LEVEL III

Question: 1
Topic: Portfolio Management – Individual
Minutes: 26

Questions 1 and 2 relate to Patricia and Alexander Tracy. A total of 35 minutes is allocated to these questions. *Candidates should answer these questions in the order presented.*

QUESTION 1 HAS FOUR PARTS (A, B, C, D) FOR A TOTAL OF 26 MINUTES.

Patricia and Alexander Tracy, both age 59, are residents of Canada. They have twin sons who will enter a four-year university program in one year. Patricia is a long-time employee of a telecommunications company. Alexander is a self-employed sales consultant.

Alexander's annual income is now steady after years of extreme highs and lows. The Tracys have built an investment portfolio through saving in Alexander's high income years. The Tracys' current annual income is equal to their total expenses; as a result, they cannot add to savings currently. They expect that both their expenses and income will grow at the inflation rate. All medical costs, now and in the future, are fully covered through government programs.

The Tracys worry about whether they have saved enough for retirement, and whether they will be able to maintain the real value of their portfolio. Inflation is expected to average 4% for the foreseeable future.

The Tracys have approached Darren Briscoe to help them analyze their investment strategy and retirement choices. The Tracys disagree about the appropriate investment strategy. Patricia prefers not losing money over making a high return. This is partly a result of continuing regret for a loss experienced in an equity mutual fund several years ago. Alexander's history of making frequent changes in their portfolio greatly annoyed Patricia. She thinks Alexander focused only on potential return and paid little attention to risk.

The Tracys currently have all their assets in inflation-indexed, short-term bonds that are expected to continue to earn a return that would match the inflation rate after taxes. After retirement, they are willing to consider changing their investment strategy if necessary to maintain their lifestyle.

The Tracys are eligible to retire next year at age 60. If they do, Patricia will receive annual payments from her company's defined-benefit pension plan and both Patricia and Alexander will receive payments from the Canadian government pension plan. Alexander does not participate in any company or individual retirement plan. Briscoe has compiled financial data and market expectations for the Tracys' retirement, shown in Exhibit 1. Currently, Briscoe estimates that the Tracys' investment portfolio will grow to 1,100,000 Canadian dollars (CAD) by their retirement date next year.

LEVEL III

Question:	1
Topic:	Portfolio Management – Individual
Minutes:	26

Exhibit 1
Financial Data and Market Expectations
Patricia and Alexander Tracy

	Retirement at Age 60 (2010)
Expected annual expenses	CAD 125,000
Annual pension income (after-tax)	
Patricia's company plan	CAD 40,000
Combined government pension	CAD 40,000
Total annual pension income	CAD 80,000
Expected annual inflation	4.0%
Expected annual after-tax portfolio return	4.0%

Pension income from both Patricia's company plan and the government pension plan is fully indexed for inflation. Briscoe expects a tax rate of 20% to apply to the Tracys' withdrawals from the investment account. The Tracys expect to earn no employment income after retirement. The Tracys' residence is not considered part of their investable assets.

The Tracys have the option to delay retirement until age 65. The Tracys intend to retire together, whether it is in 2010 at age 60 or in 2015 at age 65.

Briscoe determines that if the Tracys retire at age 60, their risk tolerance is below average. If they retire at age 60, they plan to pay off their mortgage and associated taxes by withdrawing CAD 100,000 from their portfolio upon retirement.

Another consideration for the Tracys relates to funding university expenses for their sons. If the Tracys retire at age 60, each son will receive a scholarship available to retiree families from Patricia's company that will cover all university costs.

If the Tracys retire at age 65, all pension income would increase and would almost meet their annual spending needs. If they retire at age 65, the Tracys would pay all university expenses from their investment portfolio through an arrangement with the university. The arrangement, covering both sons, would require the Tracys to make a single payment of CAD 200,000 at age 60.

LEVEL III

Question: 1
Topic: Portfolio Management – Individual
Minutes: 26

A.   i.   **Prepare** the return objectives portion of the Tracys' investment policy statement (IPS) that will apply if they retire at age 60.

        ii.   **Calculate** the pre-tax nominal rate of return that is required for the Tracys' first year of retirement if they retire at age 60. **Show** your calculations.

(12 minutes)

B.   **Indicate** specific factors for the Tracys, for *each* of the following, which support Briscoe's conclusion that the Tracys' risk tolerance is below average:

    i.   Ability to take risk. **Indicate** *two* factors.
    ii.   Willingness to take risk. **Indicate** *one* factor.

(6 minutes)

C.   **Prepare** the current (2009) liquidity constraint for the Tracys' IPS:

    i.   if they retire at age 60.
    ii.   if they retire at age 65.

(4 minutes)

D.   **Prepare** the current (2009) time horizon constraint for the Tracys' IPS:

    i.   if they retire at age 60.
    ii.   if they retire at age 65.

(4 minutes)

LEVEL III

Question:	1
Topic:	Portfolio Management – Individual
Minutes:	26

Reading References:
8. "Frame Dependence: The Second Theme," Ch. 3, *Beyond Greed and Fear: Understanding Behavioral Finance and the Psychology of Investing,* Hersh Shefrin (Oxford University School Press, 2002)
14. "Managing Individual Investor Portfolios," *Managing Investment Portfolios: A Dynamic Process*, 3rd edition, James W. Bronson, Matthew H. Scanlan, and Jan R. Squires (CFA Institute, 2007)

Purpose:
To test the candidate's: (1) understanding of the investment policy statement for an individual investor, (2) ability to assess pertinent factors for an investor's ability to assume risk, (3) ability to calculate an investor's required return, and (4) understanding of an investor's other constraint factors.

LOS 2009 –III-3-8 -a, "Frame Dependence: The Second Theme"
   The candidate should be able to:
   a)   explain how loss aversion can result in investors' willingness to hold on to deteriorating investment positions;

LOS 2009 –III-4-14-a,f,j,k,l, "Managing Individual Investor Portfolios"
   The candidate should be able to:
   a)   discuss how source of wealth, measure of wealth, and stage of life affect individual investors' risk tolerance;
   f)   compare and contrast risk attitudes and decision-making styles across distinct investor personality types, including cautious, methodical, spontaneous, and individualistic investors;
   j)   explain how to set risk and return objectives for individual investors and discuss the impact that ability and willingness to take risk have on tolerance;
   k)   identify and explain each of the major constraint categories included in an individual investor's investment policy statement;
   l)   formulate and justify an investment policy statement for an individual investor;

LEVEL III

Question:	1
Topic:	Portfolio Management – Individual
Minutes:	26

Guideline Answer:

PART A

i.
Return Objective Statement
The Tracys' return objective is to provide sufficient after-tax cash flow in retirement to meet annual living expenses in excess of pension and other retirement income. Given the Tracys' concern about inflation eroding their purchasing power, the portfolio should also realize a return high enough to maintain the real (inflation adjusted) value of their asset base.

ii.
Return Calculations are:

		Retire Next Year at Age 60
Cash Flows		
Inflows		
Patricia's company pension	CAD	40,000
Combined government pension		40,000
Total Inflows		80,000
Outflows		
Estimated expenses		125,000
After-tax net income needed		(45,000)
Pretax net income needed (using 20% tax rate)		(56,250)
Investable Assets		
Estimated investment portfolio in one year		1,100,000
Mortgage payoff		(100,000)
Investment portfolio upon retirement		1,000,000
Required Return Calculation		
Pretax income need divided by investable assets		5.625%
Plus expected inflation		4.000%

Required Pretax Nominal Return (arithmetic)   **9.625%**
Required Pretax Nominal Return (geometric)   **9.850%**
[(1.05625 × 1.04) – 1 = .0985 = 9.850%] OR [(1.0563 × 1.04) – 1 = 9.86%]

LEVEL III

Question: 1
Topic: Portfolio Management – Individual
Minutes: 26

PART B

These circumstances indicate a below average overall risk tolerance for the Tracys:

Ability to take risk
- Small amount of investable assets to support them in retirement relative to their spending levels, particularly if they choose to retire at age 60
- Because there will be no post-retirement employment income, there will be no further funds added to their portfolio (no human capital during retirement).
- With one year to retirement, there will be no further funds added to investable assets since current annual income equals expense.
- Alexander does not participate in any company or individual retirement plan.

