The Morning Session of the 2014 Level III CFA® Examination has 11 questions. For grading purposes, the maximum point value for each question is equal to the number of minutes allocated to that question.

Question	Topic	Minutes
1	Portfolio Management – Individual	20
2	Portfolio Management – Individual	19
3	Portfolio Management – Equity	17
4	Portfolio Management – Economics	15
5	Portfolio Management – Institutional	16
6	Portfolio Management – Institutional	16
7	Portfolio Management – Fixed Income	11
8	Portfolio Management – Asset Allocation	15
9	Portfolio Management – Risk Management	15
10	Portfolio Management – Trading, Monitoring, and Rebalancing	19
11	Portfolio Management – Individual/Behavioral	17

Total: **180**

QUESTION 1 HAS FIVE PARTS (A, B, C, D, E) FOR A TOTAL OF 20 MINUTES.

Andres Scolari is a private wealth advisor who works at a large asset management firm in a country where the USD is the local currency. Scolari is preparing an IPS for Louis and Marie Crusoe, ages 53 and 51.

The Crusoes are married and have both worked for the same company their entire careers. They would like to retire in four years and spend time traveling. The Crusoes have one daughter who is preparing to attend university.

Scolari reviews the Crusoes' assets. Their taxable investment portfolio totals USD 1,400,000 and is currently allocated 22% to equities and 78% to fixed income. The Crusoes have accumulated an asset base that they think will be large enough to meet their retirement needs. Neither Louis nor Marie is eligible for a defined benefit pension.

The Crusoes earn a combined after-tax salary of USD 135,000 per year and do not expect any changes in their employment income during the next four years. Their annual savings are USD 35,000, which are transferred directly into their investment portfolio and immediately invested in the existing asset allocation. Their only debt is a home mortgage of USD 25,000, which they plan to pay off in the next few weeks. The Crusoes also plan to establish a USD 60,000 fund in the next few weeks to cover the university tuition for their daughter.

In preparing the IPS, Scolari concludes that the Crusoes have a below-average risk tolerance.

A.   **Justify**, with *two* reasons, Scolari's conclusion that the Crusoes have a below-average risk tolerance.

<div align="center">

4 minutes (Answer 1-A on page 4)

</div>

B.   **Determine** the Crusoes' liquidity requirement (in USD) from their portfolio for the coming year. **Show** your calculations.

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3 minutes (Answer 1-B on page 5)

</div>

A few weeks later, after the planned cash outflows, the current value of the Crusoes' investment portfolio is USD 1,330,000. Scolari has determined that when the couple retires four years from today, a portfolio valued at USD 2,200,000 could sustain them through their retirement years.

Given their risk tolerance, Scolari expects the Crusoes to earn an after-tax return of 4.5% per year on their current portfolio and any additions to the portfolio prior to retirement. The Crusoes believe they can continue to save an after-tax total of USD 35,000 per year during the next four years.

C.   **Demonstrate**, given the current assumptions, that the Crusoes will *not* be able to retire in four years in accordance with their existing plan. **Show** your calculations.

Note: For the purpose of this calculation, annual savings should be considered an end-of-year cash flow.

5 minutes (Answer 1-C on page 6)

The Crusoes realize that to retire in four years, they could choose to increase their annual savings or earn additional income. Scolari states that another option would be to sell their house or borrow against their home equity.

D.   **Identify** *two* other options available to the Crusoes that could allow them to retire in four years.

Note: No calculations are required.

4 minutes (Answer 1-D on page 7)

Over the following year, the Crusoes' USD 1,330,000 investment portfolio earned a 6% before-tax return. This return included interest of USD 40,698, dividends of USD 10,374, and realized capital gains of USD 21,546. The tax rate on dividends and realized capital gains is 15%, and the tax rate on interest earned is 25%.

E.   **Calculate** the investment portfolio's percentage return after taxes. **Show** your calculations.

4 minutes (Answer 1-E on page 8)

Answer Question 1-A on This Page

1-A. **Justify**, with *two* reasons, Scolari's conclusion that the Crusoes have a below-average risk tolerance.

Answer Question 1-B on This Page

1-B. **Determine** the Crusoes' liquidity requirement (in USD) from their portfolio for the coming year. **Show** your calculations.

Answer Question 1-C on This Page

1-C. **Demonstrate**, given the current assumptions, that the Crusoes will *not* be able to retire in four years in accordance with their existing plan. **Show** your calculations.

Note: For the purpose of this calculation, annual savings should be considered an end-of-year cash flow.

Answer Question **1-D** on This Page

1-D. **Identify** *two* other options available to the Crusoes that could allow them to retire in four years.

Note: No calculations are required.

Answer Question **1-E** on This Page

1-E. **Calculate** the investment portfolio's percentage return after taxes. **Show** your calculations.

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QUESTION 2 HAS FOUR PARTS (A, B, C, D) FOR A TOTAL OF 19 MINUTES.

Nicole Greene has just retired from her position as Chief Financial Officer of Panther Corporation, a large publicly traded company. During her career, she accumulated a large number of Panther shares through share-based grant compensation. Greene's one million shares are currently valued at USD 20 million and represent the majority of her wealth. Panther shares do not pay a dividend.

