

2021 年 05 月 CFA 三级百题预测

1. SS1 Ethical and Professional Standards
2. SS2 Ethical and Professional Standards
3. SS3 Behavioral Finance
4. SS4 CME
5. SS5 Asset Allocation
6. SS6 Derivatives and Currency Management
7. SS7-8 Fixed income Portfolio Management
8. SS9-10 Equity portfolio management
9. SS11 Alternatives
10. SS12-13 Private Wealth Management
11. SS14 Portfolio Management for Institutional Investors
12. SS15 Trading, Performance Evaluation, and Manager Selection

1. SS1 Ethical and Professional Standards

Case 1: Rayne Brothers

1. Solution: B.

B is correct because Standard I (A) - Knowledge of the Law requires CFA Members to understand and comply with all applicable laws, rules and regulations including the CFA Institute Code of Ethics and Standards of Professional Conduct. In the event of conflict, Members must comply with the stricter law, rule or regulation, including those of the Code and Standards. As the South African laws are considered to be stricter than the CFA Code and Standards or Ugandan law, Mutini must adhere to the South African laws and regulations.

2. Solution: C.

C is correct because members and candidates must not accept gifts, benefits, compensation, or consideration that competes with or might reasonably be expected to create a conflict of interest with their employer's interest. In this case, holding a competition to encourage sales is unlikely to cause a conflict of interest with the employer's interests.

3. Solution: C.

C is correct because a member or candidate with supervisory responsibility should enforce policies related to investment and non-investment related activities equally: i.e. not concentrate on investment related over non-investment related policies.

4. Solution: A.

A is correct because as a CFA charterholder, Okello has a duty to clients under Standard III (A) - Loyalty, Prudence and Care which requires him to act for the benefit of his clients and place the clients' interest before his employer's or his own. Standard III (A) establishes a minimum benchmark for the duties of loyalty, prudence and care that are required of all members and candidates regardless of whether a legal fiduciary duty applies.

5. Solution: B.

B is correct because the sales agent implies that Rayne is the asset manager when in fact OAM is the asset manager. By omitting the fact that Rayne is only a sales agent and implying Rayne manages the portfolio, the sales agent is misrepresenting their professional activities and thus is in violation of Standard I (C) Misrepresentation.

6. Solution: B.

B is correct because recommended procedures for compliance of Standard III (A) are that regular

account information should be submitted to the client at least quarterly not semi-annually.

Case 2: Kim Tang

1. Solution: B.

Disclosure of the managers' involvement with CFA Institute is not a violation of Standard VII(A)—Conduct as Members and Candidates in the CFA Program, because it does not reveal any confidential information. But the CFA designation must always be used as an adjective. In this situation, the designation has not been used as an adjective, thus the statement is in violation of Standard VII(B)—Reference to CFA Institute, the CFA Designation, and the CFA Program (i.e., the statement should read “the entire research team is made up of CFA charterholders,” rather than “they are all CFA’s”). Members must not exaggerate the meaning or implications of membership in CFA Institute or holding the CFA designation, which Tang does, violating Standard VII(B).

A is incorrect because members must not exaggerate the meaning or implications of membership in CFA Institute or holding the CFA designation. Statements that overstate the competency of an individual or imply that superior performance can be expected from someone with the CFA designation are not allowed under the Standard.

C is incorrect because the CFA designation must always be used as an adjective, i.e., “the entire research team is made up of CFA charterholders.”

2. Solution: C

The performance return claim is a violation of Standard V(B)—Communication with Clients and Prospective Clients, which requires opinion to be separated from fact. In addition, Standard I(C)—Misrepresentation prohibits members and candidates from guaranteeing clients any specific return on volatile investments. In the case of complex analyses, such as proprietary investment analytics software used by CleanTech, analysts must clearly separate fact from statistical conjecture and should identify the known limitations of an analysis, which has been done.

A is incorrect because the investment software has determined investment returns on green transportation companies based on a multiple factor regression analysis, so there is diligence and reasonable basis for the opinion as required by Standard V(A)—Diligence and Reasonable Basis. In addition, disclosure of key risks associated with such software has been provided.

B is incorrect because Standard V(B)—Communication with Clients and Prospective Clients, which requires a balanced discussion of how this investment would perform should tax incentives change or be eliminated completely, has been addressed.

3. Solution: A.

A is correct because Standard III(C) Suitability does not appear to have been violated because the fund is characterized as a high-risk investment and it is clearly stated that EnergyAlgae is also a high-risk investment. CleanTech’s statement that the hedge fund benefited from the increase in

share value for EnergyAlgae last year is a violation of Standard I(C) Misrepresentation because the fund had only recently invested in the stock so did not benefit from the large move in the stock's price. Standard II (A) Material Nonpublic Information has also been violated by the board member who shared material nonpublic information with the hedge fund and by the fund because it acted on the information.

4. Solution: C.

A reasonable and diligent effort was not made when the analysis on EnergyAlgae was updated on only an annual basis because the information on the company could change materially in such a high-risk industry, a violation of Standard V(A)–Diligence and Reasonable Basis. In addition, when the company reports financial results on a semiannual basis, an annual update to a research report would not be timely.

A and B are incorrect because the earnings projections along with the operational analysis are components of a reasonable and diligent effort. Third-party research may be relied upon only when a reasonable and diligent effort has been made to determine the research is sound, which in this case appears to have been performed.

5. Solution: A.

According to Standard I(B)–Independence and Objectivity, full and fair disclosure of all matters that could reasonably be expected to impair independence and objectivity must be made to all clients. In this case, the controlling position in the broker held by the founders of CleanTech, as well as the fact that Slar has underwritten two stocks the hedge fund holds and whose recommendations the fund relied on to make these investments, must be disclosed to all clients so they are better able to judge motives and possible biases for themselves.

C is incorrect because the controlling position in the broker as well as the fact that this firm has underwritten two stocks the hedge fund holds and whose recommendations the fund relied upon to make these investments must be disclosed to all clients so they may be better able to judge motives and possible biases for themselves according to Standard VI(A)–Disclosure of Conflicts; however, there is no requirement the position be eliminated.

B is incorrect because all clients should be made aware of the ownership structure along with other relevant information as required by Standard V(B)–Communication with Clients and Prospective Clients, and there should not be selective disclosure of just one piece of relevant information concerning the arrangement.

6. Solution: B.

The hedge fund had priority in trading the stock ahead of employees. The hedge fund is

effectively the client. But it does not alleviate the stock price manipulation that was engaged in by the fund and its employees, a violation of Standard II(B)—Market Manipulation. In addition, there does not appear to be an adequate basis for recommending the stock (i.e., negative information on the company's products from potential customers and suppliers), a violation of Standard V(A)—Diligence and Reasonable Basis.

A is incorrect because there does not appear to be an adequate basis for recommending the two stocks in violation of Standard V(A)—Diligence and Reasonable Basis.

C is incorrect because both the hedge fund and its employees have engaged in practices that distort prices in violation of Standard II(B)—Market Manipulation. This appears to be a classic “pump and dump” fraud where worthless stock is promoted to the public and once it reaches a certain price level the insiders who helped boost the share price sell off their shares, leaving other investors holding stock that has little or no value.

Case 3: Sue Kim

1. Solution: A.

A is correct because the hedge fund manager's trades do not represent a violation of Standard II (B), Market Manipulation. Kim is not engaging in practices that distort prices or artificially inflates trading volume with the intent to mislead market participants. Because the trades are based on material nonpublic information, however, Kim is in violation of Standard II (A) Material Nonpublic Information. Kim is also in violation of Standard V (A) Diligence and Reasonable Basis because she has based her investment decisions on information received from third parties and has not determined if this information is sound and the processes and procedures used by those responsible for the research were valid.

2. Solution: C.

C is correct because showing past performance of funds managed at a prior firm as part of a performance track record is permissible under Standard III (D) Performance Presentation only as long as showing that record is accompanied by appropriate disclosures about where the performance took place and the person's specific role in achieving that performance, which Kim did not do. In addition, the material used to create this performance record is the property of Kim's former employer, and in order to use this record she should have obtained permission to do so but did not as required by Standard IV (A) Loyalty.

3. Solution: C.

C is correct because disclosure that fully explains the referral fee arrangement has not been properly provided in violation of Standard VI (C) Referral Fees. Akagi is required to disclose in writing, and prior to the execution of any agreement, referral fee agreements in place including the nature and the value of the benefit. Kim is also in violation of Standard IV (C) Responsibilities of Supervisors because she has a responsibility to oversee Akagi and ensure the appropriate disclosures are made concerning referral fees. In addition, Kim verbally telling clients that Green Note compensates Akagi for his efforts to find investors for the fund is not sufficient to meet the disclosure requirements.

4. Solution: B.

B is correct because Standard VI (B) Priority of Transactions concerns investment transactions for clients and employers having priority over investment transactions in which a member or candidate is the beneficial owner. Because the manager does not have beneficial ownership in securities traded in client accounts, this Standard has not been violated. By purchasing shares for Miriam's account before other client accounts, the manager has violated Standard III (B) Fair

Dealing, which requires members and candidates to treat all clients fairly when taking investment action with regard to general purchases. In addition, because the hedge fund manager's trades are based on material nonpublic information, they are in violation of Standard II (A) Material Nonpublic Information. The mosaic theory is not applicable here because the manager used it as a way to hide her receipt of material nonpublic information.

5. Solution: A.

A is correct because Kim has not violated the Code of Ethics and Standard I (A) Knowledge of the Law. Her efforts to influence the legislative process, including her personal donations, are legal and not a violation of any standard.

6. Solution: A.

A is correct because Standard V (A) Diligence and a Reasonable Basis requires members and candidates to ensure their firms have standardized criteria for reviewing external advisers, which Kim has met. Kim is in violation of Standard V (B) Communication with Clients and Prospective Clients because she has not communicated the changes in her investment process to clients. By presenting the third-party research as her own, Kim has also violated Standard I (C) Misrepresentation.

Case 4: Athena

1. Solution: B.

B is correct because Zefferman states the firm is responsible for putting clients' interests above the firm's when appropriate. The General Principles of Conduct embedded in the six components of the Asset Manager Code state that managers have the responsibility of acting for the benefit of clients. The code does not stipulate that this responsibility is applicable only when appropriate.

2. Solution: B.

B is correct because Zefferman, as a CFA charterholder, will be responsible for ensuring Athena complies with the stricter anti-money laundering laws of Europe, where some of its clients reside, as per Standard I (A) Knowledge of the Law. Europe's new laws, which encompass and exceed the local anti-money-laundering regulations, are already in place; therefore, these are the regulations that must be currently followed.

3. Solution: C.

C is correct because Section D, Risk Management, Compliance, and Support, of the Asset Manager Code states that portfolio information provided to clients should be reviewed by an independent third party. The compliance department would be considered an independent third party because compliance is not involved with compiling or presenting the information to clients. According to Section F, Disclosures, disclosures should be truthful, accurate, complete, and understandable. It is unlikely that clients would easily understand complicated calculations. Section F, Disclosures, also calls for communications with clients to be on an ongoing and timely basis. Communication with clients only when they ask for it would not be consistent with the Asset Manager Code. It is recommended that communication be at least on a quarterly basis.

4. Solution: B.

A is correct because Section B(6)(b), Investment Process and Actions, requires clients to be treated equitably, not equally. Clients have different investment objectives and risk tolerances, so treating clients equally would be inconsistent with the Asset Manager Code. B and C are incorrect because the policy is consistent with the Asset Manager Code.

5. Solution: A.

A is correct because Section E, Performance and Valuation, of the Asset Manager Code calls for the use of fair market values sourced by third parties when available, and when such third-party prices are not available, the code calls for the use of "good faith" methods to determine fair value.

Athena's policy appears consistent with this requirement. In terms of client reporting, monthly valuation reports would be consistent with the call for timely reporting.

6. Solution: B.

B is correct because at a minimum, Section D, Risk Management, Compliance, and Support, of the Asset Manager Code recommends that a business continuity plan include plans for contacting and communicating with clients during a period of extended disruption. Wilson's continuity plan includes no such strategy. Wilson's recommendation for disclosing the firm's risk management process to both clients and regulators goes beyond the code recommendation, which is to disclose the risk management process only to clients.

Case 5: Jacaranda

1. Solution: B.

There is no indication that Remmy violated his responsibility as a supervisor under Standard IV(C): Responsibilities of Supervisors. He did, however, violate Standard I(C): Misrepresentation and Standard IV(A): Loyalty by plagiarizing his former employer's compliance manual. Work performed for an employer remains the asset of the employer and cannot be taken to another firm without permission.

2. Solution: A.

Standard V(B): Communication with Clients and Prospective Clients requires the firm to inform the clients about the specialization or diversification expertise provided by external adviser(s) when outside advisers are used to manage various portions of the clients' assets under management. This information allows clients to understand the strategies being applied that affect their investment objectives. Stating "These advisers have the necessary expertise to manage property assets" is not likely to provide enough information for the clients to understand the investment methodologies or strategies implemented by the outside advisers.

3. Solution: A.

Standard III (D): Performance Presentation requires firms to provide credible performance information to clients and prospective clients as well as to avoid misstating or misleading clients and prospective clients about the investment performance of firms. A single composite that includes all client portfolios, regardless of investment objectives (which would likely be different for the retail and institutional clients) could be considered to be misleading. The standard does not require firms to be GIPS compliant. Firms not in compliance with the GIPS standards, however, should present the performance of a weighted composite of similar portfolios, rather than using a single representative account or all accounts with different non-similar portfolios.

4. Solution: B.

Standard V(C): Record Retention requires the retention and maintenance of records to support the investment analyses, recommendations, actions, and other investment-related communications with clients and prospective clients. Because the independent research contractor provides research only for Jacaranda, he would not necessarily be considered a third-party research provider. Thus, he would be required to send his research reports to the firm along with his underlying supporting analysis and financial models. Therefore, Jacaranda does not meet the record retention requirements. The standard allows firms to keep hard copies

and/or electronic copies of documents. In addition, although it recommends files be retained for a minimum of seven years, Jacaranda is still in compliance with the standard in that it meets local regulatory requirements.

5. Solution: C.

As Gatera is not a covered person, it is not required for Bukenya to report him to CFA Institute. However, because Bukenya is a supervisor, she does have the responsibility under Standard IV(C) Responsibility of Supervisors to conduct a thorough investigation of the activities to determine the scope of the wrongdoing. In addition, the supervisor should respond promptly and increase (not maintain) supervision.

6. Solution: A.

Standard III (E): Preservation of Confidentiality requires information about former clients, as well as existing and prospective clients, to be kept confidential unless the law requires the disclosure or permission has been given to disclose the information. Jacaranda's policies cover only existing and prospective clients.

Case 6: Ravinder

1. Solution: A.

Recommendations for Standard VI (A)-Disclosure of Conflicts advises that employee compensation packages based on short-term performance be disclosed to clients, which is currently not allowed by Ravinder's employer. Thus, she should renegotiate her compensation package to either remove the performance aspect of the structure so she can disassociate from the practice or seek to lengthen the performance period assessed to, at minimum, one year. If Ravinder disclosed the compensation package to her clients without her employer's permission, she would be in violation of Standard IV (A)-Loyalty. If she asked her clients to renegotiate their contracts, she may potentially violate Standard III (A)-Loyalty, Prudence and Care because the new contracts may not be as favorable as the current contracts, thus potentially harming her clients.

2. Solution: A.

Taking a more aggressive investment approach for a middle-income person who aims to retire in five years and at a time when his portfolio is being drawn on to cover court-ordered liabilities, regardless of any delay in funding his son's seed capital, may only be appropriate if the portfolio in question represented a small portion of Canon's overall wealth. Typically, a person's risk tolerance decreases with age, regardless of their employment status.

3. Solution: A.

By not giving proper instructions to Obi that required him to return the brochure to her for editing review prior to distribution, she violated Standard IV(C)-Responsibilities of Supervisors. Had Ravinder properly overseen the work done by Obi, the error may have been detected and corrected prior to the brochure being distributed.

4. Solution: C.

Standard III (D)-Performance Presentation recommends terminated accounts remain in the historical records of a weighted composite. Standard III (D) requirements and recommendations can be met without complying with the GIPS standards.

5. Solution: C.

Mensah would violate Standard V (A)-Diligence and Reasonable Basis because his research indicated that the company was overvalued. Mensah would not have violated Standard II (A)-Material Nonpublic Information because causing someone to trade on rumors does not necessarily involve trading on material nonpublic information. In addition, Mensah would not

have violated Standard VI (A)—Disclosure of Conflicts because the bonus structure is not short-term focused and considers long-term value creation through correct investment recommendations. As a result, disclosure of this bonus structure is not required.

6. Solution: B.

Standard VI (A)—Disclosure of Conflicts requires a member or candidate who becomes a director of a publicly listed company to be isolated from those making investment decisions concerning the publicly listed company at which the employee is a director. One such way of doing this would be to not participate in investment strategy meetings when Naivasha is being discussed. But Ravinder would violate Standard I (D)—Misconduct if she shared nonmaterial information if the directors of Naivasha considered it to be confidential. She would also violate Standard III (A)—Loyalty, Prudence, and Care if she excluded Naivasha shares from her clients' portfolios because this approach may negatively affect their investment performance.

Case 7: Ruth McDougal

1. Solution: A.

McDougal's decision to change the recommendation on a stock based on overhead conversations is not a reasonable course of action for a professional analyst, even though the content of the conversations turned out to be true. The standard violated is Standard V(A)--Diligence and Reasonable Basis.

2. Solution: A.

Under Standard I(B) Independence and Objectivity, the best course of action for McDougal to avoid any conflict is to decline the offer and to proceed on her own budget as planned to attend the seminar and write objective research.

3. Solution: C.

This involves Standard IV(B) Additional Compensation Arrangements. McDougal is required to disclose any fee arrangements to her employer. This allows Cratter Finance to consider the outside arrangement when considering the actions and motivations of McDougal.

4. Solution: A.

Standard III(B) Fair Dealing requires that the portfolio managers treat all accounts fairly when taking investment action. In this case they are giving trading priority to specific accounts, knowing that the report has been circulated for review and is not yet available to all clients.

They are not in violation of Priority of Transactions as they are not trading their own account in conflict with any of Cratter Finance's client accounts. They are not in violation of Diligence and Reasonable Basis since they are basing their actions on research recommendations by their firm.

5. Solution: C.

Standard VI(C) Referral Fees deals with the disclosure of referral fees. It explicitly states that the purpose of disclosure is (1) to evaluate any partiality shown in any recommendations of services and (2) to evaluate the full cost of services.

6. Solution: C.

This question deals with the CFA Institute's professional conduct program (PCP) as stated in the CFA Institute bylaws and rules of proceedings related to professional conduct. The CFA Institute cannot impose a monetary fine.

Case 8: Marcia Lopez

1. Solution: A.

A is correct. Putting on her business card “CFA, Level I” and the year in which she expects to receive the CFA designation is a violation of Standard VII(B): Responsibilities as a CFA Institute Member or CFA Candidate, Reference to CFA Institute, the CFA Designation, and the CFA Program. “Candidates in the CFA Program may refer to their participation in the CFA Program, but such references must clearly state that an individual is a candidate in the CFA Program and must not imply that the candidate has achieved any type of partial designation.” Moreover, CFA candidates must never “cite an expected completion date of any level of the CFA Program.”

2. Solution: B.

B is correct. By acting on the analysts’ recommendation changes for their discretionary accounts before the changes are publicly disseminated, the team is violating Standard III(B): Duties to Clients, Fair Dealing. Standard III(B) requires members and candidates to “deal fairly and objectively with all clients when providing investment analysis, making investment recommendations, taking investment action, or engaging in other professional activities.” Guidance to Standard III(B) states: “Members and candidates must make every effort to treat all individual and institutional clients in a fair and impartial manner. A member or candidate may have multiple relationships with an institution; for example, the member or candidate may be a corporate trustee, pension fund manager, manager of funds for individuals employed by the customer, loan originator, or creditor. A member or candidate must exercise care to treat all clients fairly.”

3. Solution: A.

A is correct. Hockett/Lopez violated the Code and Standards. By developing/recommending a balanced portfolio for the Kochanskis without knowing their clients’ investment objectives, risk tolerance, horizon, etc., Hockett/Lopez violated Standard III(C): Duties to Clients, Suitability: “When Members and Candidates are in an advisory relationship with a client, they must:

- A Make a reasonable inquiry into a client’s or prospective client’s investment experience, risk and return objectives, and financial constraints prior to making any investment recommendation or taking investment action and must reassess and update this information regularly.
- B Determine that an investment is suitable to the client’s financial situation and consistent with the client’s written objectives, mandates, and constraints before making an investment recommendation or taking investment action.
- C Judge the suitability of investments in the context of the client’s total portfolio.”

Hockett/Lopez should have developed an investment policy statement for the Kochanskis before they recommended any investments.

4. Solution: A.

A is correct. Lopez violated Standard III(D): Duties to Clients, Performance Presentation in her use and presentation of the composite portfolio's performance because she did not include the performance of terminated accounts. In addition, she included only the team's discretionary accounts of similar size to the Kochanski's. Lopez should have included terminated and current discretionary accounts that were similar in her composite portfolio's performance. There is no need to include non-discretionary accounts as clients make their own investment decisions for such accounts.

Case 9: Frank Litman

1. Solution: B.

B is correct. The Asset Manager Code allows outsourcing, although managers retain the liability and responsibility for any outsourced work. Managers have a responsibility to ensure that the information they provide to clients is accurate and complete. By receiving an independent third-party confirmation or review of that information, clients can have an additional level of confidence that the information is correct, which can enhance the manager's credibility. Such verification is also good business practice.

2. Solution: C.

C is correct. According to the recommendations and guidance in the Asset Manager Code the compliance officer should be independent of any investment and operations personnel.

B is incorrect because the compliance officer should be independent of any investment and operations personnel.

A is incorrect because the compliance officer should report to the CEO or to the Board. The compliance officer reports to the CEO.

3. Solution: B.

According to Standard IV(B), members should disclose the terms of any agreement under which a member will receive additional compensation. Terms include the nature of the compensation, the approximate amount of compensation, and the duration of the agreement. According to Standard III(E), members must keep information about current and prospective clients confidential. Client names would be considered confidential, particularly when tied to the other previously mentioned information to be given to the employer.

4. Solution: B.

According to Standard IV(B)—Additional Compensation Agreements Litman must obtain written permission from all parties involved when conflicts of interest are present.

5. Solution: C.

Standard III(D)—Performance Presentation allows the use of simulated performance analysis as long as it is clearly stated that the results are simulated. Litman uses historical data over 20 years, but he has only managed actual accounts for friends for 10 years. Consequently, he should have stated in the footnote that the results were simulated.