Willingness to take risk
- Their desire for preservation of the real value of their portfolio
- Patricia's preference to avoid losses due to previous experience
- Conservative nature of current investments

PART C

Liquidity Needs
In 2009, the year before retirement, the Tracys have no liquidity constraints.

If they retire at age 60:
The Tracys will need significant annual distributions (CAD 56,250 pretax or CAD 45,000 after-tax) from their investment portfolio to support their living expenses. They will also need CAD 100,000 to pay off their mortgage and income taxes associated with the withdrawal upon retirement. They expect no other significant inflows or outflows.

If they retire at age 65:
The Traceys need CAD 250,000 [CAD 200,000 / (1– 0.2)] to fund their sons' prepaid tuition plan in one year and pay taxes on the withdrawal. There will be no other liquidity needs because the Tracys expect to continue meeting their living expenses with their salary income until retirement.

PART D

Time Horizon
If they retire at age 60:

LEVEL III

Question: 1
Topic: Portfolio Management – Individual
Minutes: 26

The one year to retirement could be considered the first of a two-stage horizon. Otherwise, the Tracys have a long, single stage time horizon of 25 years or more in retirement based upon their current ages.

If they retire at age 65:
The Tracys have a two stage horizon. 1) The first covers the six-year period until retirement. 2) The second covers an estimated 20 years or more in retirement.

Alternatively, the Tracys could be said to have a multi-stage horizon consisting of 1) one year during which the University payment is due, 2) five additional years of work, and 3) an estimated 20 years or more in retirement.

LEVEL III

Question:	2
Topic:	Portfolio Management – Individual
Minutes:	9

Questions 1 and 2 relate to Patricia and Alexander Tracy. A total of 35 minutes is allocated to these questions. *Candidates should answer these questions in the order presented.*

QUESTION 2 HAS ONE PART FOR A TOTAL OF 9 MINUTES.

Patricia and Alexander Tracy both retired five years ago at age 65 and their sons now support themselves. As a result of better than expected investment returns over the past five years, the Tracys' investment portfolio has significantly increased in value. They now think that their future after-tax investment returns will exceed their expenses for their remaining joint life expectancy. Their new investment objective is to maximize the assets their sons will inherit, subject to a review of the Tracys' risk tolerance by their financial advisor.

During retirement, the Tracys' medical costs are fully covered by the government. The Tracys have no earned income during retirement. They have previously paid off all debt and expect to remain debt-free.

Determine whether *each* of the following measures has increased, decreased, or remained unchanged for the Tracys since just prior to retirement:

i.   implied assets
ii.   implied liabilities
iii. risk tolerance

Justify *each* response with *one* reason.

Answer Question 2 in the Template provided on page 9.

(9 minutes)

LEVEL III

Question: 2
Topic: Portfolio Management – Individual
Minutes: 9

Template for Question 2

Measure	Determine whether *each* of the following measures has increased, decreased, or remained unchanged for the Tracys since just prior to retirement. (circle one)	Justify *each* response with *one* reason.
i. implied assets	Increased Decreased Remained unchanged	
ii. implied liabilities	Increased Decreased Remained unchanged	
iii. risk tolerance	Increased Decreased Remained unchanged	

LEVEL III

Question:	2
Topic:	Portfolio Management – Individual
Minutes:	9

Reading References:

15. Excerpts from "Lifestyle, Wealth Transfer and Asset Classes," Ch. 4, and "Techniques for Improving After-Tax Investment Performance," Ch. 6, *Investment Management for Taxable Private Investors,* Jarrod Wilcox, Jeffrey E. Horvitz, and Dan diBartolomeo (The Research Foundation of CFA Institute, 2006)
19. "Life-Cycle Investing," Ch. 3, *Investment Management for Taxable Private Investors*, Jarrod Wilcox, Jeffrey E. Horvitz, and Dan diBartolomeo (The Research Foundation of CFA Institute, 2006)
20. "Lifetime Financial Advice: Human Capital, Asset Allocation, and Insurance," Roger G. Ibbotson, Moshe A. Milevsky, Peng Chen, *Financial Analyst Journal* (CFA Institute, January/February 2006)
46. "Monitoring and Rebalancing," Ch. 11, *Managing Investment Portfolios: A Dynamic Process*, 3rd edition, Robert D. Arnott, Terence E. Burns, Lisa Plaxco, and Philip Moore (CFA Institute, 2007)

Purpose:
To test the candidate's: (1) understanding of the investment policy statement for an individual investor, (2) ability to assess pertinent factors for an investor's ability to assume risk, (3) ability to calculate an investor's required return, and (4) understanding of an investor's other constraint factors.

LOS 2009-III-4-15-b, Excerpts from *Investment Management for Taxable Private Investors*
    The candidate should be able to:
    b) explain the expected effects of shrinking time horizons, as investors grow older, on (1) the risk tolerance for average investors and that of very wealthy investors with bequest goals, and (2) the desirability of realizing taxable gains;

LOS 2009-III-4-19-a,b, "Life-Cycle Investing"
    The candidate should be able to:
    a) explain the importance of age and level of wealth in setting investment policy;
    b) explain how changes in the ratio of discretionary wealth to total assets can affect an investor's asset allocation;

LOS 2009-III-4-20-a, "Lifetime Financial Advice"
    The candidate should be able to:
    a) explain the concept and discuss the characteristics of "human capital" as a component of one's total wealth;

LEVEL III

Question: 2
Topic: Portfolio Management – Individual
Minutes: 9

LOS 2009-III-16-46-c, "Monitoring and Rebalancing"
The candidate should be able to:
   c)   recommend and justify revisions to an investor's investment policy statement and
         strategic asset allocation, given a change in investor circumstances;

LEVEL III

Question: 2
Topic: Portfolio Management – Individual
Minutes: 9

Template for Question 2

Measure	Determine whether *each* of the following measures has increased, decreased, or remained unchanged for the Tracys since just prior to retirement. (circle one)	Justify *each* response with *one* reason.
i. implied assets	Increased (Decreased) Remained unchanged	The present value of the Tracys future employment income is zero. Their implied assets dropped to zero upon retirement and remain at zero.
ii. implied liabilities	Increased (Decreased) Remained unchanged	The Tracys' implied liabilities (the present value of their retirement expenses) peaked at the beginning of their retirement. Since then, the implied liabilities have regularly declined along with their life expectancy.
ii. risk tolerance	(Increased) Decreased Remained unchanged	The Tracys' risk tolerance has increased since retirement given their increasing discretionary wealth. Also, the Tracys' new investment objective is to maximize their sons' inheritance requires/allows for a longer, multigenerational time horizon, which increases risk tolerance.