As a top executive at Panther, Greene was restricted from liquidating or hedging her equity holdings in the company. Now that she is retired, she wants to achieve the following immediate objectives with regard to her Panther shares:

- reduce the risk associated with her wealth concentration;
- defer capital gains taxes;
- retain upside return potential.

Greene is meeting with her financial advisor, Rob Reynaldo, for advice on how to accomplish these objectives. Reynaldo first notes that Greene's Panther shares have a very low cost basis. The jurisdiction in which Greene resides levies capital gains taxes only on the sale or disposal of a security. Therefore, any outright sales of shares would result in significant long-term capital gains which would be taxed at 30%.

The first strategy that Reynaldo suggests to Greene is to buy put options on her Panther shares. He identifies put options on Panther shares that have a strike price of USD 20.00, one year to expiration, and an option price of USD 1.95 per Panther share.

A.   **Explain** how *each* of Greene's three objectives is achieved by Reynaldo's suggested put option strategy.

6 minutes (Answer 2-A on page 12)

Greene calculates that the put option strategy Reynaldo suggests would cost USD 1.95 million. She asks Reynaldo whether there are any alternatives to reduce the cost of hedging by using different put options on Panther shares. Reynaldo suggests using put options that expire sooner, but Greene rejects this alternative because she does not want to have to roll over her position more frequently.

B.   **Identify** *two* other strategies, using *only* Panther put options, to reduce Greene's cost of hedging. **Discuss** *one* disadvantage of *each* alternative.

6 minutes (Answer 2-B on page 13)

Greene tells Reynaldo that a former colleague used a cashless collar strategy after his retirement. Reynaldo determines that the pairs of options shown in Exhibit 1 are available, all with the same expiration dates. Panther's share price is currently USD 20.00.

Exhibit 1
Strike Prices of Available Panther Options (in USD)

Option Pair	Put	Call
F	17.50	23.50
G	22.50	22.50
H	23.50	17.50

C.   **Identify** which option pair is *most likely* to create a cashless collar position for Greene. **Justify** your response.

     Note: No calculations are required.

3 minutes (Answer 2-C on page 14)

Greene would also like to explore ways to generate liquidity from her Panther holdings without an outright sale of shares. Reynaldo suggests that she could generate liquidity by using a forward conversion with options.

D.   **Formulate** a forward conversion with options strategy for Greene. **Describe** how this will allow her to generate liquidity from her position in Panther shares.

     Note: No calculations are required.

4 minutes (Answer 2-D on page 15)

Answer Question 2-A on This Page

2-A.   **Explain** how *each* of Greene's three objectives is achieved by Reynaldo's suggested put option strategy.

Answer Question **2-B** on This Page

2-B. **Identify** *two* other strategies, using *only* Panther put options, to reduce Greene's cost of hedging. **Discuss** *one* disadvantage of *each* alternative.

Answer Question 2-C on This Page

2-C. **Identify** which option pair is *most likely* to create a cashless collar position for Greene. **Justify** your response.

Note: No calculations are required.

Answer Question **2-D** on This Page

2-D. **Formulate** a forward conversion with options strategy for Greene. **Describe** how this will allow her to generate liquidity from her position in Panther shares.

Note: No calculations are required.

QUESTION 3 HAS FIVE PARTS (A, B, C, D, E) FOR A TOTAL OF 17 MINUTES.

Rachel Wang works for a global fund manager. She is assessing the investment style of the firm's largest equity fund, Fund A.

Fund A is described as a U.S. actively managed value fund. It has remained fully invested and currently holds 50 U.S. stocks with a weighted-average market capitalization of USD 20 billion. The fund hired a new manager three years ago, and Wang is evaluating the manager's investment style using a returns-based analysis.

Wang uses six indices in her regression analysis, which is based on monthly observations from the past 36 months. The regression output indicates that Fund A's selection is 0.28. Detailed results of her analysis are shown in Exhibit 1.

Exhibit 1
Returns-Based Style Analysis for Fund A

Index	Style Weights
U.S. large-cap growth	19%
U.S. large-cap value	23%
U.S. mid-cap growth	18%
U.S. mid-cap value	8%
U.S. small-cap growth	18%
U.S. small-cap value	14%

A.   **Justify**, with *two* reasons, why Wang's choice of indices is appropriate for a returns-based style analysis.

4 minutes (Answer 3-A on page 18)

B.   **Determine**, using the results of the returns-based style analysis, whether the description of Fund A's investment style is accurate. **Justify** your response with *one* reason.

3 minutes (Answer 3-B on page 19)

Wang reviews the performance of one of the firm's market-neutral funds, Fund B. She compares Fund B's returns to benchmark returns. Fund B follows a pairs trading strategy using equities of U.S. energy companies in the S&P 500 Index. The market beta for the broad U.S. energy index is 1.05. The current risk-free rate is 2% and the expected market risk premium is 6%.

C.   **Determine** the appropriate benchmark for Fund B. **Justify** your response with *one* reason.

3 minutes (Answer 3-C on page 20)

Wang now focuses her attention on the performance record of Sarah Brown, who manages two funds for the firm: Fund C and Fund D. Fund C follows a long-short strategy and Fund D is a long-only fund. Both funds are limited to U.S. industrial stocks.