6. Solution: B.

Standard III(C)—Suitability requires that members make a reasonable inquiry into a client or prospective client's investment experience, risk and return objectives, and financial constraints

prior to making any investment recommendations or taking investment action and must update this information regularly. Such an inquiry should be repeated at least annually and prior to material changes to specific investment recommendations or decisions on behalf of the client.

The Code and Standards do not require clients to be treated the same.

A is incorrect because the Standards do not require clients to be treated equally.

C is incorrect because the Standards would require Litman to review his client's new circumstance to advise accordingly.

2. SS2 Ethical and Professional Standards

Case 1: Redlands

1. Solution: B.

The percentage of the composite which non-fee paying accounts represent should be disclosed.

2. Solution: C.

Returns must be clearly labeled as gross of fees or net of fees.

3. Solution: A.

GIPS recommends performance presentations include returns for quarterly and/or shorter time periods.

4. Solution: A.

The GIPS standards requires that returns be clearly labeled as gross of fees or net of fees.

5. Solution: B.

The GIPS standards require firms to disclose which dispersion measure is presented.

6. Solution: A.

The GIPS standards specifically prohibit firms from stating that a particular composite presentation has been “GIPS verified”.

Case 2: Arcadia

1. Solution: A.

A is correct because although the GIPS standards recommend that firms undertake verification, it is not required to claim compliance. The Phoenix office holds itself separate geographically, as well as with respect to personnel and its investment process. Philadelphia will be able to be GIPS compliant even if its Phoenix office is not. Finally, because Arcadia markets itself as separate and distinct from the other affiliates, it can claim compliance even if the others units are not compliant.

2. Solution: B.

B is correct because the GIPS standards require all transactions to be recognized on the trade date and not the settlement date. Trade date is when the transaction takes place, whereas settlement date is when the exchange of cash, securities, and paperwork involved in a transaction is completed.

3. Solution: C.

C is correct because GIPS requires cash and cash equivalents to be included in total return calculations for all asset classes.

4. Solution: C.

C is correct because Portfolio C is required to hold cash at 15%, which is too much for the portfolio manager to execute his strategy effectively. The unanticipated nature of the contributions and withdrawals that can occur daily makes it difficult to invest the funds in equities. This large cash balance implies that the portfolio is nondiscretionary.

5. Solution: A.

A is correct because Arcadia is required by the GIPS standards to present five years of performance because the composite has been in existence for that period. The small-cap composite was started on 31 December 2007. For each composite presented to be GIPS compliant, the Standards require that firms show at least 5 years of annual performance (less if the firm or composite has been in existence for a shorter period) and then the performance record must be extended each year until 10 years of results have been presented.

6. Solution: A.

Note 1 is required. It describes the definition of the firm used to determine the total firm assets. Note 2 is recommended because the firm is encouraged but not required to provide a list of the

firms contained within the parent company. Note 7 is required because firms must disclose which dispersion measure is presented.

Case 3: Sing-Siew Lee

1. Solution: A.

Custody fees should not be considered direct transaction costs, even when they are charged on a per-transaction basis. They are not to be treated as a trading expense.

2. Solution: B.

GIPS standards require the use of fair value for portfolio valuations.

3. Solution: C.

GIPS standards require the separation of composites by strategy as well as vintage year.

4. Solution: B.

According to GIPS standards, the correct order of valuation methodologies is:

1. Objective, observable quoted market prices for similar investments in active markets. (#2)
2. Quoted prices for identical or similar investments in markets that are not active. (#2)
3. Market-based inputs other than quoted prices that are observable for the investment. (#3)
4. Subjective, unobservable inputs. (#1)

5. Solution: B.

B is correct. The GIPS standards specify the types of investments that are not considered real estate, such as publicly traded REITs and private debt investments, both commercial and residential.

A is incorrect because REITs are not subject to GIPs real estate provisions.

C is incorrect because commercial real estate loans are not subject to GIPs real estate provisions.

6. Solution: C.

GIPS standards require that the firm being verified, and not the verification firm (i.e., Stowe), maintain the data and information necessary for the calculations.

Case 4: Anton

1. Solution: C.

C is correct because the GIPS standards require that firms use trade-date accounting for the purpose of performance measurement for periods beginning 1 January 2005 (I.1.A.5). The principle behind requiring trade-date accounting is to ensure that no significant lag occurs between a trade's execution and its reflection in the portfolio's performance.

2. Solution: C.

C is correct because a GIPS requirement is that returns from cash and cash equivalents held in portfolios must be included in total return calculations (I.2.A.3). A primary purpose of performance measurement is to enable prospective clients and, by extension, their consultants to appraise an investment management firm's result. Within the constraints established by a client's investment policy statement (IPS), active managers often have discretion to decide what portion of a portfolio's assets to hold in cash or cash equivalents.

3. Solution: C.

C is correct. The GIPS standards specify the required frequency of asset weighting. Provision I.2.A.7 states that for periods beginning on or after 1 January 2010, composite returns must be calculated by asset weighting the individual portfolio returns at least monthly. Provision I.2.B.2 recommends that the same be done for earlier periods.

4. Solution: A.

A is correct because Long Pond is required by GIPS standards to present five years of performance because the composite has been in existence for that period. The mid-cap composite was started on 31 December 1999; therefore, performance for 2006 must be presented. After presenting five years of performance, the firm should present additional annual performance up to 10 years.

5. Solution: A.

A is correct because Provision I.6.A.4 states that for periods prior to 1 January 2012, real estate investments must have an external valuation at least once every 36 months. For periods beginning on or after 1 January 2012, real estate investments must have an external valuation at least once every 12 months unless client agreements stipulate otherwise; in that case, they must have an external valuation at least every 36 months (or more frequently if required by the client agreement).

Case 5: Bud Walter

1. Solution: B.

B is correct because for GIPS compliance, a single verification report must be issued with respect to the whole firm. Verification cannot be carried out only on a composite and, accordingly, does not provide assurance about the investment performance of any specific composite. The Standards stress that firms must not state or imply that a particular composite has been “verified.”

2. Solution: C.

C is correct. WCM’s return calculation is not GIPS compliant. GIPS requires that returns are calculated on a monthly basis for periods beginning on or after 1 January 2001.

3. Solution: A.

A is correct because the composite consists of all actual fee-paying portfolios that are managed on a discretionary basis. It is therefore in compliance with GIPS standards.

4. Solution: A.

A is correct because custodial fees should not be considered a component of direct trading expenses.

5. Solution: B.

B is correct. Walter is correct about the high/low range, which is skewed by outliers. He is also correct that the standard deviation allows for comparability across investment firms. However, he is incorrect about the interquartile range. Because this measure includes only the middle 50% of portfolio returns, thus excluding extreme observations, it is not impacted by outliers.

6. Solution: A.

A is correct. The valuation hierarchy presented by Walter is GIPS compliant.

Case 6: Ng**1. Solution: A.**

Ng is correct. Because Rune Europe is using the Rune Managers name and marketing materials, the division is not being held out to clients or potential clients as a distinct business entity and so it should be included in the definition of the firm.

2. Solution: B.

The policy on account inclusion is compliant with the standards.

3. Solution: A.

For periods after 1 January 2010, carve-outs must include their own cash balance in order to be included in a composite, so a cash allocation policy for periods after 1 January 2010 would not be GIPS compliant.

4. Solution: C.

The firm description must always be presented in GIPS compliant advertisements. The number of accounts in the composite need not be disclosed in advertisements, and only advertisements that include performance information must disclose the composite and benchmark descriptions.

5. Solution: B.

The currency used to express performance, whether any fees other than trading expenses are deducted from gross-of-fees returns, whether any fees other than trading expenses and management fees are deducted from net-of-fees returns, the fee schedule, and a measure of internal dispersion are all required disclosures for compliance with the GIPS standards.

6. Solution: B.

The annualized three-year ex post standard deviation of monthly returns must be presented for both the composite and the benchmark for each annual period after 1 January 2011. The annualized three-year ex post standard deviation of monthly returns for benchmark is not shown in Exhibit 1. Firms are required to disclose that policies for valuing portfolios, calculating returns, and preparing compliant presentations are available upon request.

Case 7: Vision 2020 (AMC)

1. Solution: B.

B is correct because the board gave instructions to Akinyi to ensure compliance with capital markets regulations, thus upholding one of the general principles of conduct of the Asset Managers Code. However, the desire for the Fund to act as a buyer of last resort violates the principle of acting for the benefit of clients: i.e. placing their interests before their own. By putting their own interests in front of their clients, the board is not acting in a professional and ethical manner. While the Fund may benefit corporate finance clients and meet the demand of some clients for a Fund, Fund clients' interests may not be protected by the Fund guaranteeing to buy 100% of the corporate finance clients' private placements. These placements may not meet the Fund's objectives and risk profile, thus not protecting the interests of the Fund's clients.

2. Solution: C.

C is correct because the recommendation states that the Fund should respond to all client inquiries where the principles state the managers should communicate with clients in a timely and accurate manner. While it is true managers should respond to client inquiries, they also have the responsibility to present performance information that is fair, accurate, relevant, timely and complete. This is a form of communication.

3. Solution: A.

A is correct because the Directors have corporate finance experience and business experience, not asset management experience and therefore they should hire professional asset managers to manage the Fund.

4. Solution: C.

C is correct because the Fund would comply with the Code if it made full disclosure to all of its clients regarding the relationship between the Fund and V2020 activities; the Investment Banking/corporate finance activities. Both parties should disclose any common ownership, even minority positions. It may disadvantage Fund clients if it were not allowed to participate in any of the private placements done by V2020 on behalf of their corporate finance clients.

5. Solution: B.

B is correct because the Code calls for the Manager to maximize client portfolio value by seeking best execution for all client transactions. If trades only go through one stockbroker, best execution cannot be assured. In addition, any equity ownership in these brokers should be

disclosed as this arrangement has the potential for conflicts of interest.

6. Solution: A.

A is correct because the Code calls for complete disclosures regarding significant changes in personnel and any regulatory or disciplinary action taken against the Fund. While they disclosed the conditional license renewal and the removal of the Fund Manager, they did not disclose the serious condition that any further violation will result in the Fund being closed. Clients should be told about the regulator's warning so they can make an informed decision regarding whether to continue their investment in the Fund. Disclosure is not required for the payment of bonuses, or termination packages to employees.

Case 8: Access Wealth Management

1. Solution: C.

The fourth step of ethical decision-making is to reflect on and assess your decision and its outcome. Using an ethical decision-making framework will help assess situations from multiple perspectives and avoid poor decision making. The framework provides no guarantee of a positive outcome but may help avoid making unethical choices.

2. Solution: C.

Professionals, in general, may opt to raise a concern with various parties, including the following:

- Colleagues or contemporaries
- Supervisors
- A firm's compliance or ethics officer
- A mentor outside the firm
- A professional body hotline
- Senior individuals in the firm, a firm's whistleblowing (or "speak-up") line
- A regulator or law enforcement agency

When a dilemma occurs, internally raising an issue is a good starting place as it can be followed with an independent internal review. When seeking the advice of others, confidentiality should be maintained. Protecting the client and the firm may take priority over the individual professional, raising a concern. Note that client interests supersede firm or individual interests in areas with regulatory consequences.

3. Solution: A.

The investment management profession and investment firms must be interdependent to maintain trust.

4. Solution: B.

The greatest challenge for the investment profession possibly comes from technology. Rapid advances in computing power, data storage, and internet connectivity threaten to alter the definition of professional expertise and how it is applied to serve investors. Globalization has created a more common practice around the world and greater international harmonization of investment practices and regulation. Globalization may bring challenges if large global investment firms establish their own standards and practices that conflict with the codes of individual bodies.

3. SS3 Behavioral Finance

Case 1: Doug Green

1. Solution: A.

A is correct. Statement 3 is incorrect, traditional finance assumes investors have access to perfect information and process all available information in an unbiased way. Green has commented they process all available information based on their own experiences. Statement 1 regarding prices and Statement 2 regarding information are both correct.

2. Solution: A.

A is correct. Weaver's criticisms concerning the rational economic man (REM) are correct. A common shortcoming of the theory concerns the inner conflicts that real people face and even Keynes acknowledged the limitations of people in making decisions.

3. Solution: C.

C is correct. Behavioral biases can be categorized as either cognitive errors or emotional biases. Cognitive errors stem from basic statistical, information-processing, or memory errors and are considered to result from faulty thinking. Weaver's elderly client has exhibited a cognitive error: an information-processing or memory error regarding the losses that were taken to eliminate taxable realized gains which resulted in a higher-than-normal cash balance.

4. Solution: A.

A is correct. Weaver's client most likely demonstrated satisficing when he purchased the antique vehicle. Satisficing combines satisfy and suffice and describes decision, actions, and outcomes that may not be optimal, but are adequate.

5. Solution: B.

B is correct. Conclusion 3 is least likely correct. Green and Weaver's conclusion regarding sophisticated investors being better positioned to outperform fewer savvy participants in efficient markets is incorrect. Only in inefficient markets may sophisticated investors have an advantage. In theory if markets are strong form efficient neither investor would have an advantage. Both Conclusion 1 regarding support for both efficient markets and anomalous markets and Conclusion 2 regarding the construction of investment are both correct.

Case 2: Meredith Yang

1. Solution: A.

A is correct. Bailey is not exhibiting characteristics of multiple investor types. He is only exhibiting the investor characteristics associated with an Active Accumulator (AA) that include both cognitive and emotional biases. He is also exhibiting behavioral changes as he is aging as he has become more emotional about his investment portfolio.

2. Solution: A.

A is correct. Owen's comment regarding Steven's current portfolio construction is not correct. Her current portfolio is subject to mental accounting, has been constructed in layers and does not take into consideration covariance between assets.

3. Solution: C.

C is correct. Burke's comment that he had suffered a major loss in LTop stock in the past and because of that experience he would not be able to support buying the stock regardless of the improved outlook and analyst upgrade unduly influenced the other committee members. The committee member's actions demonstrated Social Proof, they wrongly endorsed the Investment Committee Chair's judgement, and they may not have been fully aware they were doing so.

4. Solution: B.

B is correct. Philly's increased trading activity is indicative of overconfidence. In bubbles investors often exhibit symptoms of overconfidence; overtrading, under-estimation of risks, failure to diversify, and rejection of contradictory information. With overconfidence, investors are more active and trading volume increases, thus lowering their expected profits. Overconfidence and excessive trading are linked to confirmation bias and self-attribution bias as well as hindsight bias and the illusion of knowledge.

Case 3: Laura Davidson

1. Solution: A.

Both Conner and Donnelly are exhibiting emotional biases. When advising emotionally biased investors, advisers should focus on explaining how the investment program being created affects such issues as financial security, retirement, or future generations rather than focusing on quantitative details. The recommendation for Conner would be more suited for a cognitively biased investor. O'Driscoll is a cognitively biased investor (friendly follower). As such, focusing on such metrics as the Sharpe Ratio would be appropriate for this client.

2. Solution: B.

Donnelly is entrepreneurial and created his own wealth. He lacks spending controls, does not believe in the benefits of portfolio diversification, has a high-risk tolerance, and prefers high-risk investments recommended by friends. These are all attributes of an active accumulator.

3. Solution: A.

The illusion of control bias can be encouraged by complex models. The illusion of control can lead to analysts being overly confident when forecasting complex patterns, such as future interest rate movements.

4. Solution: A.

Framing bias is a type of cognitive error in which a person answers a question differently based on the way in which it is asked. This behavior is unlikely to explain the persistence of momentum. Regret is a type of hindsight bias that can result in investors purchasing securities after a significant run-up in price because of a fear of not participating. This bias could explain momentum. With availability bias, also referred to as the recency effect, the tendency to recall recent events more vividly can result in investors extrapolating recent price gains into the future. This bias could also explain momentum.

5. Solution: B.

It is recommended that investment committees be composed of people with differing skills and experiences, not similar as Kelly has suggested. Decision makers are most likely to learn to control harmful behavioral biases when they have repeated attempts at decision making and there is good quality feedback on prior outcomes. The investment committee chair should actively encourage alternative opinions so that all perspectives are covered. Asking for individual views prior to discussion can help mitigate the impact of group thinking.

Case 4: Krista Duchene

1. Solution: B.

Jonathan has relatively low wealth and high standard of living risk (SLR), suggesting we mitigate (change his behavior). But he is also emotional, and we will likely have to accommodate some of his biases. The desire to hold the investment grade bonds his father bought is an emotional (endowment) bias, but it makes sense that he retains significant fixed income, given his lower overall risk tolerance and the fact that he is approaching retirement. We can more reasonably accommodate that bias and retain the bonds. Totally avoiding international equity ignores the potential to lower his portfolio risk through diversification as well as potentially improve his return. Both are important given his significant SLR. It makes more sense to work with him and mitigate that bias.

2. Solution: C.

The loss that has already occurred, cannot be changed, and should not rationally affect his next decision. The proposal has an expected payoff of losing \$50 (50% chance of making \$5,000 and 50% chance of losing \$5,100) but the payoff is clearly uncertain. A risk averse investor would not accept the proposal.

A risk averse investor would not even accept a fair wager with an expected 0 payoff. Accepting a negative payoff event is risk seeking. Seth is so averse to emotionally accepting he has already lost 5,000, he will take a proposal with a negative payoff.

3. Solution: C.

Leah's description of the coin toss is an example of gambler's fallacy; in this case a mistaken belief that reversal to the mean dictates that the previous coin flips affect the next outcome. With a coin, the next and every flip is independent of all other flips and a 50/50 proposition.

Anchoring and adjustment refers to being "anchored" to a previous data point. Being influenced by (anchored to) the previous forecast, the individual is not able to fully incorporate or make an appropriate adjustment in her forecast to fully incorporate the effect of new information. It is not the same as inaccurately extrapolating past data into the future. Confirmation bias refers to the tendency to view new information as confirmation of an original forecast.

4. Solution: A.

Micah is clearly anchored to the original purchase price of 25, so the behavior is most like anchoring and adjustment. There are also elements of conservatism, forming an initial rational view and then not updating it; as well as confirmation, ignoring new analyst reports that the current price is fair. However, Micah's situation is more specific in that he is "anchored" to his \$25

initial purchase price.

5. Solution: C.

Status quo bias, endowment bias, and regret aversion bias are very closely related. However, status quo is maintaining a choice out of inertia, which is exactly what Stacey is doing.

In contrast, endowment bias arises when some intangible emotional value is assigned to a holding, perhaps because it was inherited. That may well be true, but the facts do not specifically tell us that. Regret aversion bias is the fear of making a change and having it go badly, so the thought is that by doing nothing, one will never be responsible.

6. Solution: A.

The behavioral asset pricing model adds a sentiment premium to the discount rate of the traditional capital asset pricing model; the required return on an asset is the risk-free rate, plus a fundamental risk premium, plus a sentiment premium. There is nothing in the behavioral asset pricing model that mentions satisficing.

The adaptive markets hypothesis (AMH) assumes successful market participants apply heuristics until they no longer work and then adjust them accordingly. In other words, success in the market is an evolutionary process. Those who do not or cannot adapt do not survive. AMH specifically assumes that investors satisfice rather than maximize utility.

Holding a well-diversified portfolio as prescribed by traditional finance will maximize utility in theory. With behavioral portfolio theory, individuals construct a portfolio by layers. Each layer reflects a different expected return and risk. The result does not maximize utility in theory, so there is an element of satisficing occurring. Satisfice is described as investors gathering what they consider to be an adequate amount of information and apply heuristics to arrive at an acceptable decision (i.e., behavioral portfolio theory). The investor does not necessarily make the theoretically optimal decision from a traditional finance perspective.

Case 5: Arzac Wealth Management Services

1. Solution: C.

Arzac's ideal clients would most likely be classified as the Guardian investor personality type using the BB&K classifications. Guardians are cautious and concerned about the future, particularly as they approach retirement. They are concerned about protecting their assets and may seek advice from those they perceive as being more knowledgeable than themselves.

B is incorrect because Individualists are independent and confident investors who like to make their own decisions. They are unlikely to easily take advice without doing their own analysis.

A is incorrect because celebrities hold opinions about some things but may be willing to take advice about investing. They only recognize their investment limitations to a certain extent.

2. Solution: B.

B is correct. Because risk analysis is a cognitive process, the risk tolerance questionnaire may fail investors with an emotional bias—those who are likely to view risk as an emotional process rather than a cognitive process. Risk tolerance questionnaires will likely work better for investors with a cognitive bias because they are likely to think about risk more logically. Therefore, Arzac's questionnaire will likely fail Active Aggressive investor types because of their primary emotional bias. Consequently, the relationship between the investor and the adviser may not be favorable.

A is incorrect because an Active Growth investor type has a primary cognitive bias. Investors with a cognitive bias look at risk as a cognitive process, not an emotional process.

C is incorrect because a Passive Moderate investor type has a primary cognitive bias. Investors with a cognitive bias look at risk as a cognitive process, not an emotional process.

3. Solution: A.

Pak constructed his initial investment portfolio through the equal distribution of mutual funds, reflecting simple heuristics or a framing bias. This is an example of a naive diversification strategy (i.e., dividing assets equally among available funds irrespective of the underlying composition of the funds). The equal distribution may also reflect a fear of regret: Pak doesn't understand which fund will outperform, so he decides to invest in all three equally.

B is incorrect because Pak has been increasing his exposure to global securities over time, as he wants to reduce risk by increasing his diversification by investing outside his home market. He does not have a home bias.

C is incorrect because Pak did not purchase an investment on the basis of familiarity but declined to purchase his employer's stock because he felt the company was not performing to expectations.

4. Solution: B.

In expressing the opinion that he should have known the Brexit referendum outcome in advance, Pak is exhibiting hindsight bias or regret. Humans have a tendency to see past events as having been predictable, and the resulting regret can be acute when the event results in a highly volatile market.

A is incorrect because Pak did not follow his friends when they exited the market prior to the Brexit referendum.

C is incorrect because Pak is selling his biggest losers so does not exhibit signs of loss aversion.

5. Solution: A.

Self-attribution bias is a bias in which people take personal credit for successes and attribute failures to external factors outside the individual's control. There is no evidence she takes personal credit for her success. Torok credits the firm's financial models for the accuracy of the forecasts.

B is incorrect because Torok is likely overconfident given that she considers herself to be one of the top five analysts in the market and being asked to speak at banking conferences and on TV. She also sources additional information similar in nature, so it is unlikely to increase the accuracy of her forecast but instead reinforces her confidence in that forecast.

C is incorrect because Torok may have been subject to the illusion of control due to using overly complex forecast models. Excess of information cannot eliminate the risk in a model or the modeling process.