LEVEL III

Question: 3
Topic: Institutional PM
Minutes: 24

QUESTION 3 HAS FIVE PARTS (A, B, C, D, E) FOR A TOTAL OF 24 MINUTES.

Wirth-Moore Corporation is a U.S.-based publisher of educational media. Wirth-Moore sponsors a defined-benefit pension plan. The plan's assets are invested in a broadly diversified portfolio of government and investment grade corporate bonds. Pension plan participants include both active workers and retirees. Pension benefits payments are not adjusted for inflation. The duration and market value of the pension plan's assets are equal to the duration and market value of the plan's projected benefits obligation (PBO). Wirth-Moore believes that it has adequate financial strength and profitability to maintain annual pension contributions based on the pension plan's features and Wirth-Moore's workforce characteristics.

Wirth-Moore recently established the Foundation for the Future (FF), a company-sponsored charitable foundation. FF's mandate from Wirth-Moore is to promote sustainable living through education and research on renewable resources.

FF employs one person to administer grant applications, but does not employ full-time investment professionals. Wirth-Moore donated 10 million U.S. dollars (USD) to FF as a permanent endowment. FF is not restricted to spending only investment income. Wirth-Moore does not plan to make additional donations to FF in the foreseeable future, although FF is permitted to accept donations from others.

FF's board retains Allyson Joy, an investment advisor, to make recommendations for its endowment fund. She summarizes her understanding of FF's investment objectives and related information in Exhibit 1.

Exhibit 1
FF Investment Information

• To minimize taxes under U.S. law, FF's board intends to make annual distributions equal to 5% of its average asset market value.
• The board adopted a goal to increase the value of the endowment by seeking a rate of return exceeding the rate needed to maintain the real purchasing power of the portfolio.
• FF's investment policy limits the amount that can be invested in any single issuer's securities to no more than 5% of the portfolio.
• FF's annual investment management expenses are 0.45% of assets.
• The annual rate of inflation is expected to be 3% in both FF's overhead and in the fields of education and research that FF supports.

A. **Prepare** FF's return objective for next year. **Show** your calculations.

(4 minutes)

LEVEL III

Question:	3
Topic:	Institutional PM
Minutes:	24

B. i. **Determine** whether FF or the Wirth-Moore pension plan has greater ability to take risk. **Justify** your determination with *one* reason.

ii. **Determine** whether FF or the Wirth-Moore pension plan has greater willingness to take risk. **Justify** your determination with *one* reason.

(6 minutes)

C. **Formulate** the following investment policy constraints for FF:

i. Liquidity.
    Show your calculations.

ii. Time horizon.
     Justify your response with *one* reason.

(6 minutes)

FF presently bases its annual spending on the average market value of its assets each year. Noland Reichert, a member of FF's board, is concerned about recent market volatility. Reichert proposes a spending rule based on a rolling three-year average market value. In response to Reichert's proposal, Joy recommends a geometric spending rule, where spending is based on a geometrically declining average of trailing endowment values. FF's external tax counsel advises that there would be no adverse tax consequence from adopting either smoothing rule.

D. **Explain** the effect on FF's spending of adopting Joy's smoothing rule rather than Reichert's smoothing rule.

(4 minutes)

Reichert also serves on the board of Headwaters University Foundation, an endowment with more than USD 1 billion in assets. Headwaters recently invested in a private equity venture based on the recommendation of its internal investment staff. The venture requires a USD 2.5 million minimum investment by each participant, with a five-year lock-up provision. The private equity venture is not expected to generate income, but has the potential to increase in value at a rate of 20% per year over the next five years. Reichert recommends that FF should participate in this private equity venture.

E. **Justify**, with *two* reasons, why Reichert's recommendation is inappropriate for FF.

(4 minutes)

LEVEL III

Question: 3
Topic: Institutional PM
Minutes: 24

Reading References:
"Managing Institutional Investor Portfolios," Ch. 3, *Managing Investment Portfolios: A Dynamic Process*, 3rd edition, R. Charles Tschampion, Laurence B. Siegel, Dean J. Takahashi, and John L. Maginn (CFA Institute, 2007)

"Asset Allocation," Ch. 5, *Managing Investment Portfolios: A Dynamic Process,* 3rd edition, William F. Sharpe, Peng Chen, Jerald E. Pinto, and Dennis W. McLeavey (CFA Institute, 2007)

Purpose:
To test knowledge of investment objectives and constraints for foundations.

LOS: 2009-III-5-21-c, h, i, j, l, m, n
The candidate should be able to:
c)   evaluate pension fund risk tolerance when risk is considered from the perspective of the (1) plan surplus, (2) sponsor financial status and profitability, (3) sponsor and pension fund common risk exposures, (4) plan features, and (5) workforce characteristics;
h)   distinguish among various types of foundations, with respect to their description, purpose, source of funds, and annual spending requirements;
i)   compare and contrast the investment objectives and constraints of foundations, endowments, insurance companies, and banks;
j)   formulate an investment policy statement for a foundation, an endowment, an insurance company, and a bank;
l)   discuss the factors that determine investment policy for pension funds, foundations, endowments, life and non-life insurance companies, and banks;
m)   compare and contrast the asset/liability management needs of pension funds, foundations, endowments, insurance companies, and banks;
n)   compare and contrast the investment objectives and constraints of institutional investors given relevant data such as descriptions of their financial circumstances and attitudes toward risk.

LOS: 2009-III-8-26-i
The candidate should be able to:
i)   evaluate the theoretical and practical effects of including additional asset classes in an asset allocation;

LEVEL III

Question: 3
Topic: Institutional PM
Minutes: 24

Guideline Answer:

PART A
FF's board has stated a goal to earn a rate of return in excess of the rate needed to maintain the real purchasing power of the portfolio. The minimum objective for foundation return includes: 1) the 5% annual rate of spending that is planned, plus 2) investment management expenses (0.45%), and 3) the 3% rate of inflation that is expected.

- Multiplicative approach: $(1.05 \times 1.0045 \times 1.03) - 1 = 8.64\%$.
- Additive approach: $5\% + 0.45\% + 3\% = 8.45\%$.
- The multiplicative approach is more precise because it accounts for the effect of compounding in a multi-period setting. The additive approach is approximate.

PART B
i.
FF has greater *ability* to take risk than Wirth-Moore's pension plan. FF has a spending goal that is supported by an objective of minimizing taxes. In contrast, the pension plan must pay defined benefits, which constitutes legal liability. This difference increases FF's ability to take risk compared to Wirth-Moore's pension plan.

ii.
FF's *willingness* to take risk is greater than that of Wirth-Moore's pension plan, as illustrated by three facts:
1. FF's board has chosen to seek additional return to maintain the real purchasing power of the portfolio, or
2. Increase the size of the endowment in real terms.
3. Wirth-Moore pension plan's asset allocation is conservative (currently completely invested in bonds) indicating a low willingness to take risk.

PART C
i.
FF needs liquidity equal to its planned, annual spending (5%), plus the expenses of generating investment earnings (0.45%), less contributions. FF does not expect contributions from Wirth-Moore in the foreseeable future. Therefore, FF's liquidity requirement amounts to 5.00% + 0.45% = 5.45% of assets
- 5.45% x $10 million = $545,000.