Wang collects historical data on the two funds' alphas as shown in Exhibit 2.

Exhibit 2
Historical Alphas

	2011	2012	2013
Fund C			
Alpha (long-side)	0.3%	0.5%	0.4%
Alpha (short-side)	2.2%	2.8%	2.5%
Fund D			
Alpha	0.2%	0.3%	0.2%

Wang notices that Brown has consistently delivered positive alphas in both Fund C and Fund D during the past three years. However, the short-side alphas were significantly greater than the long-side alphas. This performance difference confirms Wang's view that more price inefficiencies can be found on the short side of the market than on the long side.

Wang also notes that Fund D's alphas are lower than Fund C's long-side alphas, even though both funds are managed by the same person and are invested in similar long portfolios of U.S. industrial stocks.

D.   **Support**, with *two* reasons, Wang's view regarding price inefficiencies.

4 minutes (Answer 3-D on page 21)

E.   **Explain** the *most likely* reason that Fund D's alphas were lower than Fund C's long-side alphas.

3 minutes (Answer 3-E on page 22)

Answer Question **3-A** on This Page

3-A. **Justify**, with *two* reasons, why Wang's choice of indices is appropriate for a returns-based style analysis.

Answer Question **3-B** on This Page

3-B. **Determine**, using the results of the returns-based style analysis, whether the description of Fund A's investment style is accurate. **Justify** your response with *one* reason.

Answer Question 3-C on This Page

3-C.   **Determine** the appropriate benchmark for Fund B. **Justify** your response with *one* reason.

Answer Question **3-D** on This Page

3-D. **Support**, with *two* reasons, Wang's view regarding price inefficiencies.

Answer Question **3-E** on This Page

3-E.   **Explain** the *most likely* reason that Fund D's alphas were lower than Fund C's long-side alphas.

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QUESTION 4 HAS THREE PARTS (A, B, C) FOR A TOTAL OF 15 MINUTES.

Étienne Leroy is a global investment strategist for a French investment advisory firm. He is currently reviewing the asset allocation of the firm's largest global fund. Leroy estimates the expected returns for three asset classes: North American equities, Eurozone fixed income, and Asia-Pacific real estate. He uses the Singer-Terhaar approach to the international capital asset pricing model for his analysis. Leroy gathers data for each asset class as shown in Exhibit 1.

Exhibit 1
Capital Market Expectations

Asset Class	Standard Deviation (annualized)	Correlation with the Global Investable Market (GIM)	Degree of Integration with the GIM
North American equities	18%	0.83	0.80
Eurozone fixed income	7%	0.69	0.70
Asia-Pacific real estate	13%	0.47	0.60

Leroy makes the following assumptions in his analysis:

- The expected return for the GIM is 6.0%.
- The expected standard deviation for the GIM is 12.5%.
- The risk-free interest rate is 2.0%.
- The Asia-Pacific real estate asset class has an illiquidity premium of 0.4%.

A.   **Calculate** the expected return for the Asia-Pacific real estate asset class, using the Singer-Terhaar approach. **Show** your calculations.

5 minutes (Answer 4-A on page 26)

Leroy researches the current monetary policy environment in a developed country where the fund invests. This country's central bank has been pursuing a low interest rate policy in an effort to accelerate economic growth following the global financial crisis. A report issued by the firm's research department indicates that the central bank's interest rate policy closely follows the Taylor rule.

The central bank recently updated its GDP growth rate and inflation rate forecasts, as shown in Exhibit 2. As a result, Leroy believes that the central bank is likely to change its target short-term interest rate. The central bank has stated publicly that it expects no changes in the GDP trend growth rate, target inflation rate, or neutral short-term interest rate.

Exhibit 2
Selected Macroeconomic Data

Economic Measure	Trend	Target	Previous Forecast	Updated Forecast
GDP growth rate	3.5%	---	1.4%	1.3%
Inflation rate	---	2.0%	0.8%	0.7%

B.   **Calculate** the expected change (direction and amount) in the central bank's target short-
       term interest rate based on the Taylor rule. **Show** your calculations.

4 minutes (Answer 4-B on page 27)

Leroy then researches the fund's investment in Workia sovereign debt. Workia is an emerging
market country and a major producer of iron ore. Due to higher growth in other areas of the
economy, the contribution of iron ore production to Workia's GDP declined from 20% to 18% in
the past year. Leroy reviews the information shown in Exhibit 3 and calculates appropriate ratios
to develop further insights into Workia. The local currency is the Workia dollar (WOD).

Exhibit 3
Selected Macroeconomic Data for Workia
(in WOD billions)

Economic Measure	Previous Year	Current Year
GDP (nominal)	90.0	95.4
External debt	37.2	48.0
Foreign exchange reserves	12.0	12.9
Short-term debt	8.0	8.6

C.   **Discuss** *one* factor whose change during the current year:

       i.   weakens Workia's ability to service its debt.
       ii.   strengthens Workia's ability to service its debt.