6. Solution: C.

The analyst who presents at the committee appears to be influenced by the status and prior comments made by the members of the investment committee. He may have wrongly favored the judgment or endorsement of committee members, which is an example of social proof bias.

A is incorrect. Given that the committee chair insists each analyst presents and gives their opinions before committee members indicates he will unlikely dictate the investment decisions.

B is incorrect because the chair requires all presentations to be made available to the committee well in advance of any meeting. Allowing the committee members to form opinions independently prior to the meeting will likely give rise to active discussions with varying viewpoints. Having members of an investment committee with diverse backgrounds and different investment styles can be viewed favorably in that it can help prevent groupthink. It does not necessary indicate they will not be able to reach a consensus.

Case 6: Vito Chen

1. Solution: A.

Conservatism bias is when an individual maintains his or her prior views by inadequately incorporating new information. Mrs. Wentworth believes international stocks are risky even when she is presented with new information proving that they are not. Availability bias is not correct because it relates to making investment decisions based on specific events/investments that are easily recalled. Mrs. Wentworth does not hold this belief due to a specific event or investment.

2. Solution: B.

Jack takes credit for successful startups but blames the failed startups on external conditions. This is an example of self-attribution bias.

3. Solution: A.

Henry does not want to make a change in his portfolio, preferring to maintain it at the existing level, signaling the presence of a status quo bias. Also, he is attached to his portfolio because he inherited it from his parents. This is an example of endowment bias.

4. Solution: C.

Mental accounting bias does result in a higher risk profile, but it is because total risk and correlation between assets are not considered and not because higher returns are pursued. Options A and B are a consequence of mental accounting bias.

5. Solution: C.

According to transitivity, investment rankings must be applied consistently. If Sherry prefers investment A to B and prefers investment B to C, she must prefer investment A to C.

6. Solution: B.

One of the foundations of prospect theory is loss aversion. Investors focus on risk relative to gains and losses (change in wealth) rather than risk relative to returns. The result is that the disutility associated with a loss is greater than the increase in utility from a gain of the same magnitude.

4. SS4 CME

Case 1: Brian O'Reilly

1. Solution: C.

O'Reilly's answer is incorrect with respect to correlation estimates. High-frequency data are more sensitive to asynchronism across variables and, as a result, tend to produce lower correlation estimates.

2. Solution: C.

O'Reilly's explanation of the anchoring trap is incorrect. The anchoring trap is the tendency of the mind to give disproportionate weight to the first information it receives on a topic. Initial impressions, estimates, or data anchor subsequent thoughts and judgments.

3. Solution: C.

The covariance between Market 1 and Market 2 is calculated as follows:

$$M_{12} = (1.20 \times 0.90 \times 0.0225) + (0 \times 0 \times 0.0025) + [(1.20 \times 0) + (0 \times 0.90)] \times 0.0022 = 0.0243.$$

4. Solution: C.

According to the Grinold-Kroner model, the expected long-term developed market equity return is equal to the sum of the: 1) expected income return (dividend yield minus the percentage change in the number of shares outstanding), 2) expected nominal earnings growth return (long-term inflation rate plus long-term corporate earnings growth rate), and 3) repricing return (expansion rate for P/E multiples). In this case:

$$E(Re) = [1.95 - (-1.0)] + [1.75 + 3.50] + 0.15 = 2.95 + 5.25 + 0.15 = 8.35\%$$

Case 2: Rogers

1. Solution: A.

A is correct. Data for alternative investments without liquid public markets tend to overly smooth return variations because they are often appraisal-based rather than transaction-based. This smoothing underestimate risk and the magnitudes of correlation values.

2. Solution: A.

A is correct. Survivorship bias is when a data series only reflects companies that exist at a given moment in time and not companies that may have left prior to the given moment in time (i.e., only the surviving firms are in the data). The NEXT Index has survivorship bias as evidenced by the frequent change in its component firms because of failure and acquisition by larger non-index firms.

3. Solution: B.

B is correct. To determine the correlation matrix within the different energy sectors, Rogers' team relies on a weighted average of correlations derived from multifactor models and historical correlations. A shrinkage estimator is a weighted average of correlation (or covariance) matrices created from at least two different correlation (or covariance) matrices generated from different sources.

4. Solution: A.

A is correct. Rogers' team views giving more weight to the historical correlations as a safety measure and to manage client expectations. The prudence trap is a tendency to be overly cautious in forecasts because of potentially damaging results from being incorrect.

5. Solution: B.

B is correct. Phillips believes the impact of hurricane activity will not necessarily continue in the future. A time-period bias occurs when relationships or sensitivities only occur during a particular period.

Case 3: Minglu Li

1. Solution: C.

C is correct. The SCI data is an index that is not composed of the same number of firms in each period because of firm failures and combinations through time, which indicates survivorship bias.

2. Solution: C.

C is correct. As stated, the projections in the survey data tended to be more volatile than the actual outcomes over the same time. This finding indicates that the ex-post risk (i.e., the volatility of the actual data) tends to have a downward bias relative to the ex ante risk displayed by the survey data. This result is evidence of ex post risk being a biased measure of ex ante risk.

3. Solution: B.

The Taylor rule sets the optimal short-term rate as:

Neutral rate + $0.5 \times (\text{GDP growth forecast} - \text{GDP growth trend}) + 0.5 \times (\text{Inflation forecast} - \text{Inflation target})$

Applying numbers from Exhibit 1, $2\% = 2.5\% + 0.5 \times (2\% - 1\%) + 0.5 \times (1.5\% - 3.5\%)$.

4. Solution: B.

B is correct. A flat yield curve is consistent with tight monetary policy and loose fiscal policy making. Tolliver's statement is incorrect regarding fiscal policy.

Case 4: Ptolemy

1. Solution: C.

Spenser's statement is most accurate. In the economic indicators approach, for example, the composite of leading economic indicators is based on an analysis of its forecasting usefulness in past cycles. The indicators are intuitive, simple to construct, require only a limited number of variables, and third-party versions are also available.

2. Solution: B.

The Grinold–Kroner model formula is

$$E(R) = D/P - \Delta S + i + g + \Delta P/E.$$

First, compute the compound annual growth rate of the P/E: $(15.0/15.6)^{1/10} - 1 = -0.4\%$.

Next, compute, as a percentage, the expected return per the Grinold–Kroner model formula:

$$E(R) = 2.1 - (-1.0) + 2.3 + 2.6 - 0.4 = 7.6,$$

where

$E(R)$ = expected rate of return on equity

D/P = expected dividend yield

ΔS = expected percent change in number of shares outstanding

i = the expected inflation rate

g = the expected real total earnings growth rate (not identical to EPS growth rate in general, with changes in shares outstanding)

$\Delta P/E$ = per period percent change in the P/E multiple

3. Solution: B.

The Taylor rule is

$$R_{\text{optimal}} = R_{\text{neutral}} + [0.5 \times (\text{GDP}_{\text{forecast}} - \text{GDP}_{\text{trend}})] + [0.5 \times (I_{\text{forecast}} - I_{\text{target}})].$$

$$R_{\text{optimal}} = 2.5 + [0.5 \times (3.0 - 4.5)] + [0.5 \times (3.2 - 2.5)] = 2.5 - 0.75 + 0.35 = 2.10\%.$$

4. Solution: A.

The Singer–Terhaar approach for determining the expected return on an asset class involves determining the risk premium arising from systematic risk as a weighted average of the risk premiums arising from a fully integrated market and fully segmented market, where the weights for the fully integrated market are the degree of integration of the markets. The risk premium for the fully integrated market is given by

$$RP_i = \sigma_i \rho_{i,M} \left(\frac{RP_M}{\sigma_M} \right) \text{ where } \frac{RP_M}{\sigma_M} \text{ is the Sharpe ratio for the world market portfolio.}$$

The risk premium for the fully segmented market is given by $RP_i = \sigma_i \left(\frac{RP_M}{\sigma_M} \right)$

In addition, if there are market imperfections, such as illiquidity premiums, they must be added in. · Finally, the expected return on the asset class is determined by adding these risk premiums to the risk-free rate, in classical capital asset pricing model fashion.

Step 1:

Systematic risk premium in fully integrated market

$$\text{Risk premium: } RP_i = \sigma_i \rho_{i,M} \left(\frac{RP_M}{\sigma_M} \right) \quad (23\% \times 0.85 \times 0.31) = 6.06\%$$

Step 2:

Systematic risk premium in fully segmented market

$$\text{Risk premium: } RP_i = \sigma_i \left(\frac{RP_M}{\sigma_M} \right) \quad (23\% \times 0.31) = 7.13\%$$

Step 3:

$$\text{Weight systematic risk premiums by degree of integration: } (0.65 \times 6.06 + 0.35 \times 7.13) = 6.43\%$$

Step 4:

$$\text{Add the illiquidity premium } 6.43\% + 0.60\% = 7.03\%$$

Step 5:

$$\text{Add the risk-free rate } 2.5\% + 7.03\% = 9.53\%$$

5. Solution: A.

The most favorable phases when considering equity returns are initial recovery and early upswing whereas the late upswing, slowdown, and recession phases carry the greater risk for equities.

Hungary has the combination of factors consistent with the initial recovery/early upswing phases of the business cycle – increasing production, low inflation, improving confidence, stimulatory fiscal/monetary policies, and abundant capacity. These indicators point to strongly rising stock prices and therefore most attractive for equity returns.

Case 5: CME

1. Solution: C.

$$\beta_i = \text{Cov}(R_i, R_M) / \text{Var}(R_M)$$

Note that covariance is given as 0.0075.

Find $\text{Var}(R_M)$ by using the Sharpe ratio = RP_M / σ_M and solve for σ_M

Expected return – Risk-free rate = RP_M

$$7.2\% - 3.1\% = 4.1\% \text{ (or 0.041)}$$

$$\sigma_M = 0.041 / 0.36 = 0.1139$$

$$\text{Var}(R_M) = (0.1139)^2 = 0.0130$$

$$\beta_i = 0.0075 / 0.0130 = 0.58$$

2. Solution: A.

Grey recommends the Singer–Terhaar approach and a correlation of 0.39 between real estate and the market. Use these steps to solve for the expected return:

Step 1	Fully integrated risk premium	$(14.0\% \times 0.39 \times 0.36) =$	1.97%
	Fully segmented risk premium	$(14.0\% \times 0.36) =$	5.04%
Step 2	Fully integrated and segmented risk premium, considering the degree of integration	$(1.97\% \times 0.6) + (5.04\% \times 0.4) =$	3.20%
Step 3	Expected return estimate: Fully integrated and segmented risk premium + Risk-free rate	$3.20\% + 3.1\% =$	6.3%

3. Solution: C.

F_1 = Factor 1, Global Equity

F_2 = Factor 2, Global Bonds

$$\text{Var}(F_1)^{0.5} = 0.025^{0.5} = 0.1581$$

$$\text{Var}(F_2)^{0.5} = 0.0014^{0.5} = 0.0374$$

$$\text{Cov}(F_1, F_2) = \sigma_1 \sigma_2 \rho_{1,2} = 0.1518 \times 0.374 \times 0.33 = 0.002$$

Real estate factor sensitivities are $b_{re,1}$ 0.6 for sensitivity to global equity and $b_{re,2}$ 0.15 for global bonds. Residual risk variance (given) is $\text{Var}(\epsilon_{re}) = 0.044$.

Variance of real estate =

$$b_{re,1}^2 \text{Var}(F_1) + b_{re,2}^2 \text{Var}(F_2) + 2b_{re,1}b_{re,2}\text{COV}(F_1, F_2) + \text{Var}(\epsilon_{re})$$

$$= (0.6)^2 \times 0.025 + (0.15)^2 \times 0.0014 + 2 \times 0.6 \times 0.15 \times 0.002 + 0.044 = 0.053392$$

Square root of variance is the standard deviation = 0.231, or 23.1%.

4. Solution: B.

Cortez's statement to calculate a weighted average for the covariance estimate is an example of shrinkage estimation. Shrinkage estimation involves taking a weighted average of a historical estimate of a parameter and some other parameters estimate, in which the weights reflect the analyst's relative belief in the estimates. A shrinkage estimator of the covariance matrix is a weighted average of the historical covariance matrix and an alternative estimator of the covariance matrix.

5. Solution: A.

In deflation, real estate experiences downward pricing pressure (negative) and bonds benefit from improving purchasing power (positive). Therefore, Grey's comment about real estate is incorrect. In equilibrium, inflation at or below expectations is a positive for equities. The comment about equities is correct.

6. Solution: B.

Cortez's statement is entirely correct. A disadvantage of the leading indicators-based approach is that historically, it has not consistently worked because relationships between inputs are not static. An advantage to the econometric approach is that it provides quantitative estimates of the effects on the economy of changes in exogenous variables.

Case 6: Culpepper

1. Solution: B.

The most likely cause of the price gain was a decrease in the discount rate over the period. Given the mature nature of the economy and companies in the Index, it is unlikely that the estimate of long-term real dividend growth or dividend payouts changed much, if at all.

2. Solution: A.

In a developing country, there may be severe problems with the accuracy of data inputs. It is difficult to obtain macroeconomic data in developed countries with long-established methods and facilities. The problems of obtaining accurate and historically consistent data are multiplied in developing markets.

3. Solution: C.

Most top-down models are of the econometric type and rely on historical relationships to be the basis for assumptions about the future. Thus, they can be slow in detecting cyclical turns.

Case 7: Olli Nava Scenario

1. Solution: B

Statement 1 is correct. There is theoretical and empirical evidence that average long-term government bond yields are directly linked to the trend rate of growth in an economy.

Statement 2 is incorrect. Over the long run, the capital gains component of equity returns is directly linked to GDP. However, this does not apply to the income component of returns (i.e., the dividend yield). Hence, it is not true to say that the total return (capital gains plus income) is linked to GDP growth.

2. Solution: C.

Real GDP growth = labor input growth + labor productivity growth = 0.8% + 1.2% = 2.0%

Nominal GDP growth = real GDP growth + inflation = 2.0% + 2.5% = 4.5%

Long-term capital gains in equity markets = $\% \Delta$ nominal GDP + $\% \Delta$ profits/GDP + $\% \Delta$ PE = 4.5% + 0% + 0% = 4.5%

Long-term total domestic market equity return = capital gains + dividend yield = 4.5% + 3.0% = 7.5%

3. Solution: B.

A country cannot simultaneously have unrestricted capital flows, a fixed exchange rate, and an independent monetary policy because changes in monetary policy (e.g., interest rates) will likely cause capital flows, which will impact on the currency exchange rate. Hence, developing Market B is least likely to be able to follow an independent monetary policy.

4. Solution: A.

The Dornbusch overshooting mechanism states that immediate capital flows will strengthen the currencies of countries with high expected returns to the point where the high return currency will be expected to depreciate going forward by the return differential.

This is captured by the relation:

$$E(\% \Delta S_{\text{VAR/FIX}}) = E(R_{\text{VAR}}) - E(R_{\text{FIX}}), \text{ where:}$$

$E(R_{\text{VAR}})$ = expected return in the variable currency market

$E(R_{\text{FIX}})$ = expected return in the fixed currency market

The quote of DOM/FOR has the domestic currency as variable and the foreign currency of Country X as fixed.

The expected return of the domestic market is given by the sum of the domestic returns and premiums. This is equal to 0.75% + 0.00% + 1.10% + 3.00% + 0.00% = 4.85%.

The expected return of the market in Country X is given by the sum of the Country X returns and premiums. This is equal to $1.25\% + 0.50\% + 0.60\% + 4.00\% + 0.00\% = 6.35\%$.

Hence under the Dornbusch overshooting model: $E(\% \Delta S_{\text{DOM/FOR}}) = 4.85\% - 6.35\% = -1.50\%$

Hence, the forecast foreign exchange rate in one year = $(1 - 0.015) \times \text{spot}_{\text{DOM/FOR}} = (1 - 0.015) \times 1.3020 = 1.2825$.

Note that the higher expected return currency of Country X is expected to weaken going forward.

5. Solution: B.

Purchasing power parity states that high inflation currencies are expected to weaken. If the domestic country inflation is expected to be higher than inflation in Country X, then the domestic currency is expected to weaken. This means the DOM/FOR quote will rise as there will be more DOM units per FOR units.

Case 8: Earl Warren

1. Solution: B.

Country C is a developing market. Less-developed markets are likely to be undergoing more rapid structural changes, which may require the analyst to make more significant adjustments relative to past trends.

2. Solution: B.

Warren's model predicts that Country C's business cycle is currently in the late upswing phase. In the late expansion phase, interest rates are typically rising as monetary policy becomes more restrictive.

3. Solution: A.

The exchange rate S_d/f (INR is the domestic currency) will most likely rise because the Indian currency versus the foreign currency will depreciate. Both the decrease in short-term rates and the likely decrease in the equity premium are likely to induce short-term capital outflows. This should put significant pressure on the Indian currency to depreciate (i.e., the S_d/f exchange rate will rise if INR is defined as the domestic currency). The initial impact may be offset to some extent by inflows of government bonds as investors push yields down in anticipation of increasing demand, but as bonds are repriced, it will reinforce the downward pressure on the exchange rate.

4. Solution: C.

If monetary policy is restrictive and fiscal policy is expansionary, the yield curve is flat and the economic implications are less clear.

5. Solution: C.

The expected return of 10-year BBB rated corporate bond at issue is $2.5\% + 1\% + 0.85\% + 0.65\% = 5.0\%$.

6. Solution: C.

The expected change in the cap rate is $\frac{4.45\% - 4.6\%}{4.6\%} = -3.26\%$;

$E(R) = \text{Cap Rate} + \text{NOI growth rate} - \% \Delta \text{Cap Rate} = 4.6\% + 2.5\% - (-3.26\%) = 10.36\%$.

5. SS5 Asset Allocation

Case 1: Windsong

1. Solution: B.

B is correct. The economic net worth is the difference between the total assets and the total liabilities ($21.00 - 15.25 = 5.75$), as calculated in the following economic balance sheet.

Economic Balance Sheet of Jane Lennon (in \$ millions)

Assets		Liabilities and Net Worth	
<i>Financial Assets</i>		<i>Financial Liabilities</i>	
Investment portfolio	8.00	Mortgage: vacation property	1.00
Restricted shares	1.00		
Real estate: residence	2.00	<i>Extended Liabilities</i>	
Real estate: vacation property	3.00	Everett's education	1.50
Defined contribution pension plan	2.50	Trust for Marshall	2.00
University endowment			1.75
PV of future consumption			9.00
<i>Extended Assets</i>		Total Liabilities	15.25
Human capital	4.50	Net Worth	
		Economic net worth	5.75
Total Assets	21.00	Total Liabilities and Net Worth	21.00

A is incorrect. It ignores the restricted shares but keeps everything else: $(21 - 1) - 15.25 = 4.75$

C is incorrect. It ignores earnings until retirement (human capital): $(21 - 4.5) - 15.25 = 1.25$

2. Solution: A.

A is correct. Both of the funds planned for the trust and university endowment represent an imminent need (immediate for the trust and within two years for the endowment). The funding needed for education, however, extends over the longest time horizon, possibly as long as 8 to 10 years. Thus, its sub-portfolio would be in the best position to take on the greatest risk.

B is incorrect. Although the special needs trust for Marshall will provide benefits for his entire life, and therefore has a long-time horizon, from Lennon's perspective it requires immediate funding and should be very liquid and bear little risk.

C is incorrect. Funding of the university endowment involves a short-term time horizon (within two years) so it should bear little risk.

3. Solution: C.

C is correct. The behavioral bias illustrated in Lennon's past investment experience was

loss-aversion bias: Losses are perceived as more painful than the satisfaction of equivalent gains, and assets that have incurred losses but have little chance of recovery are retained because the pain of recognizing the loss is too great. Given the risk of having to give back gains already realized, winning investments are often sold early, resulting in self-imposed limited upside potential.

A is incorrect. Self-control bias is a bias in which people fail to act in pursuit of their long-term, overarching goals because of lack of discipline. Lennon does not appear to exhibit this bias because she has taken steps to deal with her specific goals, including saving for her own future and that of her children.

B is incorrect. The mental accounting bias involves setting up separate accounts or buckets for wealth, each with its own risk tolerance and expected return depending on the purpose the investor associates with it. Although one of Fox's comments refers to taking higher risk to achieve one of the goals, this is not being referred to in Exhibit 1, which deals with retaining losers and selling winners.

4. Solution: A.

A is correct. Kelly's second comment regarding institutions' goals-based allocations is correct. Some institutions (e.g., insurance companies) segment their general account assets into sub-portfolios associated with specific lines of business or blocks of liabilities, with each sub-portfolio having its own return objective.

B is incorrect. Trainor is incorrect. Some institutions may focus on asset-only allocations, but another approach that can be used is liability-relative, which focuses on the assets in relation to the liabilities.

C is incorrect. Kelly's first comment about the Sharpe ratio and the law of large numbers is incorrect. Institutions that maximize their Sharpe ratio for an acceptable level of volatility would be following an asset-only asset allocation approach, and, as such, they would not be concerned with modeling their liabilities.

5. Solution: B.

B is correct. Although Trainor is correct that asset classes should be diversifying, low pairwise correlations with other asset classes is not sufficient. An asset class may be highly correlated with some linear combination of the other asset classes even when pairwise correlations are not high. Both of Kelly's comments are correct: Asset classes should have high within-group correlations but low correlations with other classes. If liquidity and transaction costs are unfavorable for an investment of a size meaningful for an investor, an asset class may not be a suitable investment for that investor.

A is incorrect. Kelly's first comment is correct about both the within-group and between class correlations.

C is incorrect. Kelly's second comment is correct. The criteria that he is referring to is that asset classes should have the capacity to absorb a meaningful proportion of an investor's portfolio. He is correct in saying that if liquidity and transaction costs are unfavorable for an investment of a size meaningful for an investor, an asset class may not be a suitable investment for the investor.

6. Solution: C.

C is correct. Asset classes should have a return premium based on an underlying market risk factor (e.g., beta) and not any underlying skill of the investor. Strategies, on the other hand, involve combinations of asset classes with the objective of earning a return based on investment skill.

A is incorrect. There will be overlap of sources of risk when asset classes are defined, e.g., US and non-US equities, or even US small and large cap equities will have some risks in common, but there should be as few common risk factors as possible, and they should have only modest correlations.

B is incorrect. Emerging markets equities should be considered a distinct asset class as they differ from other equities in terms of diversification potential, informational efficiency, corporate governance, taxation, and currency convertibility.

Case 2: Noir Rashwan

1. Solution: C.

For institutional investors like a large sovereign wealth fund with a long-time horizon and little liquidity needs, a portfolio comprised largely of non-traditional investments where manager skill and an illiquidity premium can be earned is acceptable.