Question: 3
Topic: Institutional PM
Minutes: 24

ii.
FF has a single-stage, long term investment time horizon. This conclusion is supported by the following 1) FF was established with the intent of lasting into perpetuity; 2) FF plans to maintain a 5% annual spending rate.

PART D
The objective of a smoothing rule is to reduce fluctuations in FF's operating budget by reducing the effect of a large change in the market value of the investment portfolio from one year to the next. Joy's recommended smoothing rule is a geometric spending rule in which spending is based on a geometrically declining average of trailing endowment values. This would result in greater emphasis on recent market values and less on past values.

One problem with Reichert's proposed smoothing rule, a spending rule based on a rolling three-year average market value, is that it places the same weight on market values three years ago as it does on recent market values. A single extraordinary return three years ago could still result in a large change in spending in the current year.

PART E
Differences in expertise or resources may constrain the types of investments FF's board should consider, compared to Headwaters. FF's portfolio of USD 10 million is much smaller than the USD 1 billion Headwaters endowment fund. Low-cost, easy-to-monitor, passive investment strategies are often the primary approach to implementing a strategic asset allocation for smaller portfolios. FF has only one administrative employee, affording it limited resources to deal with the costs and complexities of due diligence. In contrast, Headwaters has sufficient investment staff to find, evaluate, select and monitor alternative investments such as a private equity venture.

A minimum investment of USD 2.5 million would concentrate at least 25% of FF's endowment in the private equity venture, which is inconsistent with the investment policy limitation of no more than 5% in any single issuer's securities.

The 5-year lock-up provision and absence of income would not provide any liquidity, which may be inconsistent with FF's spending needs.

LEVEL III

Question: 4
Topic: Institutional PM
Minutes: 11

QUESTION 4 HAS THREE PARTS (A, B, C) FOR A TOTAL OF 11 MINUTES.

Setzer is a U.S.-based chain of department stores with operating assets of 1 billion U.S. dollars (USD) in market value terms. Setzer sponsors a defined-benefit pension plan (Pension Plan) that invests exclusively in domestic equities and domestic investment grade corporate bonds. Selected Setzer and Pension Plan financial data are shown in Exhibit 1.

Exhibit 1
Setzer and Pension Plan Financial Data

Setzer (excluding Pension Plan)	
Measure	**Value**
Debt/equity ratio (market value)	1.0
Operating assets market value (USD billion)	1.0
Equity beta	2.0
Debt beta	0.0

Pension Plan	
Measure	**Value**
Equity portfolio beta	1.0
Debt investments beta	0.0
Market value (USD million)	800
Equity allocation (%)	60
Surplus (USD million)	0.0

Setzer hires Tim Bearne to study the implications of the asset allocation of the Pension Plan's investment portfolio on Setzer's financial and operating characteristics. Bearne notes that a defined-benefit pension plan's assets and liabilities can directly affect the sponsoring company's equity price, the equity price volatility, and the amount of operational risk the company is able to assume.

The risk-free rate of return is 3% and the equity risk premium is 9%. Bearne's preliminary analysis does not take the effects of taxes into consideration.

Setzer bases its capital budgeting decisions on the internal rate of return (IRR) and accepts capital projects with IRR greater than Setzer's weighted average cost of capital (WACC). Setzer does not include the Pension Plan's assets and liabilities when calculating its WACC.

A.   **Calculate** Setzer's WACC including the Pension Plan's assets and liabilities.

(4 minutes)

B.   **Discuss** the implications of **not** including the Pension Plan's assets and liabilities in Setzer's capital budgeting decision-making process.

LEVEL III

Question: 4
Topic: Institutional PM
Minutes: 11

Note: No calculations are required.

(4 minutes)

Six months have passed. As a result of negative returns on the Pension Plan's investment portfolio, the Pension Plan is now underfunded by USD 50 million. The Pension Plan's investment committee, seeking to raise expected returns, increases the investment portfolio's equity allocation to 70%. Immediately after this decision is implemented, Setzer's equity price volatility and beta increase. Assume Setzer's operational assets and its debt/equity ratio (market value) remained constant during the six-month period.

C.   **Discuss** why Setzer's equity beta increases in response to the Pension Plan's change in the asset allocation.

(3 minutes)

LEVEL III

Question: 4
Topic: Institutional PM
Minutes: 11

Reading References:
 22.   "Allocating Shareholder Capital to Pension Plans," Robert C. Merton, Volume 18,
        Journal of Applied Corporate Finance (Morgan Stanley, Winter 2006)

Purpose:
To test the candidate`s ability to recognize and quantify the effects of asset allocation decisions in defined-benefit pension plans on a corporate sponsor's capital structure and risk profile.

LOS: 2009-III-2-22-a,b,c
The candidate should be able to:
a)   compare and contrast funding shortfall and asset/liability mismatch as sources of risk faced by pension plan sponsors;
b)   explain how the weighted average cost of capital (WACC) for a corporation can be adjusted to incorporate pension risk and discuss the potential consequences of not making this adjustment;
c)   explain, in an expanded balance sheet framework, the effects of different pension asset allocations on total asset betas, the equity capital needed to maintain equity beta at a desired level, and the debt/equity ratio.

LEVEL III

Question:	4
Topic:	Institutional PM
Minutes:	11

Guideline Answer:

PART A

Without adjusting for the effect of pension asset-risk mismatch, the beta for operating assets equals 1.0. The calculation is displayed below – Standard Balance Sheet Estimates.

Standard Balance Sheet Estimates

		Assets					Liabilities and Equity		
	Value	Risk (Beta)	Weight	Weighted Average		Value	Risk (Beta)	Weight	Weighted Average
Operating Assets	1,000	**1.0**	100%	1.0	Debt	500	0.0	50%	0.0
					Equity	500	2.0	50%	1.0
Total Assets	1,000			1.0	Total Debt + Equity	1,000			1.0

With an allocation of 60% to equities in the pension portfolio and a debt beta of zero, the beta for the asset base of the pension fund equals 0.60. For the liability side, Setzer has USD 500 million each in equity and debt (debt/equity of 1.0), and the Pension Plan has USD 800 million in debt (beta of zero).
Adjusting for the effect of pension asset-risk mismatch, the beta for operating asset equals 0.52. The calculation is displayed below – Full Economic Balance Sheet Estimates.

Full Economic Balance Sheet Estimates

		Assets					Liabilities and Equity		
	Value	Risk (Beta)	Weight	Weighted Average		Value	Risk (Beta)	Weight	Weighted Average
Operating Assets	1,000	**0.52**	55.6%	0.289	Debt	500	0.00	27.8%	0.000
Pension Assets	800	**0.60**	44.4%	0.267	Equity	500	2.00	27.8%	0.556
					Pension Liabilities	800	0.00	44.4%	0.000
Total Assets	1,800			0.556		1,800			0.556

Operating Assets Beta = (Total Asset Beta – Weighted Pension Beta)
                                      Operating Assets Weight
Operating Assets Beta = (0.556 – ((800/1,800) x 0.6)) = 0.52
                                      (1000/1,800)
With a risk-free rate of 3.0% and an equity risk premium of 9.0%, Setzer's weighted average cost of capital (WACC) equals 7.68%, using the CAPM, WACC = 3 % + 0.52 x (9%).