6 minutes (Answer 4-C on page 28)

Answer Question 4-A on This Page

4-A.   **Calculate** the expected return for the Asia-Pacific real estate asset class, using the Singer-Terhaar approach.
         Show your calculations.

Answer Question 4-B on This Page

4-B. **Calculate** the expected change (direction and amount) in the central bank's target short-term interest rate based on the Taylor rule. **Show** your calculations.

Answer Question 4-C on This Page

4-C. **Discuss** *one* factor whose change during the current year:

    i.   weakens Workia's ability to service its debt.

    ii.   strengthens Workia's ability to service its debt.

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QUESTION 5 HAS THREE PARTS (A, B, C) FOR A TOTAL OF 16 MINUTES.

Kevin Jardine is Chief Financial Officer of GHPL, a pharmaceutical firm that develops insulin delivery devices for use in treating diabetes. GHPL operates a defined benefit (DB) pension plan that is open to new participants. The DB plan is entirely funded by contributions from GHPL.

The firm's risk committee asks Jardine to assess how GHPL's DB plan compares to the plans of two competitors, MWOL and QYDL. He summarizes selected financial data in Exhibit 1 and plan characteristics in Exhibit 2 for each of the three firms.

Exhibit 1
Selected Financial Data
(amounts in USD millions, except ratios)

	GHPL	MWOL	QYDL
For the Year Ended 31 December 2013			
Sales	500	300	800
Net income	135	90	120
As of 31 December 2013			
Projected benefit obligation	520	409	201
Debt-to-equity ratio	1.3	1.1	1.4

Exhibit 2
DB Plan Characteristics

	GHPL	MWOL	QYDL
Provision allowing lump-sum distributions	Yes	No	No
Provision allowing early retirement	No	No	Yes
Proportion of active lives	62%	57%	69%
Plan funded status	Surplus	Deficit	Surplus

A.   **Determine**, for *each* category below, which company's pension plan *most likely* has the lowest risk tolerance:

i.   Sponsor financial status/profitability
ii.   Workforce characteristics

Justify *each* response with *one* reason.

Note: Consider *each* category independently.

6 minutes (Answer 5-A on page 32)

The growth rates of GHPL's revenue and number of employees are expected to exceed the sector's annual growth rate over the next several years. As a result, Jardine concludes that GHPL's proportion of active lives will increase over the next two years. He also reviews the details of GHPL's DB plan and notes that the provision allowing lump-sum distributions will expire in 18 months.

B.   **Determine**, for *each* factor below, whether the DB plan's liquidity requirement in two
          years will be lower, the same, or higher relative to its liquidity requirement today,
          holding all else constant:

     i.   Change in proportion of active lives
     ii.   Change in provision allowing lump-sum distributions

     Justify *each* response with *one* reason.

     Note: Consider *each* factor independently.

6 minutes (Answer 5-B on page 33)

One year later, GHPL's DB plan is in deficit. GHPL's management wants to eliminate the
plan's current funding shortfall without having to make additional contributions to the plan.
Jardine considers two alternative investment approaches for GHPL: a liability mimicking
investment approach and an asset-only investment approach.

C.   **Discuss** whether *each* of the following investment approaches could achieve GHPL's
          objective:

     i.   Liability mimicking
     ii.   Asset-only

4 minutes (Answer 5-C on page 34)

Answer Question 5-A on This Page

Note: Consider *each* category independently.

Category	**Determine**, for *each* category, which company's pension plan *most likely* has the lowest risk tolerance. (circle one)	**Justify** *each* response with *one* reason.
i. Sponsor financial status/profitability	GHPL MWOL QYDL	
ii. Workforce characteristics	GHPL MWOL QYDL	

Answer Question 5-B on This Page

Note: Consider *each* factor independently.

Factor	**Determine**, for *each* factor, whether the DB plan's liquidity requirement in two years will be lower, the same, or higher relative to its liquidity requirement today, holding all else constant. (circle one)	**Justify** *each* response with *one* reason.
i. Change in proportion of active lives	lower the same higher	
ii. Change in provision allowing lump-sum distributions	lower the same higher	

Answer Question 5-C on This Page

5-C. **Discuss** whether *each* of the following investment approaches could achieve GHPL's objective:

    i.   Liability mimicking

    ii.   Asset-only

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QUESTION 6 HAS THREE PARTS (A, B, C) FOR A TOTAL OF 16 MINUTES.

The Munoz Symphony is a non-profit organization. Munoz has an endowment, currently valued at USD 20 million, that supports its operating budget. The primary objective of the endowment is to maintain the long-term purchasing power of its portfolio while also meeting its spending requirement.

The endowment's spending rule requires the endowment to distribute 2.0% of its beginning portfolio value to Munoz each year. Munoz currently receives enough funds from the endowment to meet its spending needs, and in recent years Munoz has had a budget surplus. On average, Munoz's operating expenses grow 1.5 percentage points faster than the general inflation rate. Other than a 0.5% management fee, the cash flows for the endowment in recent years have been entirely composed of investment income inflows and distribution outflows. However, Munoz's board is confident that it could raise funds through donor contributions, if necessary.

Investment returns for the endowment are volatile, but during the past three years, market conditions produced investment returns that exceeded the return objective. Despite this recent outperformance, Munoz's board is concerned about the level of fluctuation in year-to-year distributions from the endowment.