The problem large institutional investors may run into is not enough alternative investments available to invest in, like hedge funds, to meet their target asset allocation.

2. Solution: A.

Minkara is displaying recency bias (also referred to as representative bias) when investors attach more importance to more recent data. In this case, he is placing more emphasis on the recent run up in real estate prices and equating that with similar events that led to the last global recession. Loss aversion is when the utility given up from a loss is greater than the utility derived from achieving a gain on an investment. In loss aversion, the investors sell winners too soon and hold onto losers too long in hope of gaining back some of their losses. Mental accounting is when assets (or liabilities) are separated into different buckets based on subjective criteria. There is no evidence of mental accounting in this situation.

3. Solution: A.

The after-tax standard deviation = pre-tax standard deviation $(1 - t) = 13\% (1 - 0.2) = 10.4\%$.

After-tax risk and return can significantly impact the efficient frontier; therefore, the post-tax standard deviation should be used as an input into the asset allocation process.

4. Solution: C.

Pre-tax allowable deviation is $15\% - 10\% = 5\%$ or $10\% - 5\% = 5\%$.

Post-tax deviation = $5\% / (1 - t) = 5\% / (1 - 0.2) = 6.25\%$ for a range of 3.75% to 16.25%

5. Solution: C.

He is exhibiting illusion of control in that he believes OPEC can control the world supply of oil.

Changes in the economic environment can lead to major changes for optimization of asset allocation as changes in oil and gas production have significantly changed over the last decades.

Home bias has to do with a preference to invest in securities listed on the exchanges of your home country. Framing bias has to do with answering a question differently depending upon how it is asked.

6. Solution: B.

Since long-term rates are not projected to increase, there would be no need to decrease the allocation to long-term bonds. The increase in short-term rates will make cash instruments like money market funds more attractive; high yield spreads mean corporate bond prices are undervalued, allowing for opportunities to invest in investment grade and high yield bonds.

Case 3: Angelica Mukasa

1. Solution: A.

P&C insurers such as Channel are primarily focused on matching assets to the projected, probabilistic cash flows of the risks they are underwriting. Therefore, fixed-income assets are likely the largest component of their asset base. An allocation to higher risk assets, such as equity, is likely much smaller. Thus, Allocation 1 is more appropriate than either Allocation 2 or 3.

In addition, the regulation limits non-publicly traded securities such as real estate and private equity, to 10%, which would eliminate Allocation 2 from consideration.

Allocation 3 is less appropriate than Allocation 1, given the small allocation to fixed income and relatively large allocations to equity and cash.

2. Solution: B.

A heuristic approach is least relevant. Heuristics refers to rules that provide a reasonable but not necessarily optimal solution. Some investors may skip the various optimization techniques and simply adopt an asset allocation mix (such as the “120 minus your age” rule or a 60/40 stock/bond mix).

Shortfall risk is a liability-relative approach focused on the risk of having insufficient assets to pay obligations when due.

Surplus optimization is a liability-relative allocation approach that involves applying mean-variance optimization (MVO) to an efficient frontier based on the volatility of the surplus (known as surplus volatility or surplus risk) as the measure of risk.

3. Solution: A.

Global real estate is most likely to be considered for inclusion by Channel’s pension plan for any of the following reasons:

- Asset classes should be mutually exclusive for the purpose of asset allocation. Overlapping asset classes will reduce the effectiveness of asset allocation in controlling risk. Thus, given the plan’s current investment in global equities, emerging markets equities should be excluded from consideration. In addition, we assume that the plan’s current allocation to domestic corporate bonds includes both investment grade and high yields. While the high yield allocation is not explicitly defined, global high-yield corporate bonds are likely to overlap somewhat and should be excluded from consideration.
- Asset classes should be diversifying. A new asset class should not have extremely high expected correlations (over 0.95) with existing asset classes. Otherwise, the new asset class will be effectively redundant in a portfolio because it will duplicate risk exposures already present. None of the possible asset classes presented in the example have high expected

correlations with the current portfolio.

- The asset classes as a group should make up a preponderance of world investable wealth. Selecting an asset allocation from a group of asset classes satisfying this criterion should increase expected return for a given level of risk (Sharpe ratio).

Based on global real estate's Sharpe ratio (relatively high) and its correlation to the existing portfolio (reasonably low), while the existing portfolio's Sharpe ratio is not provided, we can make a reasonable assumption that adding this asset class will likely improve the portfolio's expected return.

Note that global real estate is the only asset class left after the two other asset classes were eliminated based on mutual exclusivity.

Other remaining criteria to help specify asset classes include: Assets within an asset class should be relatively homogeneous. Asset classes selected for investment should have the capacity to absorb a meaningful proportion of an investor's portfolio without seriously affecting the portfolio's liquidity.

4. Solution: A.

The change to the expected cash contributions to the pension fund, if adopted, would materially affect the fund's asset allocation strategy. The odds of that happening, however, appear low at present according to Mukasa. At this point, this indicates a need for the pension plan to increase sensitivity to liquidity concerns but is not necessarily cause for immediate revisions to the current allocation.

Large institutional investors, including Channel's pension plan, may benefit from operational efficiencies and other competitive advantages (such as scale, expertise and resources). However, scale may also impose obstacles related to the liquidity conditions and trading costs of the underlying assets. A very large size might make it difficult to deploy capital effectively in certain active equity strategies—for example, to benefit from opportunistic investments in niche markets or from skilled investment managers who have a small set of unique ideas or concentrated bets. Therefore, Statement 2 is not necessarily correct.

Statement 3 is mixing portfolio rebalancing (to a strategic asset allocation) and tactical asset allocation (relative to strategic asset allocation). Rebalancing is the discipline of adjusting portfolio weights to more closely align with the strategic asset allocation.

Changes in asset prices may cause the portfolio asset mix to deviate from strategic target weights even in the absence of changing investor circumstances, a revised economic outlook, or tactical asset allocation views. In contrast, tactical asset allocation (TAA) involves short-term tilts away from the strategic asset allocation (SAA) in order to exploit perceived opportunities in financial market conditions (e.g., temporary asset mispricing). These short-term bets are

expected to increase risk-adjusted return. SAA is developed based on long-term economic forecasts and capital market expectations (long-term expected asset class returns).

Case 4: Preston Remington

1. Solution: B.

Portfolio 2 has the highest probability of enabling Shipman to meet his goal for the vacation home. All three of the portfolios' expected returns over the next year exceed the 6.0% (see calculations below) required return threshold to avoid reducing the portfolio. However, on a risk-adjusted basis, Portfolio 2 (probability ratio of 0.231) has a higher probability of meeting and surpassing the threshold than either Portfolio 1 (probability ratio of 0.175) or Portfolio 3 (probability ratio of 0.225).

Step 1: Calculate the required return threshold: $54,000 \div 900,000 = 0.06 = 6.0\%$.

Step 2: To decide which allocation is best for Shipman, calculate the probability ratio:

$[E(R_p) - R_L] \div \sigma_p$, where

R_p = The return for the portfolio

R_L = The required return threshold

σ_p = The standard deviation of the portfolio

Portfolio 1: $(10.50\% - 6.0\%) \div 20.0\% = 4.50\% \div 20.0\% = 0.225$.

Portfolio 2: $(9.00\% - 6.0\%) \div 13.0\% = 3.00\% \div 13.0\% = 0.231$. (Highest)

Portfolio 3: $(7.75\% - 6.0\%) \div 10.0\% = 1.75\% \div 10.0\% = 0.175$.

2. Solution: A.

The statement regarding volatility is the least accurate. The higher the volatility of the rest of the portfolio, excluding the asset class being considered, the more likely a large divergence from the strategic asset allocation becomes, which should point to a narrower optimal corridor, all else being equal.

B is incorrect because the higher the correlation of an asset class with the rest of the portfolio, the wider the optimal corridor. When asset classes move in sync, further divergence from target weights is less likely.

C is incorrect because the higher the transaction costs, the wider the optimal corridor. High transaction costs set a high hurdle for rebalancing benefits to overcome.

3. Solution: B.

Winfield's current asset allocation is most likely based on the Black-Litterman model. Black-Litterman starts with the excess returns produced from reverse optimization, which commonly uses the observed market-capitalization value of the assets or asset classes of the global opportunity set. It then alters the reverse-optimized expected returns that reflect an investor's own distinctive views yet still behaves well in an optimizer.

A is incorrect because asset allocations using mean-variance optimization tend to be

concentrated in a subset of the available asset classes. Winfield's portfolio will be allocated to all or most of the asset classes through the reverse-optimization process followed by adjustments reflecting the investor's views.

C is incorrect because reverse optimization takes as its inputs a set of asset allocation weights that are assumed to be optimal and, with covariances and the risk aversion coefficient, solves for expected returns. The starting weights are commonly the observed market-capitalization value of the assets or asset classes of the global opportunity set. The asset allocation using reverse optimization would not take into account the investor's own views.

4. Solution: C.

Montgomery's comment about the criticisms of resampling is incorrect regarding diversification of asset allocations. Riskier asset allocations are over-diversified, not under-diversified. The comment is correct with regard to estimation errors because the asset allocations do inherit the estimation errors in the original inputs.

A and B are incorrect because riskier asset allocations are over-diversified, not under-diversified. However, the asset allocations do inherit the estimation errors in the original inputs.

5. Solution: C.

The 1/N rule asset allocation heuristic involves equally weighting allocations to assets; 1/N of wealth is allocated to each of N assets available for investment at each rebalancing date. All assets are treated as indistinguishable in terms of mean returns, volatility, and correlations.

A is incorrect because it is not an optimization model. The 60/40 stock/bond heuristic allocates 60% of assets to equities, supplying a long-term growth foundation, and 40% to fixed income, supplying risk reduction benefits.

B is incorrect. The Norway model passively invests in publicly traded securities subject to environmental, social, and governance concerns. In comparison, the endowment model asset allocation emphasizes active management of large allocations to non-traditional investments, seeking to earn illiquidity premiums.

Case 5: Teddy Brealer

1. Solution: C.

Investment in fixed-income securities specifically to generate cash distributions to offset the cash disbursements necessary for maintaining university costs in excess of tuition revenue is a liability-relative approach.

A is incorrect because a mean–variance approach is an asset-only approach that does not consider liabilities.

B is incorrect because the Black-Litterman model is an asset-only approach that does not consider liabilities.

2. Solution: B.

The ability to deviate from target portfolio weightings for short-term market opportunities is an example of tactical asset allocation, which is an active strategy. Dynamic asset allocation is a long-term active strategy, and indexing is a passive strategy.

A is incorrect because dynamic asset allocation is a long-term active strategy, not a short-term strategy.

C is incorrect because the ability to deviate from target portfolio weightings for short-term market opportunities is an example of tactical asset allocation, which is an active strategy and not a passive strategy, such as indexing strategies.

3. Solution: A.

The UPPC must seek the board of regents' approval for any asset allocation the committee proposes to implement. Consequently, the decision rights in regard to the asset allocation process are very transparent, which is consistent with best governance practices. Governance audits being on an "as requested" basis instead of being periodic is inconsistent with best governance practices. The committee members' short terms (two years for faculty and one year for students because they are final-year students) and apparent lack of financial expertise are also inconsistent with best governance practices.

B is incorrect because the committee members have very short terms (two years for faculty and one year for students because they are final year students) and appear to lack financial expertise.

C is incorrect because governance audits should be periodic and not on an "as requested" basis.

4. Solution: A.

Black's preferred approach for dealing with the additional asset allocation issues is the use of Monte Carlo simulation. Monte Carlo simulation can accommodate many future possible scenarios, such as portfolio rebalancing costs and non-normal distributions (i.e., distributions

that require more than expected return and volatility as parameters).

B and C are incorrect because Monte Carlo simulation can accommodate many future possible scenarios, such as portfolio rebalancing costs and non-normal distributions (i.e., distributions that require more than expected return and volatility as a parameter).

Case 6: Olivia Heritage

1. Solution: C.

During Phase 1, OHF was restricted to investing in only cash and high-grade debt instruments.

B is incorrect. The fund started at \$1 billion and was worth \$2.2 billion at the end of Phase 1; such a size is considered in the low range for a large institutional portfolio.

A is incorrect. During Phase 1, OHF had no liquidity constraints. No outflows were expected for 20 years, all income was to be reinvested, and the nature of the portfolio was quite liquid by regulation, consisting of cash and high-grade bonds.

2. Solution: A.

In Phase 3, 40% of assets were to be invested in high-yield bonds, real estate, private equity, and hedge funds, which were to be managed externally. Each external manager was limited to approximately \$75 million of the fund's assets. As indicated in the table below, the number of external managers required grew from about 30 to almost 150 by the end of the period. This would have placed substantial demands on the governance resources of the fund to allow for identification of suitable managers and to monitor their performance.

	Start of Phase 3	End of Phase 3
Portfolio value	\$6b	\$28b
Externally managed funds @ 40%	\$2.4b	\$11.2b
Managers needed with \$75m limit	32	149

B is incorrect. The liquidity requirements of the fund had not changed; tax revenues were again flowing into the fund, and the fund held substantial (10%) bond and cash investments.

C is incorrect. Phase 3 indicates no change in risk from Phase 2. In Phase 2, the fund was allowed to increase its risk exposure; it could invest in public equities, high-yield bonds, private equity, hedge funds, and real estate. In Phase 1, investments were very low risk—cash and high-grade bonds.

3. Solution: B.

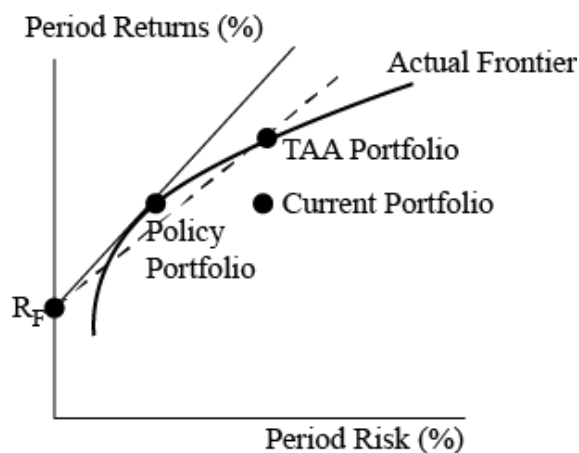
By underweighting investment-grade bonds and real estate and overweighting public equity and high-yield bonds, the TAA strategy added 0.53% to the return of the fund, as shown below.

	(1)	(2)	(3)	(4) = [(2) – (1)] × (3)
	Policy Weights	TAA Weights	Period Returns (%)	Incremental Returns (%)
Investment-grade	0.1500	0.1000	1.75	–0.0875

bonds				
High-yield bonds	0.0625	0.1000	3.00	0.1125
Public equity	0.6000	0.6500	7.00	0.3500
Real estate	0.0625	0.0250	-4.00	0.1500
Total from TAA	0.8750	0.8750		0.5250
The following had no impact on the incremental return				
Private equity	0.0625	0.0625	4.50	0.0000
Infrastructure	0.0625	0.0625	2.50	0.0000
	0.1250	0.1250		0.0

4. **Solution: A.**

The Sharpe ratio is the slope of the line drawn from the risk-free rate to a particular portfolio. The two portfolios of interest are the policy portfolio and the TAA portfolio because both are indicated as being efficient. The diagram to the right indicates that the policy portfolio/risk-free combination has a higher slope than the TAA/risk-free combination. Even though the TAA portfolio has a higher return than the policy portfolio, the additional return requires too much additional risk. In addition, the TAA portfolio may exceed management's risk tolerance.



6. SS6 Derivatives and Currency Management

Case 1: Joenia Dantas

1. Solution: B.

Converting a floating-rate loan to a fixed-rate loan requires entering into a plain-vanilla (fixed-for-floating) interest rate swap on the pay-fixed side. The swap should have the same maturity, the same payment frequency, and the same floating interest rate index as the loan and its notional principal should be equal to principal balance of the loan. The borrower will pay the fixed rate on the swap (here 10.80%) and receive the index (SELIC) from the swap counterparty. The borrower will pay the index (SELIC) plus any spread (4.50%) to the lender. The net, fixed interest rate on the swapped loan is the fixed rate on the swap plus any spread over index on the loan or $10.80\% + 4.50\% = 15.30\%$ in this situation.

2. Solution: C.

The original loan is floating rate. A floating rate loan has very low duration and therefore little market value risk. It might, as Serra suggests, pose a cash flow risk if the firm is not able to handle the increase in loan payments associated with an increase in market interest rates. Using an interest rate swap to convert the loan from a floating rate to a fixed rate reduces the cash flow risk. However, the resulting fixed rate loan has a much higher duration, and its market value will therefore fluctuate much more drastically as market interest rates change.

3. Solution: B.

The duration of the pay-fixed position in an interest rate swap is equal to the duration of a floating rate bond with the same payment frequency minus the duration of a fixed rate bond with coupon rate equal to the fixed rate and maturity equal to the swap maturity. The duration of the floating rate bond is, on average, half of the time interval between payments (in this case, half of 0.5 years or 0.25 years.) The duration of the fixed rate bond is given as 2.91 years. $0.25 \text{ years} - 2.91 \text{ years} = -2.66 \text{ years}$.

4. Solution: A.

When the current duration (DB), the target duration (DT), and the value (B) of the bond portfolio are known and the duration of the swap has been calculated, the notional principal of the

appropriate swap (NP) is found as $NP = B \left(\frac{MDUR_T - MDUR_B}{MDUR_S} \right)$; In this case, the notional

principal is: $12,000,000 \left(\frac{2.00 - 5.50}{-2.40} \right) = 17,500,000$.

5. **Solution: A.**

If AS borrows in yen, it will borrow ¥1.2 billion ($=R30,000,000 \times ¥40/R$). In order to hedge this, it will enter into a currency swap with a notional principal of ¥1.2 billion/ $R30,000,000$. It will receive 7.10% in yen from the swap and pay 9.50% in yen on the loan, for a net payment of 2.40% (on ¥1.2 billion) or ¥28.80 million.

Case 2: Omega Analytics

1. Solution: A.

The profit per collar = $S_T + \max(0, X_1 - S_T) - \max(0, S_T - X_2) - S_0 - (p_0 - c_0)$, where:

S_0, S_T = price of underlying at time 0 and time T

X_1 = exercise price of put, X_2 = exercise price of call;

p_0 = price of put at time 0; c_0 = price of call at time 0

Profit = $33 + 0 - 0 - 30 - 0.15 = 2.85$

Total profit = $\$2.85 \times 30,000 = \$85,500$

2. Solution: A.

The maximum profit on the collar occurs when the short call expires at the money, i.e., $QQQQ = \$35$.

Max profit per collar = $S_T + \max(0, X_1 - S_T) - \max(0, S_T - X_2) - S_0 - (p_0 - c_0)$

Max profit per collar = $35 + 0 - 0 - 30 - .15 = \4.85

Total max profit = $4.85 \times 30,000 = \$145,500$

3. Solution: B.

A bull spread combines a long call at a lower exercise price ($X_1 = 88$) and a short call at a higher exercise price ($X_2 = 94$). The cost of X_1 is $c_1 = \$4.40$ and the cost of X_2 is $c_2 = +\$1.00$.

The maximum profit per contract = $(X_2 - X_1 - c_1 + c_2) \times 100 = (\$94 - \$88 - \$4.40 + \$1.00) \times 100 = 2.60 \times 100 = \260 ; the maximum profit for 100 contracts is $\$260 \times 100 = \$26,000$.

4. Solution: C.

If the price of DJX = $\$93$, then the long call (exercise price = $\$88$) will be in the money and its delta would be close to 1.0. The short call (exercise price = $\$94$) will be out of the money and (very close to expiration) its delta would be close to 0.0. The overall delta is then very close to 1.0.

Case 3: Kamiko Watanabe

1. Solution: B.

B is correct because the total value of the portfolio is JPY55.0 billion and the 60% target allocation to equity would be JPY33.0 billion, but the current allocation is JPY27.5 or JPY5.5 billion less. In order to correct this, the equivalent of JPY5.5 billion in bonds with a duration of 4.75 must be sold using bond futures (converted to synthetic cash) and then converted to equity exposure with a 1.15 beta using stock futures. The number of equity futures contracts to be bought is

$$N_{sf} = \left(\frac{\beta_T - \beta_S}{\beta_f} \right) \left(\frac{S}{f_s} \right) \text{ where } \beta_T \text{ is the target beta (1.15), } \beta_S \text{ is the beta of the synthetic}$$

cash position (0), β_f is the beta of the futures contract (1.05), S is the value of the stock being created from the synthetic cash position (JPY5.5 billion), and f_s is the price of one equity futures contract (JPY1,525,000). Therefore, the number of contracts is:

$$N_{sf} = \left(\frac{1.15 - 0.00}{1.05} \right) \times \left(\frac{5,500,000,000}{1,525,000} \right) = 3,950.04$$

2. Solution: A.

A is correct because one of the swaps would be pay Nikko Bond Performance Index return and receive LIBOR.

3. Solution: B.

B is correct because a pay-fixed (receive-floating) position in an interest rate swap is similar to issuing a fixed-rate bond and buying a floating-rate bond with the proceeds. The duration of the fixed-rate bond is approximately 75% of the maturity, and the swap is short this duration. The duration of the floating-rate bond is approximately half its repricing frequency, and the swap is long this duration. Therefore, the duration of the 3-year swap with semi-annual payments is $(0.5 \times 0.5) - (0.75 \times 3) = -2.00$.

4. Solution: A.

These steps create a synthetic stock index fund that replicates a position in the underlying stocks. This is an appropriate strategy since Client A is long \$10 million in cash. The synthetic stock index fund results in significant transaction cost savings and preserves the liquidity Client A requires.

Case 4: Manuel Silva

1. Solution: B.

B is correct. Silva is incorrect about covered calls. Covered calls do not provide protection against downside losses. They do limit upside gains.

2. Solution: B.

B is correct. The straddle consists of a long call and a long put at a strike price of 1125. The maximum loss occurs when the index is at 1125, when the call and put are at the money. The maximum loss = Call premium + Put premium = 80.50 + 48.00 = 128.50. Per contract the loss is $100 \times 128.50 = \$12,850$.

3. Solution: C.

C is correct. Strategy C is a collar, which is a directional strategy; that is, its performance is dependent on the direction of the movement of the underlying (in this instance, the S&P 500 Index). The performance of strategy A (butterfly spread) and strategy B (straddle) are based on the expected volatility (relative to the rest of the market) of the S&P 500 Index.

Case 5: Anna Lehigh

1. Solution: B.

B is correct. At expiration, at-the-money call options move very rapidly to a delta of 1 or 0. At this point, the gamma is the highest and it is very difficult to maintain a delta-hedged position.