LEVEL III

Question:	4
Topic:	Institutional PM
Minutes:	11

PART B
If Setzer management estimates WACC by the standard method, ignoring pension plan assets and liabilities, management will overestimate the WACC measure, which can lead to capital allocation distortion. Without using the Pension Plan's assets and liabilities (risk mismatch) in the calculations, Setzer's total risk is effectively being assigned to its business operations, when part of that risk comes from the Pension Plan's assets. Also, since the pension liabilities are disregarded, Setzer's leverage ratio is understated. Both of these factors will result in a WACC estimate that is higher than the Setzer's actual (adjusted for the effect of pension asset-risk mismatch) WACC.

Ignoring the Pension Plan's balance sheet, the WACC would be calculated as follows:

- Operating Assets Beta = (500 x 0+500 x 2)/1000 = 1.0

- WACC = 3% + 1 x (9%) = 12%, significantly higher than the actual WACC of 7.68%.

In the evaluation of new projects, the artificially inflated WACC would lead Setzer to apply a hurdle rate that is too high; Setzer might not undertake projects that would increase its value. This could result in underinvestment in the operating part of the business.

PART C
When a company, holding its operating assets and capital structure constant, increases the equity exposure in its pension assets, it increases the risk of the overall firm. As the risk of the asset side of the balance sheet increases, investors will require a higher expected return. The liability side of the balance sheet must compensate for this risk increase in assets. The equity risk (beta) for Setzer must go up.

LEVEL III

Question: 5
Topic: Economics
Minutes: 19

QUESTION 5 HAS THREE PARTS (A, B, C) FOR A TOTAL OF 19 MINUTES.

Robert Spencer is a market forecaster with Windsor Investment Management, a U.K.-based wealth management firm. Spencer is asked to review the current economic conditions and market outlook for the U.K. and to set long-term market return expectations for domestic equities. These expectations will form the basis of Windsor's future client asset allocations. Spencer gathers the U.K. capital market data displayed in Exhibit 1.

Exhibit 1
U.K. Capital Market Data

Historical Data (past 100 years)	
Equity compounded annual growth rate (%)	11.2
Equity risk premium (%)	5.3
Dividend yield (%)	4.0
Equity repurchase yield (%)	–0.5
Nominal earnings growth return (%)	4.6
Current and Forward Looking Data	
Current equity price-to-earnings ratio	14.6
Expected equities real earnings growth rate (%)	2.7
Expected long-term inflation rate (%)	2.5

A.   **Determine**, using the information in Exhibit 1 and the Grinold-Kroner model, the component sources of the historical nominal return for U.K. equities:

   i.   income return
   ii.   earnings growth
   iii.   repricing return

(6 minutes)

A year has passed. The Bank of England (the U.K.'s central bank) has been raising the short-term interest rate. Business confidence is starting to decline. Spencer is asked to analyze the U.K. economy and consider how the Bank of England might respond in the short term to economic conditions. He gathers the economic data shown in Exhibit 2.

LEVEL III

Question: 5
Topic: Economics
Minutes: 19

Exhibit 2
U.K. Economic Data (%)

Neutral value of the short-term interest rate	3.5
Forecast U.K. GDP growth rate	0.3
Trend U.K. GDP growth rate	2.2
Yield to maturity on 10-year gilt (government bond)	4.2
Yield to maturity on 1-year gilt (government bond)	5.5
Bank of England short-term interest rate	5.5
Target U.K. inflation rate	2.0
Forecast U.K. inflation rate	4.4

B.   i.   **Determine** the target short-term interest rate for the Bank of England using the Taylor rule and the data in Exhibit 2. **Show** your calculations.

     ii.   **Describe** the *most likely* potential negative economic result if the Bank of England bases its interest rate policy on the Taylor rule.

(5 minutes)

Nine more months have passed and the U.K. economy has fallen into a recession. Under pressure to aid the economy, the U.K. Chancellor of the Exchequer (finance minister) announces a four-part economic plan aimed at improving the long-term growth trend of the U.K. economy (GDP). The plan includes the following initiatives:

- Introduction of incentives encouraging companies to increase their use of information technology;
- An increase in the mandatory retirement age from 65 to 70 years of age;
- A broad increase in taxes to fund programs that provide support for low-income families;
- A one-time tax rebate to stimulate consumer spending.

C.   **Determine**, for *each* part of the economic plan, whether the initiative is *most likely* to increase, decrease, or leave unchanged the long-term growth trend of the U.K. economy (GDP). **Justify** *each* response with *one* reason.

Note: No calculations are required.

Answer Question 5-C in the Template provided on page x.

(8 minutes)

LEVEL III

Question: 5
Topic: Economics
Minutes: 19

Template for Question 5-C
Note: No calculations are required.

Initiative	Determine, for *each* part of the economic plan, whether the initiative is *most likely* to increase, decrease, or leave unchanged the long-term growth trend of the U.K. economy (GDP). (circle one)	Justify *each* response with *one* reason.
Introduction of incentives encouraging companies to increase their use of information technology;	Increase Decrease Leave unchanged	
An increase in the mandatory retirement age from 65 to 70 years of age;	Increase Decrease Leave unchanged	
A broad increase in taxes to fund programs that provide support for low-income families;	Increase Decrease Leave unchanged	

LEVEL III

Question: 5
Topic: Economics
Minutes: 19

A one-time tax rebate to stimulate consumer spending.	Increase Decrease Leave unchanged	

Reading References:
23.   "Capital Market Expectations," John P. Calverley, Alan M. Meder, CFA, Brian D. Singer, CFA, and Renato Staub, *Managing Investment Portfolios: A Dynamic Process,* 3rd Edition (CFA Institute)

Purpose:
To test the candidate's ability to appraise and apply economic data in setting capital market expectations.

LOS: Volume 3, 2009-III-23-c, h, i, j
23.   "Capital Market Expectations"
       The candidate should be able to:
       c)   demonstrate the application of formal tools for setting capital market expectations, including statistical tools, discounted cash flow models, the risk premium approach, and financial equilibrium models;
       h)   demonstrate the use of the Taylor rule to predict central bank behavior;
       i)   evaluate (1) the shape of the yield curve as an economic predictor and (2) the relationship between the yield curve and fiscal and monetary policy;
       j)   identify and interpret the components of economic growth trends and demonstrate the application of economic growth trend analysis to the formulation of capital market expectations.