A small number of directors recently demanded a more aggressive investment strategy that could allow the Munoz endowment to match the returns of other endowments they oversee. However, Munoz's board voted to maintain the current strategy.

Elmar Asset Management, the Munoz endowment's investment manager, prepared an abbreviated IPS for the endowment as summarized in Exhibit 1. Elmar derives the 5.0% annual required return for the Munoz endowment by combining the 2.0% annual spending rule with the 3.0% expected general inflation rate.

Exhibit 1
Abbreviated IPS for Munoz Endowment

Required return	5.0% nominal annual return
Risk tolerance	Above-average
Liquidity requirement	Annual distribution of 2.0% of the endowment's beginning-of-year market value
Time horizon	Long-term
Taxes	Tax-exempt
Legal and regulatory	"Ordinary care and prudence" standard
Unique circumstances	Preference for socially responsible investments

A.   **Support**, with *three* reasons, Elmar's conclusion that the Munoz endowment has an above-average risk tolerance.

6 minutes (Answer 6-A on page 38)

B.   **Describe** *two* deficiencies in Elmar's calculation of the required return for the IPS.

4 minutes (Answer 6-B on page 39)

Elmar also manages a portfolio valued at USD 20 million for Logano Transport Insurance, a casualty insurance company. The amount and timing of loss claims by Logano's clients are uncertain from year to year. Logano calculates a new return requirement on its investment portfolio each year that encompasses current claim activity, pricing trends, and surplus level. The current real return requirement of 5.0% is approximately equal to expected net cash outflows from the portfolio. Logano's average duration of claim liabilities through final payment of a claim is 4 years. Elmar is developing an IPS for Logano.

C.   **Determine** whether *each* of the following components of Logano's IPS is lower than, the same as, or higher than that of the Munoz endowment:

   i.   Risk tolerance
   ii.   Liquidity requirement

   Justify *each* response with *one* reason.

6 minutes (Answer 6-C on page 40)

Answer Question 6-A on This Page

6-A. **Support**, with *three* reasons, Elmar's conclusion that the Munoz endowment has an above-average risk tolerance.

Answer Question 6-B on This Page

6-B.   **Describe** *two* deficiencies in Elmar's calculation of the required return for the IPS.

Answer Question ██6-C██ on This Page

IPS component	**Determine** whether *each* component of Logano's IPS is lower than, the same as, or higher than that of the Munoz endowment. (circle one)	**Justify** *each* response with *one* reason.
i. Risk tolerance	lower the same higher	
ii. Liquidity requirement	lower the same higher	

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QUESTION 7 HAS THREE PARTS (A, B, C) FOR A TOTAL OF 11 MINUTES.

Jay Gupta is a fixed income portfolio manager based in the UK whose firm reports in GBP. His portfolio consists entirely of UK government bonds. Gupta wants to improve the portfolio's risk–return profile by investing in emerging market bonds. He intends to invest in the local-currency government bonds of Alphastan, an emerging market country whose currency is the Alphastan currency unit (ACU).

Gupta summarizes relevant current market information in Exhibit 1.

Exhibit 1
Bond Portfolio and Market Data

Average yield of Gupta's existing UK bond portfolio	3.00%
Average yield of targeted Alphastan government bonds	6.20%
Duration of Gupta's existing UK bond portfolio	5.0
Duration of targeted Alphastan government bonds (local market)	5.0
6-month risk-free interest rate in UK (annualized)	2.5%
6-month risk-free interest rate in Alphastan (annualized)	5.0%
Alphastan country beta relative to UK	0.35

The economist at Gupta's firm forecasts that the spread between the yields of the targeted Alphastan government bonds and the existing UK government bonds in Gupta's portfolio will widen by 90–100 basis points during the next year.

A.   **Calculate** the minimum spread widening (in basis points) during the next year that would eliminate Alphastan's yield advantage. **Explain**, based *only* on breakeven spread analysis, whether Gupta should invest in the targeted Alphastan government bonds.

   Note: Ignore the effect of currency movements.

4 minutes (Answer 7-A on page 44)

After additional research, Gupta decides to allocate 7% of his overall portfolio to the targeted Alphastan government bonds. He wants to maintain his overall portfolio's sensitivity to UK interest rates following this new allocation.

B.   **Calculate** the new UK (domestic) bond portfolio duration required to keep the overall portfolio's sensitivity to UK interest rates unchanged. **Show** your calculations.

4 minutes (Answer 7-B on page 45)

After implementing the 7% allocation to the Alphastan government bonds, Gupta is evaluating whether to use a forward contract to hedge their currency risk. His firm's economist forecasts

that the ACU will depreciate relative to the GBP by 1.0% over the next six months. Gupta assumes that the current forward exchange rate reflects interest rate parity.

C.   **Determine** whether Gupta should hedge the currency risk in Alphastan government bonds over the next six months, assuming the economist's currency forecast is correct. **Justify** your response.