2. Solution: C.

C is correct. Strategy 3 will have a value of USD10. A put bear spread entails buying the put with the higher exercise price (USD100) and selling the put with the lower exercise price (USD90).

Value at expiration = $\max(0, 100 - 88) - \max(0, 90 - 88) = 10$

3. Solution: B.

B is correct because purchasing 15 futures contracts increases the beta to 1.00, not 1.10. Purchasing 45 futures contracts is necessary to attain the beta target.

$$N_f = \left(\frac{\beta_t - \beta_s}{\beta_f} \right) \left(\frac{S}{f} \right)$$
 where: N_f = number of futures, β_t = beta target, β_s = beta of the

stock portfolio, β_f = beta of the futures contract, S = stock portfolio value, and f = price of the

futures contract. $45 = \left(\frac{1.10 - 0.95}{1.00} \right) \left(\frac{30,000,000}{100,000} \right)$

4. Solution: B.

B is correct. Shorting European stock market futures, selling EUR, and buying USD will result in the Packer endowment fund earning the U.S. risk-free rate.

5. Solution: A.

A is correct because a swap that receives LIBOR and pays the midcap index will outperform either of the other swap alternatives outlined. Given the market expectation, Lehigh wants to receive LIBOR because rates are expected to rise and pay the midcap index because that index is expected to underperform the small-cap index.

Case 6: Garrison Investments Scenario

1. Solution: C.

In order to adjust the allocation of an existing equity portfolio, two futures contracts are needed. The first contract should have an underlying equal (or highly similar) to the existing equity exposure to be reduced. This contract is sold to reduce a portion of the existing portfolio to a zero beta, effectively canceling the exposure to that equity sector. The second futures contract should have an underlying equal to the desired equity exposure. This contract is purchased to provide the desired equity exposure. The number of contracts to use is calculated using the following formula:

$$\text{number of contracts} = \left(\frac{\beta_{\text{target}} - \beta_{\text{position}}}{\beta_{\text{futures}}} \right) \left(\frac{\text{value of position}}{\text{futures price} \times \text{multiplier}} \right)$$

For Point University, should sell 417 mid-cap contracts:

$$\text{number of contracts} = \left(\frac{0 - 1.3}{1.1} \right) \left(\frac{80,000,000}{908 \times 250} \right) = -416.5 \approx -417 \text{ contracts}$$

Note that the negative sign indicates that the contracts should be sold.

2. Solution: C.

Regressing the foreign market return measured in the investor's domestic currency versus the foreign currency value produces a minimum variance hedge ratio, and the intent is to minimize the volatility of the return to the domestic investor. It jointly minimizes the volatility of the foreign market and currency. It would be a form of a cross hedge because the hedged item (RDC) is not the same thing as the hedging vehicle (the foreign currency), but that is a vague answer and much less specific than correctly describing it as a MVH. (All MVHs are cross hedges, but most cross hedges are not MVHs.) A transaction exposure generally refers to hedging a known in or out flow of a foreign currency. There are elements of that here, but it is a much less specific answer and so is not acceptable.

3. Solution: B.

The slope coefficient for a regression of the foreign asset returns measured in the investor's domestic currency (USD) is the MVHR. $\text{JPY } 200,000,000 \times 0.8 = \text{JPY } 160,000,000$.

4. Solution: C.

The MVHR is based on regressing historical returns and its future performance is therefore less predictable and riskier. The relationship (correlation) can change. Buying calls on the USD is equivalent to buying puts on the yen and the statement correctly describes the consequences of

a protective put on the yen: downside protection, full upside participation, but an initial option premium expense.

Case 7: Declan Kaufman Scenario

1. Solution: B.

If Burch's firm borrows directly in USD, her firm will pay the USD reference rate +100bps.

If Burch's firm uses the cross-currency basis swap to borrow USD the firm will:

- Borrow EUR directly at EUR reference rate +70bps.
- Swap the Euros for USD under the swap, and in doing so agreeing to pay the USD reference rate, and receive the EUR reference rate *minus 20bps since the basis is -20bps*.

The net interest paid would, therefore, be:

(EUR reference rate + 70bps) + USD reference rate – (EUR reference rate – 20bps) = USD reference rate + 90bps

The advantage of borrowing USD through the swap market versus directly is therefore 10 bps (i.e., the difference between the cost of direct borrowing [USD reference rate + 100bps] and the cost of borrowing USD through the swap [USD reference rate + 90bps]).

2. Solution: C.

The approximate gain or loss for a 1% change in volatility for a variance swap is the swap's vega notional. The vega notional is related to variance notional through the formula:

$$\text{variance notional} = \frac{\text{vega notional}}{2 \times \text{volatility strike price}}$$

Here the variance notional is given as 263; therefore, the vega notional = $263 \times 2 \times 19 = \$9,994$.

3. Solution: B.

Payoff to variance buyer = variance notional \times (realized variance – variance strike) = $263 \times (21^2 - 19^2) = \$21,040$

4. Solution: C.

Both comments are accurate comments. The value of a variance swap becomes less dependent on implied volatility and more dependent on realized volatility as time passes. The payoff of variance swaps is convex in relation to volatility due to the nonlinear (squared) nature of variance in relation to volatility.

Case 8: Gari Dimeola Scenario

1. Solution: C.

The U.K. investor is short EUR, so they will lose on this position when the Euro strengthens against GBP. When the EUR strengthens against GBP the EUR/GBP rate will fall since it will cost less EUR to buy GBP (recall that the CFA curriculum presents currency quotes as variable or fixed). Hence, Strategy 1 and Strategy 3 would be adequate hedges. Conversely, when the EUR strengthens against GBP the GBP/EUR rate will rise meaning that Strategy 2 is also an effective hedge.

2. Solution: C.

A short straddle position is created by selling a call and a put with the same underlying details. The short straddle will have a delta that is close to zero when the options are at the money, but will have negative gamma since it is a short option position. Short options also have a positive theta and negative vega as found in Strategy C.

3. Solution: B.

A short put will have a positive delta since it loses value as the underlying asset price falls, and a negative gamma since it is a short option position. It also has positive theta since short options profit as time decay reduces the value of the option. It will also have negative vega since an increase in volatility will increase the value of the put and causes losses to the short put position.

4. Solution: A.

A volatility smile occurs when both out-the money (OTM) puts and OTM calls have higher implied volatility than at-the-money (ATM) options. A volatility smirk occurs when OTM puts have higher implied volatility but OTM calls have lower implied volatility. Since options prices decline as implied volatility falls, Karunathilike should sell OTM calls and buy OTM puts to profit from his view.

Case 9: Upsala Asset Management Scenario

1. Solution: B.

The currency overlay approach follows the IPS guidelines, but the portfolio manager is not responsible for currency exposure. Instead, a separate manager, who is considered an expert in foreign currency management, is hired to manage the currency exposure within the guidelines of the IPS. A strategic hedge ratio probably refers to a long-term percentage of currency risk to be hedged. In a separate asset allocation approach, there are two separate managers much like the currency overlay approach, but the managers use separate guidelines.

2. Solution: C.

Since the question is concerned with eliminating basis risk and not with mitigating transactions costs, statement C is the best choice. The only way to avoid basis risk is to enter a contract with a maturity equal to the desired holding period. Continually adjusting the hedge would likely create significant trading costs, but is the best method for reducing basis risk. When the futures contract is longer than the desired holding period, the investor must reverse at the end of the holding period at the existing futures price. If the futures contract is shorter than the desired holding period, the investor must close the first contract and then enter another. Both the shorter-term and longer-term contracts will create basis risk for Wulf's portfolio.

3. Solution: B.

Wulf needs protection against depreciation of the yen, (i.e., appreciation of the euro and appreciation of the ¥/€ rate). Buying an ATM ¥/€ call option (i.e., a long position in the euro) provides the complete downside risk protection that Wulf has implemented. Selling a 25-delta put option will limit upside potential from yen appreciation (euro depreciation), but reduce the cost of the hedge. The combination of a long position in a call option and a short position in a put option is called a risk reversal. Answer A is incorrect because selling a 25-delta call option in conjunction with buying an ATM call option (bull spread) will only provide limited protection against yen depreciation (i.e. limited downside risk protection). Answer C is incorrect because buying a 25-delta call option will only provide downside risk protection starting from the relevant 25-delta strike level.

4. Solution: A.

Futures remove translation risk by protecting the investor against losses on the amount hedged, but they also eliminate any chance of a gain from favorable movements. They are, however, very liquid and are less expensive to use. Options require a premium in order to provide insurance against unfavorable exchange rate movements.

5. Solution: B.

To answer this question, you must determine the beginning and ending value of the unhedged investment in terms of the investor's domestic currency. The domestic currency is the EUR and the foreign currency is the GBP. Note that the data is given as indirect quotes of the GBP (i.e., FC in the numerator). The following solution takes that into account.

$$BV = \text{GBP}5,000,000 / (0.78/\text{EUR}) = \text{EUR}6,410,256, \text{ based on } S_0$$

$$EV = \text{GBP}5,100,000 / (0.75/\text{EUR}) = \text{EUR}6,800,000, \text{ based on } S_t$$

Also account for the gain/loss on the 5,000,000 short GBP contract position. We know from the case that a contract longer than the desired period was used, which is why F_t and S_t can differ at the end of the end of the evaluation period. The beginning and ending contract prices in direct quotes of the GBP are:

$$F_0 = 1 / 0.79 = \text{EUR}1.26582/\text{GBP}$$

$$F_t = 1 / 0.785 = \text{EUR}1.27389/\text{GBP}$$

Having sold at the lower F_0 there is a loss of:

$$(\text{EUR}1.27389 / \text{GBP} - 1.26582) \times \text{GBP}5,000,000 = \text{EUR}40,350$$

This makes the total return:

$$(\text{EUR}6,800,000 - \text{EUR}40,350) / \text{EUR}6,410,256 = 5.45\%$$

Note that there are other ways to order these calculations that give the same result. This is the normal "CFA way" to analyze the situation, and it is recommended you follow it, especially if this had been a constructed response. Other methods that reach the same result should be acceptable, but why risk it.

6. Solution: B.

If Bauer shorts the appropriate amount of the index and the short position is perfectly correlated with the investment, the return must be the foreign risk-free rate. If Bauer then chooses to hedge the currency risk, he knows the exact value of the foreign currency to hedge and that the return to the (double) hedging strategy must be the domestic risk-free rate.

Case 10: Tony Kalman

1. Solution: A.

The portfolio manager would most likely use a longer-dated fixed-income (bond) futures contract to hedge his interest rate risk exposure. The choice of the hedging instrument, in fact, will depend on the maturity of the bond being hedged. Interest rate futures, like 90-day Eurodollar futures, have a limited number of maturities and can be used to hedge short-term bonds. The mark-to-market value of a receive-fixed 10-year interest rate swap will become negative if interest rates rises, and thus the swap cannot be used as a hedge in this case.

2. Solution: C.

VIX futures converge to the spot VIX as expiration approaches, and the two must be equal at expiration. When the VIX futures curve is in contango and assuming volatility remains stable, the VIX futures will get “pulled” closer to the spot VIX, and they will decrease in price as they approach expiration. Traders calculate the difference between the front-month VIX futures price and the VIX as 0.90, and the spread between the front-month and the second-month futures is 1.50. Assuming that the spread declines linearly until settlement, the trader would realize roll-down gains as the spread decreases from 1.50 to 0.90 as the front-month futures approaches its expiration. At expiration, VIX futures are equal to the VIX, and the spread with the old second-month (and now the front-month) futures contract will be 0.90. Finally, since one cannot directly invest in the VIX, trades focusing on the VIX term structure must be implemented using either VIX futures or VIX options, so Answers A and B are not feasible.

3. Solution: A.

Exchange-traded futures contract not only have initial margin requirements, they also have daily mark-to-market and, as a result, can be subject to daily margin calls. Market participants must have sufficient liquidity to meet margin calls, or have their positions involuntarily liquidated by their brokers. Note that the risk of daily margin calls is not a feature of most forwards contracts; nor is initial margin. (However, this is changing among the largest institutional players in FX markets as many forward contracts now come with what are known as Collateral Support Annexes—CSAs—in which margin can be posted. Posting additional margin would typically not be a daily event, however, except in the case of extreme market moves.)

B is incorrect because futures contracts have low transactions costs.

C is incorrect because whether the EUR is the price or the base currency in the quote will not affect the hedging process. In fact, on the CME the quote would be the market-standard USD/EUR quote, with the EUR as the base currency.

4. Solution: C.

Based on predicted export trends, Subscriber 2 most likely expects the KRW/USD rate to increase (i.e., the won—the price currency—to depreciate relative to the USD). This would require a long forward position in a forward contract, but as a country with capital controls, a NDF would be used instead. (Note: While forward contracts offered by banks are generally an institutional product, not retail, the retail version of a non-deliverable forward contract is known as a “contract for differences” (CFD) and is available at several retail FX brokers.)

A is incorrect because Subscriber 2 expects the KRW/USD rate to increase. A short straddle position would be used when the direction of exchange rate movement is unknown and volatility is expected to remain low.

B is incorrect because a put option would profit from a decrease of the KRW/USD rate, not an increase (as expected). Higher volatility would also make buying a put option more expensive.

5. Solution: C.

An increase in the expected correlation between movements in the foreign-currency asset returns and movements in the spot exchange rates from 0.45 to 0.72 would increase the domestic-currency return risk but would not change the level of expected domestic-currency return. The domestic-currency return risk is a function of the foreign-currency return risk [$\sigma(R_{FC})$] the exchange rate risk [$\sigma(R_{FX})$] and the correlation between the foreign-currency returns and exchange rate movements. Mathematically, this is expressed as:

$$\sigma^2(R_{DC}) \approx \sigma^2(R_{FC}) + \sigma^2(R_{FX}) + 2\sigma(R_{FC})\sigma(R_{FX})\rho(R_{FC}, R_{FX})$$

If the correlation increases from +0.45 to +0.72, then the variance of the expected domestic-currency return will increase—but this will not affect the level of the expected domestic-currency return (R_{DC}). Note that Subscriber 3’s expected R_{FC} has not changed. (Once again, note as well that R_{FX} is defined with the domestic currency as the price currency.)

A and B are incorrect. An increase in the expected correlation between movements in the foreign-currency asset returns and movements in the spot rates from 0.45 to 0.72 would increase the domestic-currency return risk but would not impact the expected domestic-currency return.

7. SS7-8 Fixed income Portfolio Management

Case 1: Franconia Notch

1. Solution: C.

C is correct because Granite is not only tilting the portfolios with regard to certain sectors, quality, or term structure as an enhanced indexer would, but it is also making duration adjustments. An indexer (full replication approach) or enhanced indexer would keep the duration matched to the index.

2. Solution: B.

B is correct because the statement regarding key rate durations is incorrect. Key rate duration is one established method for measuring the effect of shifts in key points along the yield curve. In this method, we hold the spot rates constant for all points along the yield curve but one. By changing the spot rate for that key maturity, we are able to measure a portfolio's sensitivity to a change in that maturity. We repeat the process for other key points (e.g., 3, 7, 10, 15 years) and measure their sensitivities as well. Simulations of twists in the yield curve can then be conducted to see how the portfolio would react to these changes.

3. Solution: C.

C is correct because perfect matching of assets and liabilities is unlikely given the difficulty in finding all the bonds in the market that exactly match the liabilities. As a result, cash flow matching requires a relatively conservative rate of return assumption for short-term cash and cash balances may be occasionally substantial.

Case 2: Farro

1. Solution: A.

A is correct. Farro's explanation is correct. There are two basic approaches to credit bond portfolio management, top-down and bottom-up. The top-down approach forms views on large-scale economic and industry developments and drives asset allocation decisions. The bottom-up approach focuses on individual issuers and issues that will outperform their peer groups. Relative value refers to the ranking of fixed-income investments by sectors, structures, issuers, and issues in terms of their expected performance during some future period of time.

2. Solution: B.

B is correct because Kumar is incorrect regarding his explanation of excess returns. Excess returns represent the difference, positive or negative, between the total return of all credit securities and Treasury securities along a set of key rate duration points across the term structure. This single statistic, excess return, therefore normalizes for the duration differential among debt asset classes, in this case between longer-duration credit and shorter-duration Treasuries.

3. Solution: A.

A is correct. Liquidity needs will impact portfolio construction. There are certain securities such as bonds issued by large corporations that will be more liquid than others such as private placements. Farro should emphasize large corporate issuers when constructing the portfolio to meet Delmarva's potential cash withdrawal.

Case 3: Kingsbridge

1. Solution: C.

Kingsbridge can leverage the GBP150 million portfolio by 100% by borrowing an additional GBP150 million. The duration of equity is provided by:

$$D_E = \frac{D_A A - D_L L}{E}$$
$$D_E = \frac{5.50(300) - 1.00(150)}{150} = 10.00$$

2. Solution: C.

To hedge against rising rates, Bixby needs to reduce duration by selling the following number of Treasury futures contracts:

$$\left(\frac{(D_T - D_I \times P_I)}{D_{CTD} P_{CTD}} \right) \times \text{Conversion factor for the CTD bond}$$

where D = duration, T = target, I = initial

$$\left(\frac{(4.25 - 5.50) \times 300,000,000}{5.3 \times 97,750} \right) \times 1.12 = \frac{-375,000,000}{518,075} \times 1.12 = -810.69$$

3. Solution: B.

The protective put buying strategy establishes a minimum value for the portfolio if interest rates rise but allows the manager to benefit from a decline in rates if his view does not materialize.

4. Solution: B.

The forward rates for both USD and EUR fully reflect the interest rate differentials as expected by interest rate parity. As such, forwards reflect that USD is expected to appreciate relative to GBP and EUR to depreciate relative to GBP. Kingsbridge's view, however, is that USD will appreciate more than the forward implies and EUR will depreciate more than the forward implies. The result in actively managing the portfolio is that the EUR bonds should be hedged into USD.

Case 4: Chesapeake Partners

1. Solution: B.

The investor with liabilities will measure success by whether the portfolio generates the funds necessary to pay out the cash outflows associated with the liabilities-in this case, a defined benefit pension plan. Meeting the liability is the investment objective; as such, it also becomes the benchmark for the portfolio. The endowment is focused on measuring the success of its fixed-income managers and does not have a specific liability to meet, therefore a bond market index is an appropriate benchmark.

2. Solution: A.

To immunize a portfolio's target value or target yield against a change in the market yield, a manager must invest in a bond or a bond portfolio whose (1) duration is equal to the investment horizon and (2) initial present value of all cash flows equals the present value of the future liability. Thus, investing in a bond portfolio with a yield to maturity equal to the target yield and a maturity equal to the investment horizon does not assure that the target value will be achieved because of reinvestment risk.

3. Solution: B.

Yield measures have limitations as an indicator of potential performance. The total return framework is a superior framework for assessing potential performance for a trade.

Case 5: Laredo Advisers

1. Solution: C.

The profit on the borrowed funds accrues to the equity; therefore, the rate of return increases from 5% in the all-equity case to 5.88% when leverage is used:

$$\frac{50,000,000 + 12,500,000 - 3,750,000}{1,000,000,000} = 5.875\%$$

The following table provides the calculations:

		Borrowed Funds	Equity Funds
Amount		\$250,000,000	\$1,000,000,000
Return rate	5.0%	\$12,500,000	\$50,000,000
Interest expense	1.5%	\$3,750,000	\$0
Net profit		\$8,750,000	\$50,000,000
Component return		3.50%	5.00%
Overall return		5.88%	

2. Solution: C.

Using interest rate parity, the euro is expected to depreciate by $0.25\% - 2.50\% = -2.25\%$. Houston believes that the euro will depreciate by only 1.75%. Based on expected returns alone, Austin should not hedge the currency risk using a forward contract because he would lock in a 2.25% loss in the euro.

Case 6: Andres Rioja

1. Solution: B.

The investor with liabilities will measure success by whether the portfolio generates the funds necessary to pay the cash outflows associated with the liabilities. In other words, meeting the liabilities is the investment objective; as such, it also becomes the benchmark for the pension plan. Although Crianza should use the pension liabilities as the benchmark, this does not preclude managers of the various asset portfolios from being assigned an appropriate asset benchmark to manage against.

2. Solution: C.

The mortgage-backed securities fund strategy uses enhanced indexing. This management style uses a sampling approach in an attempt to match the primary index risk factors and achieve a higher return than under full replication.

3. Solution: B.

The portfolio has to be rebalanced to match the dollar duration of the liabilities. The liabilities have dollar duration of \$4,000,000 (thousands) \times 14 = \$56,000,000 (thousands). The mortgage-backed securities fund is the asset class that poses contingent claim risk, so it is being liquidated, and the \$700,000 thousand is being invested in the long corporate bond fund. The new \$500,000 thousand contribution is invested in Treasury STRIPs. The reallocated assets have dollar durations nearly identical to the liabilities as calculated in the following table:

Strategy	Old Market Value (\$ thousands)	New Market Value (\$ thousands)	Duration (years)	Dollar Duration (\$ thousands)
Money market	175,000	175,000	0.25	43,750
Mortgage-backed securities fund	700,000	0	3	0
Emerging market bond fund	675,000	675,000	4.6	3,105,000
Long corporate bond fund	1,575,000	2,275,000	14	31,850,000
Treasury STRIPs	375,000	875,000	24	21,000,000
Total	3,500,000	4,000,000		55,998,750

4. Solution: B.

Priorat's explanation of key rate duration is accurate, whereas his explanation of convexity adjustment is incorrect. A convexity adjustment is used to improve the accuracy of the index's estimated price change for large parallel changes in interest rates. A convexity adjustment is an

estimate of the change in price that is not explained by duration.

Case 7: Midwest

1. Solution: A.

The investor with liabilities will measure success by whether the portfolio generates the funds necessary to pay out the cash associated with the liabilities—in this case, a defined benefit pension plan. Meeting the liability is the investment objective; as such, it also becomes the portfolio's benchmark.

2. Solution: A.

The portfolio does need to be rebalanced. As interest rates fluctuate or as time elapses, the portfolio duration will also change; thus, the portfolio must be rebalanced to adjust duration to the desired level.

3. Solution: B.

Applying functional duration or key rate durations allows durations along the yield curve to match those of the liabilities. A nonparallel shift in the yield curve will affect assets and liabilities in an offsetting manner. In addition, the portfolio could allow for active management to generate additional returns—for an incremental difference between the minimum acceptable return and the higher possible immunized rate, which is referred to as the "cushion spread."