LEVEL III

Question: 5
Topic: Economics
Minutes: 19

Guideline Answer:

PART A
The Grinold-Kroner model can be expressed as:

$$E(R_e) = (D/P - \Delta S) + (i + g) + \Delta PE$$

or

$$E(R_e) = \text{Income return} + \text{Earnings growth} + \text{Repricing return}$$

i. Income return is the sum of the dividend yield (i.e., D/P, which is 4.0%) and the equity repurchase yield (i.e., the negative of the expected change in shares outstanding, $-\Delta S$) which is -0.5%. Therefore:
Income return = D/P - ΔS = 4.0 - 0.5 = 3.5%

ii. Earnings growth is the sum of real growth in earnings and the inflation rate. This sum is shown in Exhibit 1:
Earnings growth = 4.6% (given in Exhibit 1)

iii. Repricing return: Since the equity compounded annual growth rate is given in Exhibit 1 to be
$E(R_e)$ = 11.2%, the Grinold-Kroner model can be rearranged to solve for repricing return:

11.2% = 3.5% + 4.6% + Repricing return .
Rearranging the terms:
Repricing return = 11.2% – 3.5% – 4.6% = 3.1%

PART B
i. $R_{optimal} = R_{neutral} + [0.5 \text{ x } (GDPg_{forecast} - GDPg_{trend}) + 0.5 \text{ x } (I_{forecast} - I_{target})]$

$R_{optimal}$ = 3.5 + [0.5 x (0.3 – 2.2) + 0.5 x (4.4 – 2.0)] = 3.75%

ii. The Taylor rule suggests the Bank of England should target a short-term interest rate of 3.75% versus a current short-term interest rate of 5.5%. The most likely potential negative economic result of the Bank of England following the Taylor rule is increased inflation. Since the forecast inflation rate of 4.4% is currently above the target inflation rate of 2.0%, a cut in the interest rate could cause the inflation rate to rise even further away from the target inflation rate. Lowering short-term rates will stimulate output by lowering corporations' cost of capital.

LEVEL III

Question: 5
Topic: Economics
Minutes: 19

PART C
Template for Question 5-C
Note: No calculations are required.

Initiative	Determine, for *each* part of the economic plan, whether the initiative is *most likely* to increase, decrease, or leave unchanged the long-term growth trend of the U.K. economy (GDP). (circle one)	Justify *each* response with *one* reason.
Introduction of incentives encouraging companies to increase their use of information technology;	(Increase) Decrease Leave unchanged	Increased use of information technology is likely to increase total factor productivity (TFP) growth in the economy. TFP growth also results from technical progress and efficiencies in using capital and labor inputs. TFP growth directly increases trend GDP growth.
An increase in the mandatory retirement age from 65 to 70 years of age;	(Increase) Decrease Leave unchanged	Increasing the retirement age increases both the potential labor force size and/or the actual labor force participation rate. This directly improves the trend GDP growth.
A broad increase in taxes to fund programs that provide support for low-income families;	Increase (Decrease) Leave unchanged	Taxes distort economic activity by reducing the equilibrium quantities of goods and services exchanged. A decrease in total societal income and efficiency is the cost of redistributing wealth to the least well-off. Long-term GDP will be reduced because of the impact that additional taxes will have on capital investment activity, thus diverting funds from productive purposes. Additional taxation provides disincentives to individuals and businesses and leads to inefficient allocation of resources.
A one-time tax rebate to stimulate consumer spending.	Increase Decrease (Leave unchanged)	A one-time stimulation of consumer spending can influence the business cycle. The effect is short-term or temporary in nature, but does not have an impact on the long-term trend growth rate of GDP. Milton Friedman's Permanent Income Hypothesis also holds that consumer spending behavior is largely determined by long-term income expectations.

LEVEL III

Question: 6
Topic: Portfolio Management – Asset Allocation
Minutes: 10

QUESTION 6 HAS ONE PART FOR A TOTAL OF 10 MINUTES.

Kallis Employees Pension Plan (KEPP) is the pension fund of a Finland-based mining company. KEPP is fully funded with 8 billion euros (EUR) in assets and has the following investment policy objectives:

- Earn a 10.3% annual portfolio return.
- Have a maximum Roy's safety-first ratio with a minimum return threshold of 8%.
- Maintain a cash balance sufficient to meet liquidity requirements.
- Maintain a maximum of 10% of assets in a passively managed sub-portfolio that is indexed to the S&P GSCI Precious Metals Index (SPMI).

KEPP expects to pay EUR 320 million in pension benefits this year.

At an investment committee meeting regarding possible changes to KEPP's strategic asset allocation policy, the committee reviews five alternative portfolio allocations that meet KEPP's return objectives. These alternatives are shown in Exhibit 1.

Exhibit 1
KEPP
Alternative Portfolio Allocations (%)

Asset Class	Portfolio Allocations				
	V	W	X	Y	Z
Cash equivalents	3	5	6	5	6
SPMI	10	12	8	7	9
Global bonds	40	40	47	45	41
Global equities	47	43	39	43	44
Total	100	100	100	100	100
Portfolio Measures	**V**	**W**	**X**	**Y**	**Z**
Expected total annual return	11.26	11.19	10.44	10.60	10.87
Expected standard deviation	14.90	14.82	13.93	14.15	14.52

Determine the *most* appropriate portfolio for KEPP. **State**, for *each* portfolio **not** selected, *one* reason why it is **not** the most appropriate.

Answer Question 6 in the Template provided on page x.

(10 minutes)

LEVEL III

Question: 6
Topic: Portfolio Management – Asset Allocation
Minutes: 10

Template for Question 6

Determine the *most* appropriate portfolio for KEPP. (circle one)	State, for *each* portfolio not selected, *one* reason why it is not the most appropriate.
V	
W	
X	
Y	
Z	

LEVEL III

Question: 6
Topic: Portfolio Management – Asset Allocation
Minutes: 10

Reading References:
26. "Asset Allocation," Ch. 5, *Managing Investment Portfolios: A Dynamic Process,* 3rd edition, William F. Sharpe, Peng Chen, Jerald E. Pinto, and Dennis W. McLeavey (CFA Institute, 2007)
27. "Linking Pension Liabilities to Assets," Aaron Meder and Renato Staub (UBS Global Asset Management, 2006)

Purpose:
To test the candidate's knowledge of institutional asset allocation.

LOS: 2009-III-8-26-f,h,m

26. "Asset Allocation"
   The candidate should be able to:
   f) evaluate return and risk objectives in relation to strategic asset allocation;
   h) select and justify an appropriate set of asset classes for an investor;
   m) formulate and justify a strategic asset allocation, given an investment policy statement and capital market expectations;

LEVEL III

Question: 6
Topic: Portfolio Management – Asset Allocation
Minutes: 10

Guideline Answer:

Template for Question 6
Note: Show your calculations.

Determine the *most* appropriate portfolio for KEPP. (circle one)	State, for *each* portfolio not selected, *one* reason why it is not the most appropriate.
V	Portfolio V's allocation to cash equivalents of 3% is insufficient to meet the annual liquidity requirement for pension benefits: EUR 320 million/EUR 8 billion=4%
W	Portfolio W's allocation to SPMI of 12% exceeds the maximum 10% limit allowed in KEPP's investment policy.
X	Portfolio X's Roy's safety-first ratio of 0.175 is lower than the other qualifying portfolios, Y and Z. Roy's safety-first ratio = (E(Rp) – Minimum Return Threshold) / Standard Deviation Portfolio X: (10.44% - 8.00%) / 13.93% = 0.175
Y	Portfolio Y's Roy's safety-first ratio of 0.184 is lower than the other qualifying portfolio, Z. Portfolio Y: (10.60% - 8.00%) / 14.15% = 0.184
(Z)	

LEVEL III

Question: 6
Topic: Portfolio Management – Asset Allocation
Minutes: 10

Note: Roy's safety first ratio for portfolio Z is:
(10.87% - 8.00%) / 14.52% = 0.198

Besides meeting the expected return requirement, Portfolio Z satisfies the following investment committee objectives:
- Allocation of 6% in cash equivalents is sufficient to meet liquidity requirement, equivalent to 4% (EUR 320 million/EUR 8 billion) of assets.
- Asset class allocation to SPMI of 9% is below the 10% maximum limit.
- Achieves the highest Roy's safety-first ratio of 0.198 amongst the qualifying portfolios X, Y and Z:

LEVEL III

Question: 7
Topic: Equity
Minutes: 17

QUESTION 7 HAS THREE PARTS (A, B, C) FOR A TOTAL OF 17 MINUTES.