3 minutes (Answer 7-C on page 46)

Answer Question 7-A on This Page

7-A. **Calculate** the minimum spread widening (in basis points) during the next year that would eliminate Alphastan's yield advantage. **Explain**, based *only* on breakeven spread analysis, whether Gupta should invest in the targeted Alphastan government bonds.

Note: Ignore the effect of currency movements.

Answer Question **7-B** on This Page

7-B. **Calculate** the new UK (domestic) bond portfolio duration required to keep the overall portfolio's sensitivity to UK interest rates unchanged. **Show** your calculations.

Answer Question 7-C on This Page

7-C. **Determine** whether Gupta should hedge the currency risk in Alphastan government bonds over the next six months, assuming the economist's currency forecast is correct. **Justify** your response.

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QUESTION 8 HAS FOUR PARTS (A, B, C, D) FOR A TOTAL OF 15 MINUTES.

Samar Merabet is the investment advisor for the SimplyTech defined benefit pension plan, which is based in a developed country. The current asset allocation of the plan is 65% domestic equities and 35% domestic fixed income. The plan uses an asset-only investment approach and is overseen by a risk-averse board. The numerical risk aversion level for the board is estimated to be equal to 6 on a scale of 1 to 8, where 8 represents the highest degree of risk aversion.

Merabet advises the board that the risk–return profile of the portfolio could be improved by adding non-domestic equities and bonds. Some members of the board believe that portfolio selection should focus on maximizing expected utility, but others think that shortfall risk is more important. The board uses Roy's safety-first criterion as a measure of shortfall risk and has specified a minimum return threshold of 5.0%. The risk-free rate is 2.0%.

In presenting her case for diversification to the board, Merabet provides the expected returns and standard deviations of the two global portfolios shown in Exhibit 1.

Exhibit 1
Portfolio Risk–Return Profiles

Portfolio	Expected Return	Standard Deviation
Jade	6.5%	10.0%
Ruby	7.5%	13.5%

A.   **Determine** which portfolio the board should select based *only* on expected utility. **Justify** your response.

4 minutes (Answer 8-A on page 50)

B.   **Determine** which portfolio the board should select based *only* on Roy's safety-first criterion. **Justify** your response.

4 minutes (Answer 8-B on page 51)

Merabet is advising another client, the EduFund Endowment, on adding non-domestic assets to its portfolio. The EduFund Endowment is based in the same country as the SimplyTech pension plan. The asset allocation of the endowment is 60% domestic equities and 40% domestic fixed income. The current portfolio has an expected return of 6.25% with a standard deviation of 9.5%.

Merabet is evaluating two new asset classes that might provide a mean–variance improvement for the endowment. She provides the endowment trustees with the data shown in Exhibit 2.

Exhibit 2
Asset Class Expectations

Asset Class	Expected Return	Standard Deviation	Correlation with Current Portfolio
Non-domestic developed market equity	8.0%	14.0%	0.70
Emerging market equity	9.0%	18.0%	0.50

The correlations provided in Exhibit 2 reflect normal market conditions. Merabet believes that the use of conditional return correlations is valuable in stress testing.

C.   **Determine** if adding non-domestic developed market equity would provide a mean–variance improvement for the current endowment portfolio. **Justify** your response.

4 minutes (Answer 8-C on page 52)

D.   **Support**, with *one* reason, Merabet's belief about the use of conditional return correlations.

3 minutes (Answer 8-D on page 53)

Answer Question 8-A on This Page

8-A. **Determine** which portfolio the board should select based *only* on expected utility. **Justify** your response.

Answer Question 8-B on This Page

8-B. **Determine** which portfolio the board should select based *only* on Roy's safety-first criterion. **Justify** your response.

Answer Question 8-C on This Page

8-C. **Determine** if adding non-domestic developed market equity would provide a mean–variance improvement for the current endowment portfolio. **Justify** your response.

Answer Question **8-D** on This Page

8-D.   **Support**, with *one* reason, Merabet's belief about the use of conditional return correlations.

QUESTION 9 HAS THREE PARTS (A, B, C) FOR A TOTAL OF 15 MINUTES.

Russell Hood is a portfolio manager at Bullseye Asset Management. He oversees two funds: a balanced fund and a tactical equity fund. The balanced fund has a current market value of USD 700 million and a current allocation of 65% equity (equity beta of 1.12) and 35% fixed income (modified duration of 6.55).

Hood believes that reported earnings in the upcoming quarter will be better than anticipated by the market. Based on this short-term market view, he decides to use futures contracts to adjust the allocation of the balanced fund to 80% equity and 20% fixed income for the next three months. Hood wants to maintain the balanced fund's current equity beta and modified duration.

Hood plans to use the Aries equity index futures contract and the Taurus bond futures contract to execute his transaction. He gathers the data shown in Exhibit 1 for the two contracts. Both contracts expire three months from today. The risk-free rate is 1.85%.

Exhibit 1
Selected Futures Contract Data

Contract	Price (in USD)	Futures Beta	Implied Modified Duration	Underlying Index
Aries	94,505	0.97	---	Broad equity
Taurus	99,100	---	7.15	Broad fixed income

Note: Contract prices include multipliers. Yield beta for the Taurus contract is 1.00.