4. Solution: B.

Portfolio B is the optimal strategy. Interest rate swaps are used to mimic the term structure exposure of the liability, freeing up capital to invest in higher-returning assets, such as equities. In this liability-relative approach, investments are in long-duration bonds, equities (a small allocation), and interest rate derivatives (to hedge the liability). Although interest rate risk is hedged with derivatives, Portfolio B allows for additional expected return by including equities to meet future benefits.

5. Solution: C.

Cash flow matching requires a relatively conservative rate-of-return assumption for short-term cash, and cash balances may occasionally be substantial. In contrast, an immunized portfolio is essentially fully invested at the remaining horizon duration. Funds from a cash flow-matched portfolio must be available when each liability is due.

Case 8: Berg

1. Solution: B.

Delta plans to leverage the €100 million portfolio by 100% by borrowing an additional €100 million. So, the duration of equity is calculated as follows:

$$D_E = \frac{D_A A - D_L L}{E}$$
$$D_E = \frac{6.00(200) - 1.00(100)}{100} = 11.00$$

2. Solution: C.

To hedge against rising rates, Delta needs to reduce duration by selling the following number of bond futures contracts:

$$\left(\frac{(D_T - D_I) \times P_I}{D_{CTD} P_{CTD}} \right) \times \text{conversion factor for the CTD bond}$$

where

D_T = target duration for the portfolio

D_I = initial duration for the portfolio

P_I = initial market value of the portfolio

D_{CTD} = duration of the cheapest-to-deliver bond

P_{CTD} = price of the cheapest-to-deliver bond

$$\left(\frac{(4.00 - 6.00) \times 200,000,000}{5.2 \times 98,000} \right) \times 1.15 = \frac{-400,000,000}{509,600} \times 1.15 = -902.669$$

3. Solution: B.

Using interest rate parity, the euro is expected to depreciate by $3.25\% - 2.50\% = 0.75\%$. Delta's strategists believe that the euro will depreciate by only 0.35%. Based on expected returns alone, Delta should hedge the currency risk using a forward contract and lock in a 0.75% gain in British pounds.

4. Solution: A.

The statement about Risk 1 is incorrect; emerging market debt returns are characterized by significant negative skewness.

Case 9: Aina Monts

1. Solution: A.

A is correct because an extension of classical immunization is to integrate immunization strategies with elements of active management strategies. The difference between the 6.75% YTM and 6.25% required rate is the cushion spread. As long as there is a spread cushion the manager can actively manage part or the entire portfolio.

2. Solution: C.

C is correct because contribution to spread duration is the key measure that provides the relative sensitivity to movements in spreads for a particular sector. The portfolio has an overweight to Treasury on a contribution to overall duration but is not a spread sector; a neutral position in mortgages and an underweight in corporate bonds (2.13 years in the portfolio vs. 2.37 years in the benchmark). The equal weight on a nominal basis in corporate bonds implies the duration of those bonds in the portfolio is shorter than the bonds in the index which will be less sensitive to changes in spread movement.

3. Solution: A.

A is correct because when securities have a contingent claim provision, explicit or implicit, there is an associated risk. In a falling rate scenario, the manager may have higher coupon payments halted and receive principal as is the case with mortgage-backed securities. Mortgage-backed securities therefore have contingent claims risk. Fixed-rate corporate bullet bonds do not have contingent claims risk.

4. Solution: C.

C is correct because curve-adjustment trades take place when the portfolio manager expects credit spreads will widen (either overall or in a particular sector). The specific strategy is to shift the portfolio's exposure to shorten spread duration by selling longer maturity corporate bonds and buying shorter maturity bonds, which lowers the contribution to spread duration.

5. Solution: B.

B is correct because callable bonds significantly underperform non-callable bonds when interest rates decline because of their negative convexity. When the bond market rallies, callable structures do not fully participate given the upper boundary imposed by call prices.

Case 10: Mike Spong

1. Solution: B.

In Exhibit 1, the contributions to spread duration for the Credit Sector (1.6) and for the Mortgage Sector (1.6) are slightly higher than the corresponding contributions to spread duration in the Benchmark, that is, there are minor risk factor mismatches. Note, however that the portfolio duration of the benchmark and the Smithers portfolio is 4.7. Thus, the strategy followed by Smithers is best described as an enhanced indexed strategy with minor risk factor mismatches. Also, in Statement 1, Spong states “...Smithers has minor risk factor mismatches with the benchmark.”

2. Solution: A.

Statement 1 indicates that Mondavi follows a full-replication approach that is pure bond indexing. In this approach many issues in the bond index may be illiquid and infrequently traded. This makes full-replication of an index not only difficult but also expensive to implement.

3. Solution: B.

The objective regarding tracking risk is inconsistent with their strategy. In Statement 2, Spong states that Vertex’s strategy is to construct a portfolio with significant risk factor mismatches with the benchmark and that it relies on proprietary interest rate forecast models to generate returns. Exhibit 1 indicates that for Vertex the contributions to spread duration are significantly different from the benchmark in the credit and CMBS sectors. Note also that portfolio duration is different from the benchmark duration. All this suggests that Vertex is an active manager. As an active manager Vertex would be willing accept large tracking error with the objective of generating portfolio returns that exceed the benchmark.

4. Solution: C.

Spong’s fourth statement indicates that Vertex expects a 25 basis point rise in short-term rates and a 75 basis point increase in long-term rates, that is, the yield curve is expected to steepen. In this environment callables and putables will outperform bullet structures. As rates rise, given low implied interest rate volatility, the probability of a call diminishes as does the value of the call option. Consequently callables will outperform bullets. As rates rise the put option becomes more valuable, furthermore the put allows the investor to put the option back at par thus avoiding losses. For these reasons the value of the putable structure can be expected to increase. In contrast, the bullet structure will decline in value. Thus putables also outperform bullets.

5. Solution: B.

As spreads tighten the credit sector will benefit from increased exposure to longer duration issues. Since the yield curve is expected to steepen, it would be appropriate for Vertex to shorten duration in Treasuries since rising yields will cause security prices to fall. Ideally, the net effect should be to reduce duration below the benchmark.

Case 11: Allied Advisors

1. Solution: B.

Thorne's statement is incorrect because if Flagstone had specific liabilities to match, then the liability itself becomes the benchmark.

2. Solution: A.

The Barclays Aggregate index represents a diversified portfolio of sectors and has medium-term duration which should generate reasonable returns with moderate price sensitivity as interest rates fluctuate. Statement 2 clearly indicates that the Flagstone endowment fund has a medium term horizon and generally seeks to avoid capital losses.

3. Solution: B.

The portfolio's large deviations from the benchmark in returns shown in Exhibit 2 indicate that Allied makes active bets. These returns exceed the modest that expected from enhanced indexing where the objective maybe to earn back the administrative fees of 0.15% in this case. Exhibit 3 in fact shows that Allied's sector allocation as measured by spread duration deviate materially from the index.

4. Solution: B.

The portfolio's spread duration (2.87) is greater than that of the benchmark (2.31) resulting in a mismatch of risk exposures. The difference is primarily because of the larger contribution to spread duration of corporate bonds in the portfolio (1.96) compared to the benchmark (1.38) despite having the similar nominal representation (22.5% and 23.0%, respectively).

5. Solution: A.

Matching key rate durations will reduce tracking error resulting from a non-parallel shift, such as a twist in the yield curve.

Case 12: Robert Waterman

1. Solution: B.

The riding the yield curve strategy is based on assuming the yield curve is upward sloping and will not change in shape. Therefore, buy the bond at the end of the steeper segment of the curve and hold it. As it shortens in maturity (duration), it will trade at a now lower yield and there will be a price gain. The U.K. curve is steeper and more suited to the strategy. The decline in rates from holding a U.K. bond will be larger, and therefore, the price gain will be larger. Of course, the yield is also better.

2. Solution: C.

Buying convexity means increasing portfolio convexity. Higher convexity is a benefit if there are large changes in interest rates, but the “cost” is a lower yield. Increasing portfolio convexity can be done by reducing exposure to callable and MBS (both have embedded short call positions), buying puttable bonds, or most effectively by buying calls and/or puts on bonds. While it is not a requirement to buy both options, that certainly works and is the only choice that is true.

3. Solution: A.

The carry trade refers to borrowing at lower rates to invest at higher rates. In this case, it was specified to use three-year duration instruments, so borrow at 1% U.S. rates and invest at 2% U.K. rates. An increase in U.K. rates would hurt the value of the bonds purchased and having borrowed in the United States at 3-year duration, the decline in U.S. rates increases the value of that liability, which is also a loss to the investor. The carry trade will not work if IRP predicts changes in currency value. The United Kingdom has the higher interest rate, so its currency will trade at a forward discount. If the U.K. currency (GBP) declines it will take more GBP to buy the USD required to pay back the U.S. borrowing. The cross currency carry trade actually depends in part on the observation that the higher interest rate (GBP) currency usually appreciates in value, Forward premiums and discounts are not valid predictors of change in currency value.

4. Solution: A.

The unhedged return on the foreign bond is the return on the bond plus the expected change in the NOK:

$$7.00 - 0.40 = 6.60$$

Hedging the currency requires selling the NOK forward and buying the USD. That makes the return on the hedged currency the initial forward premium or discount, which is approximated at lose the NOK and gain the USD short-term rate:

$$0.5 - 2.80 = -2.30$$

The hedged return is the return on the bond plus the forward discount for the NOK:

$$7.00 - 2.30 = 4.70$$

The currency unhedged return is superior. Therefore, do not hedge the currency risk.

5. Solution: A.

The U.S.-based firm would normally sell the foreign currency (NOK) and buy the USD to hedge the currency risk. An alternative is to sell another currency that is highly correlated to the NOK, a form of cross hedge (sometimes called a proxy hedge). The idea is that if the NOK declines versus the USD, the SEK will also decline for a gain on the short SEK contracts that offsets the loss on NOK. There must be high correlation and a predictable relationship of the SEK and NOK for this to work. Higher correlation to the USD has nothing to do directly with the cross hedge of the currency risk. Note that if the USD and the other currencies are highly correlated, it suggests they change in similar fashion to each other; in other words, the exchange rate will be relatively stable and change in currency value will be a less significant factor in the return earned from investing in the foreign bond.

6. Solution: C.

G-spread is the yield of the bond minus the interpolated yield of a comparable duration government bond. Letting w be the weight to the 3.0 duration U. S. government bond, the interpolated yield for a 3.5-year duration U.S. government bond is found as follows:

$$3.5 = w3.0 + (1-w) 4.1$$

$$3.5 = 3.0w + 4.1 - 4.1w$$

$$0.6 = 1.1w$$

$W = 55\%$ and the weight in the 4.1 duration bond is 45%

Interpolated yield of a comparable duration U.S. government bond:

$$0.55(1.00) + 0.45(1.10) = 1.05\%$$

And G-spread is: $3.70 - 1.05 = 2.65\%$

Furthermore, this G-spread is the expected return if you invest in and hedge the interest rate risk of the corporate bond by shorting a 55/45 weighted combination of the two government bonds that duration matches the corporate bond.

While SFR are similar to government bond yields, SFR do reflect some credit risk. SFR are not less credit risky than government bonds.

Case 13: Samuel Morse

1. Solution: B.

A duration matching strategy is more likely than a cash flow matching strategy to be negatively impacted by non-parallel shifts in the yield curve. With cash flow matching, assets are selected to mirror the timing of payments in the liability portfolio. In a duration matching strategy, the potential for greater dispersion of the maturities may lead to unexpected risk exposures as interest rates change over time.

2. Solution: B.

With derivative overlay strategies, in order to calculate the number of contracts needed, the futures BPV must be adjusted to reflect the conversion factor:

Futures BPV = Note BPV / Conversion Factor

$$44.8/0.8=56$$

Number of contracts = (Asset BPV–Liability BPV) / Futures BPV

$$(48,000-22,000)/56=464.286$$

3. Solution: A.

Portfolio 1 is most likely to benefit from a flattening yield curve, as it is constructed using a barbell approach, with higher allocations at the short and long ends of the yield curve.

4. Solution: B.

The total return for fixed income securities includes both yield income and price appreciation.

The expected price appreciation for both securities is 1.00%, but as the 30- year yield income is 1.50% more than the 2-year, it will have a higher expected total return.

$$2\text{-year: Yield income} = 4.75/100 = 4.75\%$$

$$2\text{-year: Price appreciation} = (101.05-100)/100 = 1.05\%$$

$$\text{Total return} = 4.75\% + 1.05\% = 5.8\%$$

$$30\text{-year: Yield income} = 6.00/100 = 6\%$$

$$30\text{-year: Price appreciation} = (101-100)/100 = 1\%$$

$$\text{Total return} = 6\% + 1\% = 7\%$$

5. Solution: C.

Total expected return = Rolling yield + E (Change in price based on investor's yield and yield spread view) – E (Credit losses) + E (Currency gains or losses)

Rolling yield = Yield income + Rolldown return

Yield income = Annual coupon payment/Current bond price = $2/97 = 2.06\%$

Rolldown return = $\frac{Bond\ price_E - Bond\ price_B}{Bond\ price_B} = \frac{97.5 - 97}{97} = 0.515\%$

E (Change in price based on investor's yield and yield spread view)

= $[-MD \times \Delta Yield] + [1/2 \times Convexity \times (Yield)^2]$

= $[-4.25 \times 0.2\%] + [1/2 \times 0.30 \times (0.2\%)^2] = -0.85\%$

E (Credit losses) = -0.20%

E (Currency gains) = +0.30%.

Total expected return = $2.06\% + 0.515\% - 0.85\% - 0.20\% + 0.30\% = 1.825\%$.

6. Solution: C.

Since the fund's clients are taxable investors, there is value in harvesting tax losses. These losses can be used to offset capital gains within the fund that will otherwise be distributed to the clients and cause them higher tax payments, which decreases the total value of the investment to clients. The fund has to consider the overall value of the investment to its clients, including taxes, which may result in the sale of bonds that are not viewed as overvalued. Tax-exempt investors' decisions are driven by their investment views without regard to offsetting gains and losses for tax purposes.

Case 14: Louis Armstrong

1. Solution: A.

To determine the positions, we take the maximum allowance of 30-year bonds of 15 million and determine money duration. Money duration is equal to market value \times modified duration divided by 100. 30-year bond money duration = 15 million \times 20.61/100 = \$3,091,500. The market values of the other positions are:

1-year bond: $\$3,091,500 \times 100/0.95 = \325 million

5-year bond: $\$3,091,500 \times 100/4.52 = \68 million

10-year bond: $\$3,091,500 \times 100/8.28 = \37 million

To profit from a decrease in yield curve curvature, the correct condor structure will be: short 1s, long 5s, long 10s, and short 30s. The positions of the condor will be: short \$325 million 1-year bond, long \$68 million 5-year bond, long \$37 million 10-year bond, and short \$15 million 30-year bond. This condor is structured so that it benefits from a decline in curvature, where the middle of the yield curve decreases in yield relative to the short and long ends of the yield curve.

2. Solution: C.

Increasing the correlations would likely increase the number of extremely unusual outcomes and, thereby, increase estimated tail risk. Higher correlations in the model increase the dispersion of outcomes (effectively decreasing diversification).

3. Solution: A.

Emerging markets indexes have a higher proportion of commodity producers and banks than developed market indexes have.

4. Solution: A.

Global credit managers do use currency swaps and invest in pegged currencies to hedge foreign exchange exposures.

8. SS9-10 Equity portfolio management

Case 1: William Pugh

1. Solution: C.

The Russell 2000 small-cap value index contains a large proportion of illiquid stocks. PMA also indicates that they assume that the factors used to explain stock returns are uncorrelated. In such cases the best index construction method is stratified sampling.

2. Solution: B.

ASM Partners' strategy is a market neutral long-short strategy. This strategy generates two alphas, one from the long position and one from the short position.

3. Solution: C.

The breadth (number of truly independent decisions made each year by the manager) required to earn the expected portfolio active return of 2.8% per year is approximately 22 decisions, calculated as follows:

$$E(R_A) = IC \times \sqrt{BR} \times \sigma_{R_A} \times TC$$

$$E(R_A) = 0.2 \times \sqrt{BR} \times 6\% \times 0.5 = 2.8\%$$

$$BR = [2.8\% / (0.2 \times 6\% \times 0.5)]^2 = 21.78$$

4. Solution: A.

The CKI portfolio has a dividend yield that exceeds the benchmark dividend yield. The P/E and P/B for the portfolio are less than the benchmark P/E and P/B. In addition, the forecast growth of the portfolio is under the forecast growth of the benchmark. These factors indicate that CKI manages a value portfolio.

5. Solution: B.

The ECO Asset Management excludes companies based on specified activities (e.g., tobacco and defense), which is a process of negative screening. Negative or exclusionary screening refers to the practice of excluding certain sectors or companies that deviate from accepted standards in areas such as human rights or environmental concerns.

6. Solution: C.

Activists typically aim to achieve their goals with smaller stakes in their target companies, usually with a less than 10% stake in the target's equity.

Case 2: Bobby Sarkar

1. Solution: B.

B is correct. A value weighted index is biased toward large mature companies and it minimizes tracking error. Furthermore, the index is self-rebalancing in that the weights automatically adjust as stock prices change; thus, rebalancing costs are minimal.

2. Solution: C.

C is correct. A market neutral long-short strategy implemented using small cap stocks will help Bayside earn alpha associated with small cap stocks but without beta exposure to the small cap sector. The overall market beta of the market neutral long-short strategy is zero.

3. Solution: A.

A is correct. Manager A has a low PE, high dividend yield and a style fit of 87% which suggests that he is following an active value strategy.

4. Solution: C.

C is correct. Manager C follows a growth investment style. Earnings momentum is a growth investment sub-style.

Case 3: Fig Tree

1. Solution: C.

Charm Fund is likely to be the most expensive fund to operate and therefore FTM will have to charge a higher fee to investors. Charm involves some (undefined) active management elements and it operates in the least developed markets (emerging and frontier) where operating expenses are likely to be higher. Securities lending also adds complexity and increases costs for FTM. Acore Fund is a fully passive approach to a single developed market and likely to have the lowest fee. Beto Fund should fall in between as a passive approach with allocations to multiple (global) developed markets.

2. Solution: A.

Deal Fund utilizes aggressive shareholder engagement, which seeks to actively influence company management in ways to increase shareholder value. Investors in Deal will have to be charged higher fees to cover the costs of these activities by FTM. But all investors will benefit if the efforts in Deal are successful.

Beto and Charm are both passive so an incentive fee is highly unlikely in either. While unlikely for both Charm does have an undefined active tilt so an incentive fee could be slightly more likely for Charm, not for Beto.

Distribution expenses are just another name for some of the costs involved in running a fund. Breaking the expense out separately does not increase costs to FTM in any meaningful way and should not have a material impact on total costs to investors.

3. Solution: A.

The effective number of stocks for a portfolio is calculated as the reciprocal of the HHI.

They are:

Results of HHI Calculations		Effective Number of Stocks
Portfolio 1	0.043	$1/0.043 = 23.26$
Portfolio 2	0.0055	$1/0.0055 = 181.82$
Portfolio 3	0.002	$1/0.002 = 500$

From this we know Portfolio 1 has the equivalent of 23 stocks, not 182. However we also know the portfolios are not likely to be equal weighted as they use market cap or free float adjusted market cap weightings. Therefore, each will contain more than $1/HHI$ stocks. Portfolio 3 would contain more than 500 stocks, making that the most likely correct statement. Given that the equivalent number of stocks in Portfolio 3 is more than double that of Portfolio 2, Portfolio 3 likely has greater diversification and less non-systematic risk.

4. Solution: A.

Value added by sector weight reflects the over or under weighting by sector times the return of that sector and can be calculated as:

Sector	Sector Returns	Manager Sector Weights	Benchmark Sector Weights	Manager $W \times$ Return	Benchmark $W \times$ Return	Difference
Information technology	10.00%	35.00%	25.00%	3.50%	2.50%	1.00%
Consumer staples	4.40%	25.00%	25.00%	1.10%	1.10%	0.00%
Energy	-1.30%	20.00%	25.00%	-0.26%	-0.33%	0.07%
Financials	2.00%	20.00%	25.00%	0.40%	0.50%	-0.10%

According to the sector attribution results above, overweighting in information technology sector added the most value to the manager's performance.

5. Solution: B.

While not a conventional approach to index replication, it is possible that this manager replicates index performance through replicating risk factors. Dividend (yield), P/E ratio, and size (market cap) are common equity risk factors. Therefore, B is correct, and A is incorrect. A combination approach of optimization within each cell of cell matching is a combination approach but there is nothing to indicate the manager looks at cell weights of market cap versus value/growth.

Case 4: Sonera Endowment Fund

1. Solution: B.

B is correct because manager B has a positive information ratio, demonstrating that he has been able to deliver active returns relative to his level of tracking error. Manager B's investment style is consistent with a value investment style, with a higher beta for the two value indices, the small-cap value index and the large-cap value index.

2. Solution: C.

C is correct because holdings data are required to create a style box and interpret the results. Gatchell is given the styles and the assets under management but not each individual investment or holding that each investment manager has selected.

3. Solution: C.

C is correct because an equal-weighted index is biased towards small-capitalization stocks.

4. Solution: B.

Gatchell is correct that stock index futures and equity swaps are low-cost alternatives to equity index mutual funds. He is also correct that a drawback of stock index futures is they have to be rolled over periodically. He is incorrect about the pricing of mutual funds: They are priced once daily.

Case 5: McMorris

1. Solution: A.

The active equity strategy has the lowest information ratio and is thus least efficient in delivering active returns. Information ratio = Active return (Portfolio – Benchmark)/Tracking risk. The information ratio is 0.5%, which is the lowest of the three.

2. Solution: B.

A market-neutral strategy is constructed to have an overall zero beta and thus show a pattern of returns expected to be uncorrelated with equity market returns.

3. Solution: C.

The active equity strategy was not value oriented because the returns-based style analysis indicates a growth orientation given a 0.65 coefficient of determination with respect to growth returns. The current holdings, however, depict a value orientation when compared with the manager's normal benchmark given the differences in dividend yield and P/E. MCAM's style has drifted over time from growth to value.

4. Solution: A.

The main risk for a value-oriented investor rather than a growth-oriented investor is misinterpreting a stock's cheapness within the investor's time horizon.

Case 6: Daenerys Targaryen

1. Solution: C.

Cersei is likely a closet indexer, or a fund that claims to be actively managed but is essentially an index fund. The low active risk, low sector deviation, and low risk contribution indicate few active bets which are representative of a closet indexer.

2. Solution: B.

A value trap indicated securities whose low P/E ratios may indicate attractive investments, but the securities' future prospects may actually worsen. As a result, these securities remain overpriced despite their current low P/E ratios.

Securities whose share prices already reflect the expectation of future growth are called growth traps. These securities may have been already overpriced when purchased.