Chandra Pabst, CFA, is an equity portfolio manager at an advisory firm that provides asset management services to nonprofit organizations. The firm was recently hired by the U.S.-based Aberdeen Family Foundation. Aberdeen's board of directors was dissatisfied with its previous equity manager. Pabst is assigned to develop a strategy for the equity portion of the portfolio.

In her initial meeting with the Aberdeen investment committee, Pabst compiled the following notes:

- The committee agrees that security prices reflect publicly available information.

- The committee expects a decline in interest rates.

- The board fired the previous equity manager because the portfolio had tracking risk exceeding 1%.

- Aberdeen pays taxes on interest, dividends, and realized capital gains.

- The board is willing to accept a low information ratio as long as returns are sufficient to maintain targeted spending.

At the end of the meeting, Pabst recommends that the Aberdeen portfolio be managed using a passive approach. The committee agrees with Pabst's recommendation.

A.   **Justify**, with *three* reasons based only on Pabst's notes, why the use of a passive investment approach is the *most* appropriate for Aberdeen's equity portfolio.

   Answer Question 7-A in the Template provided on page x.

   (6 minutes)

Pabst next begins to transition Aberdeen's portfolio holdings. She is constructing the portfolio using individual equities and is considering the following methods: full replication, stratified sampling, and optimization. The benchmark for the portfolio is the Russell 3000 Index, which is based on market capitalization and consists of 3,000 large U.S. publicly-traded companies. The value of Aberdeen's equity portfolio is 3,000,000 U.S. dollars (USD). The board prefers not to use complicated mathematical models that would be challenging to explain to donors.

LEVEL III

Question: 7
Topic: Equity
Minutes: 17

B. **Determine**, from the three methods Pabst is considering, the *most* appropriate method for constructing the equity portfolio. **Justify** your response with *two* reasons related to Aberdeen's specific circumstances.

Answer Question 7-B in the Template provided on page x.

(5 minutes)

Pabst was just hired to manage the endowment fund for the Forest Trust. The Forest Trust is actively managed and its holdings are shown in Exhibit 1.

Exhibit 1
Forest Trust Portfolio and Benchmark Data

	Portfolio	**Portfolio Benchmark**
Average market capitalization of stocks	USD 34 billion	USD 72 billion
Number of stocks	150	3,000
Price-to-book ratio	0.9	2.2
Long-term earnings growth rate (median analyst forecast)	5%	13%
Average earnings per share (EPS)	USD 0.02	USD 1.74
Dividend yield	1.3%	1.7%

Pabst is asked to classify the portfolio in one of the four value and growth substyles:

- contrarian
- high yield
- consistent growth
- earnings momentum

C. **Identify** the substyle that *best* represents the portfolio. **Justify** your response with *two* reasons related to the characteristics of the portfolio relative to the benchmark.

Answer Question 7-C in the Template provided on page x.

(6 minutes)

LEVEL III

Question: 7
Topic: Equity
Minutes: 17

Template for Question 7-A

Justify, with *three* reasons based only on Pabst's notes, why the use of a passive investment approach is the *most* appropriate for Aberdeen's equity portfolio.
1.
2.
3.

LEVEL III

Question: 7
Topic: Equity
Minutes: 17

Template for Question 7-B

Determine, from the three methods Pabst is considering, the *most* appropriate method for constructing the equity portfolio. (circle one)	Justify your response with *two* reasons related to Aberdeen's specific circumstances.
full replication	1.
stratified sampling	2.
optimization	

LEVEL III

Question: 7
Topic: Equity
Minutes: 17

Template for Question 7-C

Identify the substyle that *best* represents the portfolio. (circle one)	Justify your response with *two* reasons related to the characteristics of the portfolio relative to the benchmark.
contrarian high yield	1.
consistent growth earnings momentum	2.

LEVEL III

Question: 7
Topic: Equity
Minutes: 17

Reading References:
"Equity Portfolio Management," Ch. 7, *Managing Investment Portfolios: A Dynamic Process*, 3rd edition, Gary L. Gastineau, Andrew R. Olma, CFA, and Robert G. Zielinski, CFA (CFA Institute, 2007)

Purpose:
To test knowledge of investment approaches (passive, semiactive, and active), methods of portfolio construction, and investment styles.

LOS: 2009-III-11-33-b, c, f, i
Learning Outcomes
33. **"Equity Portfolio Management"**
   The candidate should be able to:

   b) discuss the rationales for passive, active, and semiactive (enhanced index) equity investment approaches and distinguish among those approaches with respect to expected active return and tracking risk;
   c) recommend an equity investment approach when given an investor's investment policy statement and beliefs concerning market efficiency;
   f) compare and contrast full replication, stratified sampling, and optimization as approaches to constructing an indexed portfolio and recommend an approach when given a description of the investment vehicle and the index to be tracked;
   i) compare and contrast techniques for identifying investment styles and characterize the style of an investor when given a description of the investor's security selection method, details on the investor's security holdings, or the results of a returns-based style analysis;

LEVEL III

Question: 7
Topic: Equity
Minutes: 17

Guideline Answer:

PART A
Template for Question 7-A

Justify, with *three* reasons based only on Pabst's notes, why the use of a passive investment approach is the *most* appropriate for Aberdeen's equity portfolio.
1. The firing of a manager for tracking risk exceeding 1% indicates that the Board considers this amount of risk to be excessive. A passive approach provides low tracking risk.
2. A passive approach typically has low turnover relative to active approaches. Because the Foundation is taxed on realized capital gains as well as investment income, the passive approach will result in lower taxes.
3. Committee members believe the stock market is efficient. Active approaches can be expected to be more successful when markets are inefficient.
4. The information ratio of the passive approach is 0. In the past, the Board found a low ratio to be acceptable as long as the returns were sufficient to maintain desired spending.

LEVEL III

Question: 7
Topic: Equity
Minutes: 17

PART B
Template for Question 7-B

Determine, from the three methods Pabst is considering, the *most* appropriate method for constructing the equity portfolio. (circle one)	Justify your response with *two* reasons related to Aberdeen's specific circumstances.
full replication (stratified sampling) Optimization	1. The value of Aberdeen's equity portfolio is USD 3,000,000. The full replication approach requires owning each of the 3,000 stocks in the benchmark portfolio. Replication is not cost effective given the transaction costs for smaller cap stocks.
	2. The board prefers not to use complicated mathematical models, making the optimization approach inappropriate.

LEVEL III

Question: 7
Topic: Equity
Minutes: 17

PART C
Template for Question 7-C

Identify the substyle that *best* represents the portfolio. (circle one)	Justify your response with *two* reasons related to the characteristics of the portfolio relative to the benchmark.
(contrarian) ⬭	1. Equities favored by contrarian investors trade at low price-to-book ratios, typically below 1. Forest Trust's portfolio has a price-to-book ratio of 0.9 relative to 2.2 for the benchmark.
high yield	
consistent growth earnings momentum	2. Equities favored by contrarian investors typically have little or no current earnings. Forest Trust's portfolio has a weighted-average EPS of USD 0.02 relative to USD 1.74 for the benchmark.