A.   **Determine**, to achieve Hood's adjusted allocation, the number of:

   i.   Taurus contracts he should sell.
   ii.   Aries contracts he should buy.

   Show your calculations.

8 minutes (Answer 9-A on page 56)

Three months later, the futures contracts have expired and the balanced fund's allocation has returned to 65% equity and 35% fixed income. Hood believes that bond yields will begin an upward trend and wants to adjust the duration of the balanced fund's fixed income portfolio for the next two years. Bullseye's head trader informs Hood that he can implement this duration adjustment using a pay-fixed, receive-floating interest rate swap.

Hood considers the selected swap contracts shown in Exhibit 2. He knows that he can obtain the required interest rate exposure using any one of these contracts, but his objective is to minimize the notional principal of the swap.

Exhibit 2
Selected Pay-Fixed, Receive-Floating Swap Contracts

Counterparty	Maturity	Payment Frequency
Orion	3 years	Quarterly
Ursa	3 years	Semiannual
Canis	5 years	Quarterly
Lupus	5 years	Semiannual

B.   **Determine** which counterparty's swap contract will *best* achieve Hood's objective.
      Justify your response.

3 minutes (Answer 9-B on page 57)

Hood's tactical equity fund has a current allocation of 50% small-cap equity and 50% mid-cap
equity. He wants to change the fund's allocation to 70% small-cap equity and 30% mid-cap
equity for the next three months. To implement this change, Hood executes a futures overlay
strategy of buying small-cap and selling mid-cap equity index futures contracts that expire in
three months. The underlying for each contract is a broad small-cap equity total return index and
a broad mid-cap equity total return index, respectively.

At the end of the three-month period, Hood calculates that his fund's return, including the futures
overlay strategy, was different than it would have been had he used a cash-market strategy of
buying and selling equity securities. Bullseye's head trader demonstrates that the difference in
return between the strategies was not a result of transaction costs, rounding of fractional futures
contracts, or inefficient execution prices.

C.   **Explain**, with *two* reasons, why the return of Hood's futures overlay strategy was not the
      same as that of the cash-market strategy.

4 minutes (Answer 9-C on page 58)

Answer Question 9-A on This Page

9-A.   **Determine**, to achieve Hood's adjusted allocation, the number of: (see i. and ii. below)
   Show your calculations.

   i.   Taurus contracts he should sell.

   ii.   Aries contracts he should buy.

Answer Question 9-B on This Page

9-B. **Determine** which counterparty's swap contract will *best* achieve Hood's objective. **Justify** your response.

Answer Question 9-C on This Page

9-C. **Explain**, with *two* reasons, why the return of Hood's futures overlay strategy was not the same as that of the cash-market strategy.

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QUESTION 10 HAS FOUR PARTS (A, B, C, D) FOR A TOTAL OF 19 MINUTES.

Nadine Raffo is Chief Investment Officer at Titanium Re, a reinsurance company that reports in GBP. The company uses the calendar rebalancing method on a semiannual basis for its investment portfolio. The most recent rebalancing occurred at the beginning of January based on the weights as of 31 December. Raffo is considering changing the rebalancing method to percentage-of-portfolio rebalancing with corridor widths as shown in Exhibit 1.

Exhibit 1
Titanium Re Investment Portfolio Asset Allocation

Asset Class	Strategic Asset Allocation: Target Weight	Strategic Asset Allocation: Corridor Width	Strategic Asset Allocation: Target Weight Range	Closing 30 June Allocation
Fixed income	73%	± 4%	69%–77%	71%
Cash	21%	± 2%	19%–23%	24%
Large-cap equity	6%	± 1%	5%–7%	5%

A.   **Determine** Titanium Re's fixed income allocation on 1 July under *each* of the following rebalancing methods:

   i.   Calendar rebalancing
   ii.   Percentage-of-portfolio rebalancing

4 minutes (Answer 10-A on page 62)

Titanium Re decides to adopt the percentage-of-portfolio rebalancing method using the corridor widths in Exhibit 1. Two months later, Raffo receives a request from the company's Board of Directors to adjust the fixed income corridor width based on expected changes in market conditions as detailed below:

-     Transaction costs for fixed income are expected to decrease.
-     The volatility of fixed income is expected to increase.
-     The correlations of fixed income with other asset classes are expected to increase.

Raffo reviews the expectations and replies with the following statement:

   "Based on these expected changes in market conditions, a definitive conclusion cannot be reached as to whether the fixed income corridor should be narrowed or should be widened."

B.   **Explain** why Raffo's statement is correct.

4 minutes (Answer 10-B on page 63)

Raffo reviews the holdings of Titanium Re's large-cap equity portfolio and asks her trader, Gareth Reynolds, to sell the four securities in Exhibit 2.

Exhibit 2
Trade Orders and Market Data

Security	Order Size (shares)	Average Daily Volume (shares)	Bid-Ask Spread	Share Price (in GBP)	Urgency to Complete Trade
UWOE	15,000	812,000	Wide	15.50	Low
STPR	48,000	972,000	Narrow	12.50	Low
TORN	3,000	77,000	Narrow	9.80	High
ZEHP	19,000	59,000	Narrow	7.50	High

C.   **Determine** the security for which *each* of the following trade execution tactics is *most* appropriate:

   i.   Volume-weighted average price (VWAP) algorithm
   ii. Implementation shortfall algorithm

   Justify *each* response with *three* features of the selected trade.