3. Solution: C.

The expected compound return of an asset (R_g) is related to its expected arithmetic return (R_a) and its expected volatility (σ):

$$R_g = R_a - \sigma^2/2$$

With a leverage factor of 2, the expected compounded return for the three funds is:

$$\text{Arya:} = 2 \times 0.70\% - \frac{(3.00\% \times 2)^2}{2} = 1.22\%$$

$$\text{Bran:} = 2 \times 0.80\% - \frac{(4.00\% \times 2)^2}{2} = 1.28\%$$

$$\text{Cersei:} = 2 \times 1\% - \frac{(4.5\% \times 2)^2}{2} = 1.6\%$$

4. Solution: C.

Dorne's implementation approach is affected by the manager's judgment. The portfolio allocation decisions are taken with the help of the investment committee. Discretionary strategies search for active returns by building a greater depth of understanding of a firm's governance, business model, and competitive landscape, through the development of better factor proxies, or successful timing strategies. Dorne's manager follows a bottom-up process. He develops his understanding of the environment by evaluating the risk and return characteristics of individual securities using both financial and nonfinancial variables.

5. Solution: B.

Essos limits single-security risk contribution to no more than 2%, which implies a highly diversified portfolio. The significant sector deviations despite this high diversification are often

indicative of a multi-factor manager. The relatively low tracking error further supports the argument that Essos is a multi-factor manager. The tracking error constraint of less than 5% and sector deviations of $\leq 8\%$ are relative constraint functions. The limit on single security to be not more than 2% is an absolute—not a relative—constraint. It does not depend on benchmark weights. A is incorrect because the fund follows a fully quantitative implementation approach (allocations are unaffected by a portfolio manager's judgment); hence it is systematic. C is incorrect because the fund allows significant deviations from the sector relative to the sector deviations sought by a closet indexer.

6. Solution: A.

The three main building blocks of portfolio construction are alpha skills, position sizing, and rewarded factor weightings. Riverland generates active returns by skillfully timing exposures to factors, both rewarded and unrewarded, and to other asset classes, which constitute a manager's alpha skills.

9. SS11 Alternatives

Case 1: Wanda Maximoff

1. Solution: A.

The description of the hedge fund strategy for Client 1 best fits a global macro strategy. This strategy employs high leverage and returns can be volatile. Managed futures strategies tend to use systematic trading. Dedicated short-selling strategies tend to use bottom-up analysis.

2. Solution: B.

Merger arbitrage can be viewed as writing insurance on an acquisition. If the acquisition is completed as planned, the hedge fund earns the spread (an insurance firm keeps the insurance premium if no adverse event occurs). If the transaction fails, the hedge fund stands to lose money

(analogous to an insurance company making a payout). Distressed securities investing uses low to moderate levels of leverage because of the volatility of the strategy and the long investment time horizon. A hard-catalyst event-driven strategy tends to be less risky and less volatile than a soft-catalyst strategy.

3. Solution: C.

Multi-strategy funds can reallocate funds more quickly and more easily because each of the constituent strategies is managed in-house. The fee structure of multi-strategy funds is often more attractive because netting risk is more likely to be absorbed internally.

4. Solution: A.

VIX index futures are exchange-traded and are very liquid. OTC contracts offer longer maturities but are subject to illiquidity and counterparty risk.

5. Solution: B.

The most appropriate equity-related hedge fund strategy for Client 5 is an equity market-neutral (EMN) equity strategy. Overall, EMN managers are more useful for portfolio allocation during periods of non-trending or declining markets. EMN managers neutralize market risk by constructing their portfolios such that the expected portfolio beta is approximately equal to zero. Since these portfolios do not take beta risk and attempt to neutralize many other factor risks, they typically must apply leverage to the long and short positions to achieve a meaningful return profile from their individual stock selections.

Despite the use of substantial leverage, EMN strategies typically deliver return profiles that are steadier and less volatile than those of many other hedge strategy areas.

6. Solution: B.

Based on the Client 6's requirements, allocating 10% of portfolio assets to the global macro hedge fund strategy is most suitable for the Foundation. Such an allocation would result in a decrease in standard deviation (volatility) and significant increases in the combined portfolio's Sharpe and Sortino ratios (these are the highest such ratios among the strategies presented). In addition, the lower maximum drawdown (15.0%) indicates less downside risk in the combined portfolio than with any of the other strategy choices.

Case 2: Stephen Strange

1. Solution: A.

A timber investment (private real asset) offers both growth and inflation-hedging potential, and has historically low correlation with public equity. A long or short equity strategy (hedge fund) and distressed debt investment (private credit) have equity-like characteristics and are not primarily used for inflation-hedging.

2. Solution: B.

Risk factor exposures are sensitive to the period used for analysis. A liquidity risk factor can be incorporated into a risk factor-based approach. Overestimation of portfolio diversification is a limitation of traditional approaches to asset allocation.

3. Solution: B.

In constrained MVO, the optimization is prevented from selecting the most efficient allocation by the limits placed on the minimum and maximum weights for the different asset classes. As a result, the optimal portfolios obtained from constrained MVO will lie below those obtained from unconstrained MVO.

4. Solution: B.

Statement 1 is correct since a custom index proxy (e.g., S&P 500 + 2%) is unlikely to have the same risk-return characteristics as the alternative investments strategy. Statement 2 is incorrect because the providers of peer group benchmarks use very different construction rules.

Case 3: Bruce Banner

1. Solution: A.

The risk-based approach to asset allocation does not have the limitation of combining investments with varying risk characteristics into a single portfolio. This is a limitation of the traditional approach.

2. Solution: A.

Liquidity is a priority for the organization. Funds that purchase distressed companies typically have long timelines and therefore lower liquidity than the other two fund types listed.

3. Solution: C.

The economic factors indicate economic growth (high GDP growth, low unemployment, high consumer spending). Real estate performs best when both growth and inflation are high. Response B is incorrect. Gold performs well in high inflation environments, but historically has not performed as well as real estate or private equity when the economy is growing. Response A is incorrect. Private equity does not perform as well as the other options in a high inflation environment.

4. Solution: B.

Private real estate funds typically report details on all properties owned, making it more transparent than either of the hedge funds, which do not typically share all holdings or strategies.

5. Solution: C.

Multi-collinearity is an issue that should be considered when using conditional linear factor model to analyse hedge fund strategies. To address this issue, a four-step “stepwise regression” process was used to build a conditional linear factor model that is less likely to include highly correlated risk factors.

Case 4: Olympia Investments

1. Solution: C.

Over-estimation of portfolio diversification is a main limitation of the traditional approach and not of a risk-based approach. The key limitations of the risk-based approach are: sensitivity to the historical look-back period and implementation hurdles involving additional considerations for liquidity planning, manager's selection, and rebalancing policy.

2. Solution: B.

The endowment has next-12-month liabilities as follows:

Approximately \$60 million to the university ($\$1,500 \text{ million} \times 4\%$).

Approximately \$93 million in capital calls from private investment commitments (equally allocated across private real estate, and private equity $[(10\% + 21\%) \times 1,500\text{m} \times 20\%] = \93 million).

Total liabilities next 12 months = \$60 million + \$93 million = \$153 million

3. Solution: C.

The sources of immediate liquidity (assuming high-grade corporate bonds are as liquid as government bonds) are:

Cash = $2\% \times 1,500 \text{ m} = \30 m

Bonds = $15\% \times 1,500 \text{ m} = \225 m

Total liquidity available = $30 \text{ m} \times 1.022 + 225 \text{ m} \times 99\% = \253.41 m (under stress scenario) whereas the total liabilities of the fund are \$153 m. The forecast for the next 12 months is bullish on equities, and inflation is to remain at the expectations level. Therefore with no immediate need for liquidity, allocations in bonds can be reduced to increase allocations in public equities and hedge funds, which are at the lower end of their allowable ranges. Given the returns under stress scenarios, both equities and hedge funds may seem more appropriate asset classes than private equity to benefit from an increase in allocation.

4. Solution: A.

Hedge Fund 1 will be the most appropriate fund because it follows a fixed-income arbitrage strategy. A fixed-income arbitrage strategy attempts to exploit pricing inefficiencies by taking long and short positions across a range of debt securities, including sovereign and corporate bonds, bank loans, and consumer debt. Arbitrage opportunities between fixed-income instruments may develop because of variations in duration, credit quality, liquidity, and optionality. The most common types of fixed-income arbitrage strategies include yield curve trades and carry trades. Yield curve trades involve taking long and short positions at different points to profit from the

relative mispricing of securities that may exist in a flattening or steepening curve. Perceptions and forecasts of macroeconomic conditions are the backdrops for these types of trades.

10. SS12-13 Private Wealth Management

Case 1: Boylan

1. Solution: C.

C is correct: Comment 3 is correct. The most relevant considerations in pricing life insurance are mortality expectations, the discount rate and loading. The discount rate represents an assumption about the insurer's return on its investment portfolio and it is used to discount future expected outflows, i.e., death benefits: as the discount rate decreases, the present value of those expected future cash flows increase making insurance costlier, i.e., higher premiums.

2. Solution: B.

B is correct: Human capital is the net present value of the individual's future expected labor income weighted by the probability of surviving to each future age. According to the financial publication, Henry is in the highest paying medical profession, and being the youngest has the longest expected stream of future income. Therefore, he is most likely to have the highest human capital available, and the most to lose if the stream is not realized.

3. Solution: A.

Step	Item	Calculation	Value
1	FV of premiums: annuity in advance	$\$2,750 \times FVA^{ADV}(25y, 6\%)$	\$159,930
2	FV of dividends: annuity in arrears	$\$850 \times FVA(25y, 6\%)$	46,635
	Time Value adjusted net payment		113,295
3	Estimated cash value (at end of 25 years)		60,000
4	25-year Cost of insurance		\$53,295
5	Annual payment to equal cost of insurance	$\$53,295 \div FVA^{ADV}(25y, 6\%)$	\$916
6	Cost per \$1,000 coverage per year	$\$916 \div (\$300,000 \div \$1,000)$	\$3.05

4. Solution: C.

C is correct: Janice is a stock broker specializing in medical technology and her human capital is therefore highly correlated with stock market returns. She should balance this risk by having greater exposure to financial assets that are less risky, i.e., high grade government bonds. Jason's human capital is less correlated to stock market returns; in addition, his future pension income arising from a defined benefit plan is quite stable. His optimal portfolio should have a greater allocation to the stock market than Janice.

5. Solution: B.

B is correct: Statement 1 is incorrect: since they are both the same age, Jason will receive a

higher income yield than his sister as females have a longer average life expectancy than males and therefore a longer expected payout period.

Case 2: Cooper Reyder

1. Solution: C.

The statement regarding term life insurance is most accurate. Life insurance is a perfect hedge against the loss of human capital in the event of death, whereas annuities address longevity risk. Although overall risk tolerance increases with human capital, overall risk tolerance decreases with greater wage risk. The magnitude of loss of human capital at younger ages is much more important than the higher probability of death at older ages.

2. Solution: C.

A jointly owned variable payout lifetime annuity product would provide cash flows until the end of the surviving spouse's lifetime. Therefore, the Jones family will not outlive the assets. It is true there is less certainty regarding the cash flows because they are linked to the performance of the underlying investments.

3. Solution: A.

The statement about the claims by creditors is inaccurate because the trust assets cannot be reached by the beneficiary's creditors. The other statements are accurate.

Case 3: Buylak

1. Solution: C.

The trust was irrevocable, so neither Bryn (while alive) nor his wife would have a claim on any of its assets, including the life insurance policy or its proceeds. Had Paulo predeceased Bryn, the proceeds of the life insurance policy would have been paid to the remainderman on Bryn's death: the University of Izlandia.

2. Solution: A.

Probate is the legal process to confirm the validity of the will so that executors, heirs, and other interested parties can rely on its authenticity. Only the Izlandia distribution center changes ownership through a provision of the will. Joint ownership with the right of survivorship automatically transfers to the surviving joint owner (Kasey). Death benefit proceeds under a life insurance contract pass directly to policy beneficiaries outside the probate process.

3. Solution: A.

In each year, the tax rate under the deduction method will be:

$$T_{\text{Residence}} + T_{\text{source}} (1 - T_{\text{Residence}})$$

In this case, the tax rate is calculated as follows:

$$(0.25) + 0.35(1 - 0.25) = 0.5125$$

This value is the combined tax rate net of tax relief via the deduction method.

Kasey's after-tax annual cash flow is $\text{€}450,000 \times (1 - 0.5125) = \text{€}219,375$.

4. Solution: A.

After applying 30% appreciation, the 1.5% per year wealth tax, and the two capital gains taxes (local source Landlochen and residential Weshvia using the credit method to calculate), the net proceeds are €3,432,500 calculated as follows:

Sale price	$\text{€}3,000,000 \times 1.30$	€ 3,900,000
Minus total taxes (calculated below)		-467,500
Net Proceeds		€ 3,432,500
Calculation of total taxes		
Wealth tax	$2,900,000 \times 0.015 \times 5 \text{ years}$	€ 217,500
Plus capital gains tax from Landlochen	$(3,900,000 - 2,900,000) \times 0.20$	200,000
Plus capital gains tax from Weshvia of 0.25 minus 0.20 credit	$(3,900,000 - 2,900,000) \times 0.05$	50,000
Total taxes		€ 467,500

The two-step calculation of capital gains tax under the credit method is equivalent to:

$$T_{\text{Credit Method}} = \text{MAX} [T_{\text{Source}}, T_{\text{Residence}}]$$

$$= \text{Max}[20\%, 25\%] = 25\%, \text{ giving a capital gains tax of } (3,900,000 - 2,900,000) \times 0.25 = \text{€}250,000$$

5. Solution: A.

Calculate the ending value after taxes at the end of 12 years.

$$\text{Accrual equivalent annual return \%} = 100\% \times [(\text{Ending value}/\text{Beginning value})^{1/12} - 1]$$

	Beginning Value (BV)	Return	Formula	Ending Value(EV)
Taxable	€ 1,200,000			
	Returns taxed annually at 28%	0.12	$BV[1 + 0.12(1 - 0.28)]^{12}$	€ 3,243,832
Tax deferred	€ 700,000	0.075	$BV(1 + 0.075)^{12} \times (1 - 0.40)$	€ 1,000,347
	Net of 40% distribution tax		$= €1,667,245 \times (1 - 0.40)$	
Tax exempt	€ 180,000	0.11	$BV(1 + 0.11)^{12}$	€ 629,721
	Combined ending value			€ 4,873,900
	Combined beginning value			€ 2,080,000
Accrual equivalent after-tax annual return =		$(4,873,900/2,080,000)^{1/12} - 1 = 0.0735 = 7.35\%$		

Case 4: Richards

1. Solution: B.

Primary capital is the sum of assets that fall into the personal and market risk buckets. It includes the residence, municipal bond portfolio, global equity fund and cash equivalents. It excludes the values of MTL and the concentrated positions in CTAS public stock and the warehouse (investment real estate) – those are considered aspirational.

Asset	Value (\$000's)	Cost (\$000's)	Gain= Value - Cost (\$000's)	Tax = Gain x 0.20 (\$000's)	Net Value after tax (\$000's)
Residence	2,000	2,000	0	0	2,000
Muni Bonds	3,000	3,150	(150)	-30	3,030
Global Equities	3,400	1,650	1750	350	3,050
Cash Equivalents	300	300	0	0	300
			Total Net Value =		8,380

2. Solution: C.

Richards's understanding about avoiding immediate capital gains is correct. The short sale against the box approach defers capital gains. No sale of stock occurs in establishing the collar. The short against the box strategy is riskless, whereas the collar does carry risk within the range between the exercise prices of the put and the call. The dividends will continue to be paid to Richards only in the collar. The dividends will pass through to the lender of the shares that were borrowed in the short against the box strategy and are thus not available to Richards.

3. Solution: A.

Adams's statement about the short sale against the box is correct because it creates a riskless position. Although the forward conversion with options avoids counterparty risk, the equity forward sale and the total return equity swap use a derivatives dealer and thus include counterparty risk.

4. Solution: A.

Immediate cash inflows available would include proceeds and the possible first rental payment in Offer 2; all cash flows are net of taxes. As shown in the table below Offer 1, selling the warehouse outright, produces the highest immediate cash flow net of taxes (Income Tax rate = 40%):

Offer	Offer Amount	Cost	Taxes Paid Gains Taxes = 20%	Loan Proceeds LTV =	Initial Lease Payment	Income tax deduction	Net To Reinvest Offer less
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				80%		on rent	all taxes
1	4,800,000	4,300,000	(100,000)				4,700,000
2	5,800,000	4,300,000	0 as no sale occurs	4,640,000			4,640,000
3	4,900,000	4,300,000	(120,000)		(150,000)	60,000	4,690,000

5. Solution: C.

MTL Strategy 2 is not a staged exit strategy because it does not provide for two specific liquidity events: cash up front and a sale or monetization of the remainder of Richards's ownership in the future. Strategies 1 and 3 are staged exit strategies that provide for two liquidity events.

6. Solution: B.

Evidence of both cross hedging and a mismatch in character is present in MTL Strategy 2. Buying put options on the ETF is a cross hedge against the industry risk faced by the public company. The scenario outlines an exercise of employee stock options, which will be taxed as ordinary income, and an eventual profit from a put option which will be taxed as a capital gain. This difference in tax type is a mismatch in character.

Case 5: Rhys Jacobs

1. Solution: A.

A is correct. The strategy to hold assets for the long term and avoid paying capital gains until the assets are sold many years later is an example of a tax deferral strategy.

B is incorrect. Strategy 2 is a tax avoidance strategy because no taxes are paid on tax exempt securities.

C is incorrect. Strategy 3 is a tax reduction strategy because the tax rate on the capital gains is lower than the income tax rate.

2. Solution: A.

Note 3 is most accurate. Monte Carlo simulation provides a probability distribution of outcomes, not simply a yes/no answer. In this context, the discussion of the investment strategy with a likelihood of achieving a certain return is an accurate description of the results of a Monte Carlo simulation. Merely using long-term averages for capital market returns or inflation assumptions oversimplifies their variability and leads to the clearly unrealistic implication of linear wealth accumulation.

B is incorrect because getting to a yes/no decision is also oversimplified and representative of a deterministic approach, which is opposite to the Monte Carlo process that emphasizes probability distributions.

C is incorrect because this description simply uses long-term market returns and averages. It is too simplified and suggests a linear approach to personal retirement planning and does not convey the notation of variance (or likelihood) of the value.

3. Solution: A.

A is correct.

Accumulated Value	Calculation	Results
Ignoring taxes	$\$250,000 \times [1 + 0.08]^{25}$	\$1,712,119
Including taxes	$\$250,000 \times [1 + 0.08 \times (1 - 0.10)]^{25}$	1,421,706
Amount consumed by taxes		\$290,413
Investment gain	$\$1,712,119 - \$250,000$	\$1,462,119
Investment gain consumed by taxes	$\$290,413 / \$1,462,119$	19.90%

C is incorrect because it taxes the gain at the end.

Accumulated Value	Calculation	Results
Ignoring taxes	$\$250,000 \times [1 + 0.08]^{25}$	\$1,712,119
Investment gain	$\$1,712,119 - \$250,000$	\$1,462,119
Tax on gain	$10\% \times 1,462,119$	\$146,212

Investment gain consumed by taxes	\$146,212/\$1,462,119	10.00%
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B is incorrect because the wrong denominator was chosen when calculating the percent gain: \$290,413/\$1,712,119 = 17.0%.

4. Solution: A.

If Jacobs wants to be 94% certain that his portfolio will last, he can tolerate a 6% failure rate. A spending rate of \$4 per \$100 of assets has a ruin probability of 6.3%, which is close to the stated failure rate of 6% (Exhibit 2). Therefore, he can withdraw just under 4% from the balanced portfolio, or $0.04 \times \$2,000,000 = \$80,000$.

B is incorrect because it incorrectly equates \$6 per \$100 of assets with the 6% failure rate. In this case, the calculation is $0.06\% \times \$2,000,000 = \$120,000$.

C is incorrect because it incorrectly assumes the hazard rate of 4.75% is the failure rate. In this case, the calculation is $4.75\% \times \$2,000,000 = \$95,000$.

5. Solution: C.

$$\begin{aligned}
 T_{\text{Deduction Method}} &= T_{\text{Source}} + (1 - T_{\text{Source}}) \times T_{\text{Residence}} \\
 &= 10.0\% + 15.5\% - (10.0\% \times 15.5\%) = 24.0\%
 \end{aligned}$$

A is incorrect because it assumes the exemption method, but from the perspective of Sahjong, not Mahjong, where the residence country (Sahjong) imposes no tax on foreign-sourced income.

B is incorrect because the tax rate would 15.5% under the exemption method (income from Mahjong would be taxed at the source rate, or Mahjong's tax rate): $T_{\text{Exemption Method}} = T_{\text{Source}}$.

Case 6: Connor McClelland

1. Solution: B.

The Grahams' net wealth is their total assets less their total liabilities ($\$7,512 - \$5,098 = \$2,414$), as calculated in the following economic balance sheet.

Assets		Liabilities	
Financial Capital		Debts	
Checking account	27	Residential mortgage	\$285
Taxable investment account	625	Home equity line of credit-outstanding balance	38
Residence	525		
Cash value of life insurance (combined Bradley and Reagan)	119	University education for children	350
Human capital (combined Bradley and Reagan)	3,940	Vacation home	325
Employer pensions (combined Bradley and Reagan)	956	Lifetime consumption (present value)	3,700
Military pension (Reagan)	1,320	Planned donations	400
Total Assets	\$7,512	Total Liabilities	\$5,098
		Net Wealth	\$2,414
		Total Liabilities and Net Wealth	\$7,512

A is incorrect. Human capital was not included in assets and lifetime consumption was not included in liabilities: $[(7,512 - 3,940) - (5,098 - 3,700)] = 3,572 - 1,398 = 2,174$.

C is incorrect. The death benefit rather than the cash value of life insurance was included in the calculation of assets: $(7,512 + 250 + 250 - 119) - 5,098 = 7,893 - 5,098 = 2,795$.

2. Solution: C.

Personal assets are consumed, whereas investment assets are held for the potential to increase in value and fund future consumption. Some assets, such as real estate, can be described as "mixed assets" because they can act as both personal assets (shelter) and investment assets (to help fund retirement).

B is incorrect. Financial capital includes the tangible and intangible assets (outside of human capital) owned by an individual or household. Financial capital would include the vested portion but not the unvested portion of an employer pension plan.

