasury bonds, into an asset class called "fixed Income," asset allocation becomes less effective in diversifying and controlling risk.

       Also, US equities and world equities ex-US are appropriate asset class specifications because those asset classes should be mutually exclusive to each other and to "fixed income."

       Reference: 2024, Asset Allocation, L3, Volume 1, Learning Module 3, Section 5, Modeling Asset Class Risk, pp. 152-154.

2.   **C**
       LOS: Volume 1, Learning Module 3, *Explain the use of risk factors in asset allocation and their relation to traditional asset class–based approaches.*

       Adopting a factor-based asset allocation approach does not, by default, lead to superior investment outcomes. When using factors as the units of analysis, we begin with specifying risk factors and the desired exposure to each factor. Asset classes can be described with respect to their sensitivities to each of the factors. Risk factors can be thought of as the basic building blocks of investments; most are not directly investable. In this context, risk factors are associated with expected return premiums.

       Reference: 2024, Asset Allocation, L3, Volume 1, Learning Module 3, Section 5, Modeling Asset Class Risk, pp. 157-158.

3.   **A**
       LOS: Volume 1, Learning Module 5, *Recommend and justify revisions to an asset allocation given change(s) in investment objectives and/or constraints.*

       A goal, within the context of revising the strategic asset allocation, is a change in the investor's personal circumstances that may alter their risk appetite or risk capacity. Over an individual's life span, it is unlikely that the investment goals and objectives will remain unchanged. An individual may get married, have children, or become disabled, for example, each of which may have implications for the asset allocation strategy.

4. **A**

   LOS: Volume 1, Learning Module 5, *Discuss asset size, liquidity needs, time horizon, and regulatory or other considerations as constraints on asset allocation*.

   Investors with smaller portfolios may be constrained in their ability to access private equity, private real estate, hedge funds, and infrastructure investments due to the high required minimum investments and regulatory restrictions associated with those asset classes. Also, there may be legal minimum qualifications that exclude smaller asset owners.

   Reference: 2024, Asset Allocation, L3, Volume 1, Learning Module 5, Section 2, Constraints in Asset Allocation and Asset Size, pp. 302-304, Exhibit 1.

QUESTION SET 11: GIPS

Part A
LOS: Level 3, Volume 6, Learning Module 5, *Discuss the objectives and scope of the GIPS® standards and their benefits to prospective clients and investors, as well as investment managers.*

Objectives of the GIPS standards are:

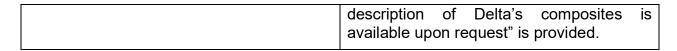| |
|---|
| Promote investor interests and instill investor confidence. |
| Ensure accurate and consistent data. |
| Obtain worldwide acceptance of a single standard for calculating and presenting performance. |
| Promote fair, global competition among investment firms. |
| Promote industry self-regulation on a global basis. |

Reference: 2024, Ethical and Professional Standards, Level 3, Volume 6, Learning Module 5, Section 1, Objective and Scope of the GIPS Standards, p. 309.

Part B
LOS: Level 3, Volume 6, Learning Module 5, *Explain requirements of the GIPS® standards with respect to presentation and reporting.*

Provide any three proper disclosures and support listed below to the GIPS report for full credit. The answers provided below may not be a complete list of disclosures for the report.

GIPS-Compliant Statement or Disclosure	Support
Definition of the firm	The report clearly defines Delta Asset Management.
Composite asset values shown	The presentation shows the amount of net assets in this composite as a percentage of the total firm assets.
Reporting currency shown	The disclosure shows the reporting currency of the composite.
Creation date shown	The composite creation date is shown.
Fee disclosure provided	Fee disclosures are provided for the performance figures.
Composite dispersions shown properly	Dispersion values are shown when the number of portfolios exceeded 5.
Composite disclosure provided	Disclosure stating that "a complete list and

	description of Delta's composites is available upon request" is provided.

Reference: 2024, Ethical and Professional Standards, Level 3, Volume 6, Learning Module 5, Section 8, Presentation and Reporting Requirements for Composites, pp. 331-333.

Part C
LOS: Level 3, Volume 6, Learning Module 5, *Discuss requirements of the GIPS® standards with respect to return calculation methodologies, including the treatment of external cash flows, cash and cash equivalents, and expenses and fees.*

A firm may choose to present money-weighted returns instead of time-weighted returns if:

- The firm has control over the external cash flows
- The portfolios are closed-end, fixed life, or fixed commitment
- Illiquid investments are a significant part of the investment strategy

Reference: 2024, Ethical and Professional Standards, Level 3, Volume 6, Learning Module 5, Section 4, Miscellaneous Return Calculation Topics, p. 320.

NOTE: Addendums to this practice exam will be posted at www.cfaboston.org