   Note: Consider *each* trade execution tactic independently.

8 minutes (Answer 10-C on page 64)

Raffo is analyzing several equities to add to the portfolio. She finds a cement company, CTAC, that she believes is trading at an attractive valuation. In establishing the CTAC position, the sequence of events is as follows:

   •   On Monday, CTAC shares close at GBP 12.24.
   •   On Tuesday afternoon, Raffo directs Reynolds to buy 15,000 shares of CTAC. The decision price is GBP 12.45. He purchases 6,000 shares at GBP 12.51. Trading fees total an additional GBP 0.01 per share purchased. CTAC's closing price on Tuesday is GBP 12.50.
   •   On Wednesday, Reynolds decides to cancel the buy order for the remaining 9,000 shares and records a cancellation price of GBP 12.90.

D.   **Calculate** the component of the implementation shortfall (in basis points) that is attributable to realized profit/loss. **Show** your calculations.

3 minutes (Answer 10-D on page 65)

Answer Question 10-A on This Page

10-A. **Determine** Titanium Re's fixed income allocation on 1 July under *each* of the following rebalancing methods:

   i.   Calendar rebalancing

   ii.   Percentage-of-portfolio rebalancing

Answer Question **10-B** on This Page

10-B.   **Explain** why Raffo's statement is correct.

Answer Question **10-C** on This Page

Note: Consider *each* trade execution tactic independently.

Trade execution tactic	**Determine** the security for which *each* trade execution tactic is *most* appropriate. (circle one)	**Justify** *each* response with *three* features of the selected trade.
i. Volume-weighted average price (VWAP) algorithm	UWOE STPR TORN ZEHP	1. 2. 3.
ii. Implementation shortfall algorithm	UWOE STPR TORN ZEHP	1. 2. 3.

Answer Question **10-D** on This Page

10-D.   **Calculate** the component of the implementation shortfall (in basis points) that is attributable to realized profit/loss. **Show** your calculations.

QUESTION 11 HAS TWO PARTS (A, B) FOR A TOTAL OF 17 MINUTES.

Charlotte Taylor is an investment advisor in the U.S. She is meeting with two clients: Paul Lam and Thomas Ashland.

Lam is a 35-year-old attorney. He recently purchased a home, where he and his wife live with their young child. The home has a mortgage of USD 300,000. Lam has been saving for several years but is behind schedule to ultimately fund his retirement. Through his experience representing corporations in legal matters, he often invests in companies that remind him of his most successful clients because "they know what works." The rest of his investment ideas come from advertisements by industry trade groups and blogs sponsored by the companies he is researching. He has repeatedly declined Taylor's suggestion to consider additional independent sources of information. To justify this, he claims to have avoided stocks that were part of "obvious bubbles" in recent years. Based on previous conversations, Taylor notes that Lam had never considered investing in such stocks.

Ashland is a retired software engineer. He is 60 years old, married, and has two adult children. Ashland lives in the same inexpensive home he bought 30 years ago, and has fully paid off the mortgage. He and his wife take only one vacation each year, to visit their grandchildren. Ashland's investment portfolio, valued at USD 8,000,000, is 30% invested in the shares of the small company his father founded. He won't consider diversifying any of this risk, stating, "it's a source of family pride and worth every penny." Taylor is concerned that Ashland rarely trades after making an initial investment, but when she suggests periodic reallocation, Ashland responds, "my portfolio will do best if I leave it alone." He has also told Taylor that he would be upset to sell an investment, only to then see it appreciate further in value.

A.   **Identify** *two* of the following behavioral biases (availability, endowment, framing, regret-aversion, representativeness, self-control) exhibited by:

   i.   Lam.
   ii.   Ashland.

   Justify *each* identified bias with *one* example from the information provided.

12 minutes (Answer 11-A on page 67)

Taylor has prepared materials to educate her clients on the implications of behavioral biases so that she may help them moderate the impact of their biases on investment performance. She believes this to be a more appropriate approach for some of her clients, rather than trying to adapt their portfolios to their biases.

B.   **Determine** whether Taylor's educational approach is *more* appropriate for Lam or Ashland. **Justify** your response with *one* reason related to the client's behavior, and *one* reason related to the client's financial circumstances.

5 minutes (Answer 11-B on page 68)

Answer Question 11-A on This Page

i. **Identify** *two* of the following behavioral biases (availability, endowment, framing, regret-aversion, representativeness, self-control) exhibited by Lam.	**Justify** *each* identified bias with *one* example from the information provided.
1.	
2.	
ii. **Identify** *two* of the following behavioral biases (availability, endowment, framing, regret-aversion, representativeness, self-control) exhibited by Ashland.	**Justify** *each* identified bias with *one* example from the information provided.
1.	
2.	

Answer Question **11-B** on This Page

11-B. **Determine** whether Taylor's educational approach is *more* appropriate for Lam or Ashland. **Justify** your response with *one* reason related to the client's behavior, and *one* reason related to the client's financial circumstances.

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