A is incorrect. The economic wealth of an individual changes throughout their lifetime, as do the underlying assets that make up that wealth. The total economic wealth of younger individuals is

typically dominated by the value of their human capital because younger individuals have not had as much time to save and accumulate financial wealth. As individuals grow older, they are likely to save some of their earnings and will accumulate financial capital.

3. Solution: B.

A risk with the loss characteristics of high frequency of occurrence and low severity of loss, such as dental cavities, is best managed through risk reduction—for example, through proper dental hygiene. A risk with the loss characteristics of low frequency of occurrence and high severity of loss, such as an earthquake that destroys your home, is best managed through risk transfer. A risk with the loss characteristics of low frequency of occurrence and low severity of loss is best managed through risk retention, such as not purchasing an extended warranty on an infrequently used and relatively inexpensive item.

A is incorrect. A risk with the loss characteristics of low frequency of occurrence and low severity of loss would be best managed through risk retention, such as not purchasing an extended warranty on an infrequently used and relatively inexpensive item.

C is incorrect. A risk with the loss characteristics of low frequency of occurrence and high severity of loss, such as an earthquake that destroys your home, would be best managed through risk transfer.

4. Solution: A.

The additional amount of life insurance Bradley should purchase using the human life value method is calculated as follows. The calculations assume (1) Bradley works for exactly 15 years and (2) his family needs the proceeds of the life insurance immediately upon his death.

1) Calculate the pretax income needed to be replaced

Bradley's annual income (before taxes)	\$175,000
Less: income and payroll taxes at 30% ($\$175,000 \times 30\%$) =	52,500
Annual income (after taxes)	122,500
Less: family expenses attributable to Bradley	20,000
Net annual income after expenses attributable to Bradley	102,500
Plus: non-taxable employer contribution to defined-contribution retirement plan ($\$175,000 \times 5\%$) =	8,750
Net after-tax income needed to be replaced for Bradley	111,250
Amount of pretax income needed to replace the net after-tax income: [($\$111,250 / (1 - 0.20)$)] = ($\$111,250 / 0.80$) =	\$139,063

2) Adjust the discount rate to account for the projected growth rate of earnings and expenses

Discount rate: 4%

Projected annual salary and expense increase for Bradley: 3%

Calculate the adjusted rate (i):

$$\begin{aligned} i &= [(1 + \text{Discount rate}) / (1 + \text{Growth rate})] - 1 \\ &= [(1 + 0.04) / (1 + 0.03)] - 1 = (1.04 / 1.03) - 1 \\ &= 1.0097 - 1 = 0.0097 = 0.97\% \end{aligned}$$

3) Determine the total amount of life insurance needed by calculating the present value of an annuity due in advance

$$\$139,063 \times PVA^{\text{ADV}}(15 \text{ years}, 0.97\%) = \$1,951,345$$

4) Less Bradley's current life insurance coverage (from Exhibit 1) (250,000)

5) Additional life insurance required for Bradley \$1,701,345

B is incorrect. The employer contribution to the defined-contribution retirement plan was not included in Step 1 of the calculation.

C is incorrect. The current \$250,000 life insurance coverage was not deducted from the calculation of the total life insurance needed.

5. Solution: C.

Because property is a financial asset, property risk is normally considered to be associated with a potential loss of financial capital, whereas earnings and health risk can affect both financial and human capital. Although the value of the Grahams' residence is significant, it is a minor portion of the family's overall financial and human capital. Thus, property risk is least likely to adversely affect the Grahams' ability to maintain their lifestyle, purchase a vacation home, pay for their children's university education, and fund charitable donations.

A is incorrect. Health risk is the risk and implication associated with illness or injury. Even with insurance, direct financial costs associated with illness or injury may include coinsurance, copayments, and deductibles. Health factors also typically have an impact on life, disability, and long-term care insurance premiums. Health risks also have implications for human capital and financial capital. For example, if a worker becomes disabled, he or she may be unable to work while health expenses are incurred, resulting in a loss to both current assets and future earnings.

B is incorrect. Earnings risk is the risk associated with an individual's earning potential. Given that there are 15/17 years before retirement, this is a significant risk for them. Earnings can be impacted by death, health issues, unemployment, and underemployment. The loss of earnings reduces human capital by reducing the present value of future expected labor income and financial capital because assets will be needed to make up for any loss of income.

6. Solution: A.

A variable joint life annuity is most appropriate. The Grahams have characteristics that are

compatible with variable annuities—average risk tolerance and the ability to adjust their spending in retirement—enabling them to select a variable annuity for which payment is linked to a risky portfolio of assets. The joint life feature will provide payments until both of them are no longer living.

B is incorrect. While the joint life feature would provide payments until both of the Grahams are no longer living, a fixed annuity would lock them into a constant income stream that is guaranteed not to change.

C is incorrect. The life annuity with period certain feature provides payment for the life of the annuitant and is guaranteed for a minimum number of years. If Bradley purchased a variable life annuity with period certain policy with a 10-year guarantee and he died after 6 years, Reagan would receive payments for only 4 more years as the beneficiary. If Bradley died after the guaranteed minimum, say at 12 years, Reagan would not receive any more payments.

Case 7: Cliff Richard

1. Solution: C.

Common investment objectives for IPS include funding lifestyle needs during retirement, supporting family members, funding philanthropic activities, and meeting bequest goals. These represent ongoing objectives. By contrast, Ford's one-time objectives may include the renovation of his home. It is common for private clients to have multiple competing objectives that they seek to achieve with the same portfolio. Richard should continue to work with Ford to ensure that his portfolio distribution rate is sustainable throughout his retirement and in alignment with his gifting goals.

2. Solution: C.

Ford exhibits the behavioral phenomenon known as the "annuity puzzle" by expressing his reluctance to lose control over his assets and his concern over the high cost of annuities.

3. Solution: B.

Ford's true investment horizon is through retirement, a period that likely will be much longer than 12 years. His wealth manager should describe his time horizon as exceeding 10 years.

4. Solution: C.

The Monte Carlo simulation shows that Ford has a 75% probability of having an amount exceeding \$1,020,039 in Year 15. Since Ford wants to gift \$1,000,000 to his daughter, he has a slightly greater than 75% probability of meeting or exceeding his goal in Year 15.

5. Solution: A.

Richard's ability to listen well and understand Ford's needs are soft skills and not technical skills.

Case 8: James Clerk Maxwell

1. Solution: B.

The total return based on the 14% before-tax annual return: $\text{USD } 3,000,000 \times 14\% = \text{USD } 420,000$.

The taxes due on each component of return: Interest: $\text{USD } 91,800 \times 0.30 = \text{USD } 27,540$

Dividends: $\text{USD } 23,400 \times 0.15 = \text{USD } 3,510$

Realized capital gains: $\text{USD } 48,600 \times 0.15 = \text{USD } 7,290$

The total dollar return net of taxes due is:

$\text{USD } 420,000 - (\text{USD } 27,540 + \text{USD } 3,510 + \text{USD } 7,290) = \text{USD } 381,660$

The annual return after taxes is equal to the total dollar return net of taxes due, divided by the beginning value of the investment portfolio:

$\text{USD } 381,660 / \text{USD } 3,000,000 = 12.722\%$

2. Solution: C.

$\text{FV} = \text{€}300,000 \times \text{FVIF}_{\text{dbg}} = \text{€}300,000 \times [(1 + 0.07)^{10}(1 - 0.25) + 0.25] = \text{€}517,609.06 = \text{€}517,609$.

3. Solution: A.

The investment returns on a non-dividend-paying account are not taxed till the end of 10 years. The value of tax deferral allows the returns to compound at a higher rate over time.

Investment returns on fixed securities are taxed every year, the tax drag on capital accumulation compounds over time when taxes are paid each year.

4. Solution: B.

Assuming his tax rate is unchanged, in 15 years, the TDA will be worth $\text{€}250,000(1.08)^{15}(1 - 0.20) = \text{€}634,434$ after taxes. The tax-exempt account will be worth $\text{€}150,000(1.08)^{15} = \text{€}475,825$.

5. Solution: A.

The current tax rate exceeds the tax rate at the time of the withdrawal. Hence the TDA accumulates more after-tax wealth than the tax-exempt account.

Case 9: Aneurin Bevan

1. Solution: A.

The typical objectives Keller would discuss include reducing the risk of wealth concentration, generating liquidity to diversify and satisfy spending needs, and achieving these objectives in a tax-efficient manner.

2. Solution: C.

The information given indicates that loyalty effects, overconfidence/familiarity (illusion of knowledge), and confirmation bias could be affecting Edward, while status quo bias, naïve extrapolation of past returns, and anchoring and adjustment bias could be affecting Melissa. However, overconfidence/familiarity, loyalty effects, status quo, and naïve extrapolation of past returns are emotional biases.

3. Solution: C.

The most common way to reduce the cost of hedging is to lower the strike price. An at-the-money put will cost more than an out-of-the-money put. But the lower the strike price, the greater the downside risk the holder retains.

Another way is to purchase puts with shorter maturity. Puts with a shorter maturity will cost less than puts with a longer maturity because the “term insurance” doesn’t last very long.

Another popular strategy is to combine the purchase of put options with the sale of put options with a lower strike price and with the same maturity as the long puts, which is known as a “put spread.” The cost of the long puts is reduced by selling puts to bring in some premium income to partially finance the purchase of the long puts.

4. Solution: B.

The yield enhancement strategy allows the Bevans to establish a liquidation value (the strike price) for the shares on which call options are written. If the stock price increases above the strike price at maturity, the calls are exercised and Bevans will deliver their long shares. They would receive the strike price of the calls and the premium from the initial sale of the calls. If the stock (SeP) closes at or below the strike price at expiration, the calls will expire, and Bevans will retain the option premium and the long shares. One of the most significant benefits of implementing a covered call writing program is that it can psychologically prepare Bevans to dispose of their shares.

11. SS14 Portfolio Management for Institutional Investors

Case 1: Bruce Wayne

1. Solution: B.

The DB pension plan's investment objective of seeking a higher rate of return than the discount rate used for valuing liabilities will help in growing the asset base in line with the growth in liabilities. The higher growth in assets will allow the plan to meet its contractual liabilities, thus reducing the need for plan contributions. It typically will involve taking on more investment risk hence will likely increase the volatility in funded status.

2. Solution: C.

The proportion of retired lives greater than active lives indicates a lower duration. This implies a lower risk tolerance. However, the size of the plan is small relative to the GME's market capitalization. This indicates more flexibility in taking investment risk and more tolerance for volatility in employer contributions. The option of no early retirement also implies a higher risk tolerance.

3. Solution: B.

The Norway model is characterized by investing in public equities and fixed income (the traditional 60/40 equity/bond model falls under the Norway model), with largely passively managed assets and with very little to no allocation to alternative investments.

4. Solution: A.

$A \div E = 1/0.25 = 4$; $(A \div E) - 1 = 3$; the standard deviation of asset returns ($\sigma_{\Delta A/A}$) = 0.07; the standard deviation of changes in liability values ($\sigma_{\Delta L/L}$) = 0.05; and the correlation between asset and liability value changes (ρ) = 0.35.

First, we compute the variance of equity value changes:

$$\sigma_{\Delta E/E}^2 = (4)^2(0.07)^2 + (3)^2(0.05)^2 - 2 \times 4 \times 3 \times 0.35 \times 0.07 \times 0.05 = 0.0715$$

standard deviation of the equity value changes

$$\sigma_{\Delta E/E} = \sqrt{0.0715} = 0.2674 = 26.74\% \text{ per year}$$

The new asset to equity ratio is $A \div E = 1/0.2 = 5$, and so $(A \div E) - 1 = 4$.

$$\sigma_{\Delta E/E}^2 = (5)^2(0.07)^2 + (4)^2(0.05)^2 - 2 \times 5 \times 4 \times 0.35 \times 0.07 \times 0.05 = 0.1135$$

standard deviation of the new equity value changes

$$\sigma_{\Delta E/E} = \sqrt{0.1135} = 0.3369 = 33.69\% \text{ per year}$$

The change in the volatility of the equity value after decreasing equity ratio (increasing leverage) is: $26.74\% - 33.69\% = -6.95\% \text{ per year}$

12. SS15 Trading, Performance Evaluation, and Manager Selection

Case 1: Ahmed

1. Solution: B.

B is correct. The implementation shortfall is the difference between the money return on a paper portfolio based on the benchmark or decision price (\$25.50 in Exhibit 1) and the actual portfolio's money return and is calculated as follows:

Portfolio Money Returns	Price £	Number of Shares	Total £
Paper portfolio original cost	25.50	1,000	-25,500
Paper portfolio end value	26.75	1,000	26,750
Paper portfolio profit			1,250
Real portfolio	26.25	800	-21,000
Commission			-135
Real Portfolio total original cost			-21,135
Real portfolio end value	26.75	800	21,400
Real portfolio profit		265	

Implementation Shortfall		
in £s: paper profit – real profit	1,250 – 265	985
As % of cost of paper portfolio	985 ÷ 25,500	3.86%
in basis points		386

2. Solution: A.

A is correct. Direct market access would be most suitable for the order of JAK—a small order(1000 shares compared with 2,000,000 ADV) of a liquid stock trading on a well-organized market (LSE).

Case 2: Lancaster

1. Solution: B.

Depending on the expected rate of alpha decay, portfolio managers are better off trading the order faster (by selecting a higher trade urgency). Higher rates of alpha decay, or alpha loss, require faster (or more accelerated) trading, to realize alpha before it is traded on by other market participants.

2. Solution: A.

If the Fund relaxes the appraisal criteria they are more likely to make a Type I error, retaining a poor manager.

3. Solution: B.

Performance attribution helps explain how performance was achieved; it breaks apart the return or risk into different explanatory components. Effective performance attribution must account for all of the portfolio's return or risk exposure, reflect the investment decision-making process, quantify the active decisions of the portfolio manager, and provide a complete understanding of the excess return/risk of the portfolio.

4. Solution: B.

The allocation effect for Sector 2 is:

$$\begin{aligned}\text{Allocation} &= (w_i - W_i)(B_i - B) \\ &= (35.78\% - 43.22\%) \times (23.89\% - 20.54\%) \\ &= -0.25\%\end{aligned}$$

5. Solution: A.

The allocation effect for each sector is:

$$\text{Allocation} = (w_i - W_i)(B_i - B)$$

$$\text{Sector 1} = (30.62\% - 25.50\%) \times (15.82\% - 20.54\%) = -0.24\%$$

$$\text{Sector 3} = (15.35\% - 20.1\%) \times (12.57\% - 20.54\%) = 0.38\%$$

$$\text{Sector 4} = (18.25\% - 11.18\%) \times (32.73\% - 20.54\%) = 0.86\%$$

Sector 1 is the only sector of the three that had a negative allocation effect.

6. Solution: C.

The total -269 bps of underperformance at the overall fund level is predominantly the result of poor Sector 4 security selection decisions (-251 bps = -2.51%).

$$\text{Allocation} = (w_i - W_i)(B_i - B)$$

$$\text{Selection + Interaction} = Wi(Ri - Bi) + (wi - Wi)(Ri - Bi)$$

According to these two equations, the results of the sector level micro attribution is as:

Return Attribution	Allocation	Selection + Interaction	Total
Sector 1	-0.24%	0.01%	-0.23%
Sector 2	-0.25%	-0.73%	-0.98%
Sector 4	0.38%	-0.21%	0.17%
Sector 4	0.86%	-2.51%	-1.64%
Total	0.75%	-3.44%	-2.69%

Case 3: Subramaniam

1. Solution: B.

Subramaniam is least accurate with respect to performance attribution. Performance attribution investigates the sources of the account's performance relative to a specific investment benchmark, not a manager's past performance.

2. Solution: A.

Based on the plan's type (defined benefit) and its characteristics, a liability-based benchmark is most appropriate. Liability-based benchmarks are used most frequently when assets are required to pay a specific future liability, as in a defined benefit pension plan.

3. Solution: C.

Hedge fund peer groups suffer from survivorship and backfill bias. Backfill bias occurs when the index provider adds a manager to the index and imports the manager's entire return history.

4. Solution: C.

The highest return per unit of systematic risk is measured by the Treynor measure. Of the given assets, the W-Life account has the highest Treynor measure.

$$T_A = \frac{(\overline{R_A} - \overline{r_f})}{\widehat{\beta}_A} \quad \overline{R_A} = \text{average asset return} \quad \overline{r_f} = \text{average risk free return}$$

$$\widehat{\beta}_A = \text{ex post Beta of the asset}$$

For the W-life account, it is $(15-4)/1.35=8.15$

Case 4: Kim Simpson and Janet Long Scenario

1. Solution: C.

The paper portfolio performance = $100,000 \times (\$35.65 - \$35.00) = \$65,000$.

The actual portfolio performance = $90,000 \times (\$35.65 - \$35.41) - (90,000 \times \$0.02) = \$19,800$.

Implementation shortfall is, therefore, $\$65,000 - \$19,800 = \$45,200$.

2. Solution: B.

In this case:

$$\text{arrival cost} = \text{side} \times \frac{\text{execution price} - \text{arrival price}}{\text{arrival price}} \times 10^4 \text{bps}$$

where:

side = +1 for a buy, -1 for a sell

arrival price = market price when the order was transmitted to the market

In this case:

$$\text{arrival cost} = +1 \times [(\$35.41 - \$35.15) / \$35.15] \times 10^4 \text{bps} = 73.97 \text{bps}$$

3. Solution: B.

The fact that VWAP for a relevant stock index is lower than the index arrival price means that markets have been falling over the trade horizon.

This means the index cost will be negative, as defined by the following formula

$$\text{index cost} = \text{side} \times \frac{\text{index VWAP} - \text{index arrival price}}{\text{index arrival price}} \times 10^4 \text{bps}$$

The intuition here is that a falling market should lower the costs of traders buying securities. Once this negative index cost (multiplied by a beta of 1) is subtracted from the arrival cost of the trade this will increase the market-adjusted cost of the trade.

4. Solution: C.

Good trade governance requires a policy in place for the aggregation of orders across multiple client accounts in order to ensure that clients are treated fairly when allocations are made on a pre-trade and post-trade basis. Answer A is incorrect since best execution is not defined simply by being the lowest cost broker—other factors need to be considered such as speed of execution, likelihood of execution and settlement, and the nature of the trade. Answer B is incorrect since a broker should disclose all execution venues used by the firm to clients.

Case 5: Education Investment Foundation Scenario

1. Solution: B.

When assessing the skill of managers, the null hypothesis is that the manager is not skillful. The alternative hypothesis therefore is that the manager does indeed have skill. A Type I error occurs when the null is incorrectly rejected (i.e., the fund hires a bad manager), and a Type II error occurs when the null is false but not rejected (i.e., the fund fails to hire good managers). The nature of both Purpose 1 and Purpose 2 of the policy is to monitor the subsequent performance of managers that have been rejected by the manager selection policy. The most likely reason for monitoring the subsequent performance of managers, who were rejected, is to detect Type II errors where a good manager is not hired by the fund due to a mistake.

2. Solution: A.

Returns-based style analysis (RBSA) uses a regression of fund returns against major risk factors to identify the risk exposures of the fund. In contrast, holdings-based style analysis (HSBA) looks at the current individual holdings of the fund and assess the style of the fund from these individual holdings. As such, the HSBA requires a higher level of data than RBSA; hence, the first consideration of lower data requirements implies RBSA would be more appropriate.

The second consideration of mitigating the effects of window dressing also implies RBSA is more appropriate. Window dressing occurs when a manager changes their holdings shortly before a reporting date in order to change the perceived risk exposures of the fund. RBSA would be less affected by window dressing because the historical regressions look at average portfolio exposures over the regression period rather than being a current snapshot.

3. Solution: B.

For a gross return of 10% and a benchmark return of 5%, computed fees would be calculated as follows:

Schedule 1 fee = $0.50\% + 0.3[10\% - 5\%] = 2\%$. This is not higher than the maximum fee of 3%; hence, the manager will take 2%.

Schedule 2 fee = $0.75\% + 0.2[10\% - 0.75\%] = 2.6\%$.

Schedule 3 fee = $1.00\% + 0.1[10\% - 1.00\%] = 1.9\%$.

4. Solution: C.

Schedule 1 fee = 0.50%. This is not higher than the maximum fee of 3%; hence, the manager will take 0.50%.

Schedule 2 fee = 0.75%.

Schedule 3 fee = $1.00\% + 0.1[-10\% - 1.00\%] = -0.1\%$.

Case 6: Cameron Li and Rick Gleeson Scenario

1. Solution: B.

Statement 1 is correct. Trading large orders increases market impact compared to trading smaller orders, and this effect is further accentuated by higher trade urgency.

Statement 2 is incorrect. Trading with lower urgency is associated with higher execution risk because of the longer period of time over which the order is executed, meaning that the trade is exposed to price volatility and changing market conditions for longer.

2. Solution: B.

Trading cost = $(900 \times \$22.33 + 600 \times \$22.43 + 700 \times \$22.47 + 800 \times \$22.65) - 3,000 \times \$22.29 = \534 . The trading cost calculation uses the price of the shares when the trader releases the order to the market, not the portfolio manager's benchmark price.

3. Solution: C.

Arrival cost = $+1 \times [(\$22.47 - \$22.29) / \$22.29] \times 10,000 = 80.8 \text{ bp}$.

The arrival cost calculation uses the price of the shares when the trader releases the order to the market, not the portfolio manager's benchmark price.

4. Solution: A.

Arrival price algorithms are generally used for relatively small orders or liquid securities. These algorithms are also used for high urgency trades (e.g., to reduce execution risk).

Case 7: Diana Prince

1. Solution: A.

The focus of the initial screening process is on building a universe of managers that could potentially satisfy the identified portfolio need and should not focus on historical performance. Identifying a benchmark is a key component of defining the manager's role in the portfolio, and third-party categorizations are an efficient way to build an initial universe which can then be further refined.

2. Solution: B.

Manager J is a top-down manager with an absolute return target. A factor-based attribution is best suited to evaluate the effectiveness of the manager's sector decisions and hedging of market risk.

3. Solution: B.

The capture ratio is defined as upside capture/downside capture. For Manager J, the capture ratio is $82\%/65.5\% = 1.25$ or 125% hence greater than 1. A capture ratio greater than 1 indicates positive asymmetry or a convex return profile. Maximum drawdown is the cumulative peak-to-trough loss during a continuous period. Given the 10-year time frame, a drawdown period of four months indicates that the portfolio recovered quickly from its maximum loss.

4. Solution: A.

The infrequent nature of the inefficiency suggests that the inefficiency is probably not worthwhile to pursue.

5. Solution: B.

Based on data in Exhibit 2, the fund underperformed its benchmark by 25 bps. As a result of changes in the shape of the yield curve, 44 bps were gained. By overweighting the corporate sector, 8 bps were lost.