LEVEL III

Question: 8
Topic: Alternative Assets
Minutes: 15

QUESTION 8 HAS TWO PARTS (A, B) FOR A TOTAL OF 15 MINUTES.

Hank Smith is the portfolio manager of U.S.-based PM Hedge Fund (PM), which focuses on precious metals, fixed income, and derivatives. Smith has a strategy of rolling forward a long position in short-dated platinum futures traded on NYMEX. Smith's expectations are as follows:

- Electricity supply disruptions in South Africa, the world's dominant platinum producer, will cause platinum supply to fall and spot prices to rise.
- Interest rates will rise.
- The convenience yield on platinum will increase.

Smith observes that his expectations are not yet reflected in platinum futures prices.

A.   **Determine**, given that Smith's market expectations are correct, whether an increase, a decrease, or no change in *each* of the following return components should be expected:

   i.   spot return (price return)
   ii.   collateral return (collateral yield)
   iii. roll return (roll yield)

   Justify *each* response with *one* reason.

   Answer Question 8-A in the Template provided on page x.
   (9 minutes)

PM holds a four-year 120,000,000 U.S. dollars (USD), 6% fixed rate bond that pays interest semi-annually. Smith expects four-year USD interest rates to rise. He wants to reduce the duration of the bond position. Lizelle Hoorn, an analyst at PM, suggests that Smith can reduce the modified duration of this position, which is currently 3, to a more acceptable 0.3 by using an interest rate swap. Smith wants the notional principal on the swap to be as close as possible to the USD 120,000,000 principal of the original bond. Hoorn provides Smith with four possible swaps, shown in Exhibit 1. Assume that the modified duration of the fixed rate component of a swap is 75% of its maturity.

Exhibit 1
Available Swap Positions

Swap	Swap Type	Swap Term	Payment Frequency
1	Pay fixed, receive floating	2 years	Semi-annually
2	Pay floating, receive fixed	4 years	Quarterly
3	Pay fixed, receive floating	4 years	Quarterly
4	Pay floating, receive fixed	2 years	Semi-annually

LEVEL III

Question: 8
Topic: Alternative Assets
Minutes: 15

B.   **Determine** which swap *best* achieves Smith's stated goals. **Justify** your response with *two* reasons.

Answer Question 8-B in the Template provided on page x.

(6 minutes)

LEVEL III

Question: 8
Topic: Alternative Assets
Minutes: 15

Template for Question 8-A

Return component	Determine, given that Smith's market expectations are correct, whether an increase, a decrease, or no change in *each* of the following return components should be expected. (circle one)	Justify *each* response with *one* reason.
i. spot return (price return)	Increase Decrease No change	
ii. collateral return (collateral yield)	Increase Decrease No change	
iii. roll return (roll yield)	Increase Decrease No change	

LEVEL III

Question: 8
Topic: Alternative Assets
Minutes: 15

Template for Question 8-B

Determine which swap *best* achieves Smith's stated goals. (circle one)	Justify your response with *two* reasons.
Swap 1 Swap 2	1.
Swap 3 Swap 4	2.

LEVEL III

Question: 8
Topic: Alternative Assets
Minutes: 15

Reading References:

37. "Alternative Investments Portfolio Management", Reading 37, *Managing Investment Portfolios: A Dynamic Process*, 3rd edition, Jot K. Yau, CFA, Thomas Schneerweis, Thomas R. Robinson, CFA and Lisa R. Weiss, CFA, (CFA Institute, 2007).

38. "SWAPS", Reading 38, Robert L. McDonald, *Derivatives Markets*, 2nd edition, Robert L. McDonald, (Pearson Education, 2006).

39. "Commodity Forwards and Futures", Reading 39, Robert L. McDonald, *Derivatives Markets*, 2nd edition, Robert L. McDonald, (Pearson Education, 2006).

44. "Risk Management Applications of Swap Strategies", Reading 44, Don M. Chance, CFA, *Analysis of Derivatives for the Chartered Financial Analyst ® Program,* Don M. Chance, (AIMR, 2003).

Purpose:
To test knowledge and use of commodity futures.

LOS: 2009-III-13-37-m, n
37. "Alternative Investments Portfolio Management"
    The candidate should be able to:
    m)   Compare and contrast indirect and direct commodity investment.
    n)   Explain the three components of return for a commodity futures contract and the effect that an upward or downward sloping term structure of futures prices will have on roll yield.

LOS: 2009-III-13-44-b, d
44. "Risk Management Applications of Swap Strategies"
    The candidate should be able to:
    b)   Calculate and interpret the duration of an interest rate swap.
    d)   Determine the notional principal value needed on an interest rate swap to achieve a desired level of duration in a fixed income portfolio.

LEVEL III

Question: 8
Topic: Alternative Assets
Minutes: 15

Guideline Answer:

PART A
Template for Question 8-A

Return component	Determine, given that Smith's market expectations are correct, whether an increase, a decrease, or no change in *each* of the following return components should be expected. (circle one)	Justify *each* response with *one* reason.
i. Spot return (price return)	⬭ Increase ⬭ Decrease No change	This is the return related to changes in the underlying commodity (platinum) using the cost-of-carry model. Smith expects the spot price of platinum to rise which would cause short-dated futures prices to rise as arbitrage trading occurred.
ii. Collateral return (collateral yield)	⬭ Increase ⬭ Decrease No change	This is the return that arises from investment in platinum futures rather than the physical platinum. Smith is able to invest the full value of the underlying contract to earn the risk-free interest rate. Since he expects interest rates to rise, this component of return will also rise.
iii. Roll return (roll yield)	Increase Decrease ⬭ No change ⬭	This is the return that arises from rolling long platinum futures contracts over time. Smith expects convenience yields will rise, increasing roll return as a result of increased backwardation. Also, he expects interest rates will rise, thus decreasing roll return. In the cost-of-carry model, these two factors have opposite effects. If these effects are assumed to offset each other, then there will be net change in the roll return. Conversely, if the rise in convenience yield is more than the rise in interest rates, roll return will increase.

LEVEL III

Question: 8
Topic: Alternative Assets
Minutes: 15

PART B
Template for Question 8-B

Determine which swap *best* achieves Smith's stated goals. (circle one)	Justify your response with *two* reasons.
Swap 1 Swap 2	1. The swap needs to pay fixed, receive floating, eliminating further consideration of Swaps 2 & 4. Paying fixed will offset receiving fixed from the original bond. Swap 3 reduced duration of the bond position. Smith needs to add a negative-duration position to reduce duration from 3 to 0.3.
(Swap 3) Swap 4	2. Swap 3 has a notional principal close to the USD 120 million of the bond position. Swap 3 will have a duration of approximately -2.9 and a notional principal of approximately USD 113 million (compared with USD 259 million for Swap 1).

Supporting Calculations:

Swap 1:
A two year pay-fixed, receive floating swap with semi-annual payments will have a duration of approximately:
$(1/2/2) – 0.75(2) = 0.25 – 1.5 = -1.25$
The required overall duration is 0.3 so the notional principal (NP) must satisfy:
USD 120,000,000(3) + NP (-1.25) = USD 120,000,000(0.3)
So NP = [USD 120,000,000(3 – 0.3)] / 1.25 = USD 259,200,000, more than double the original bond.

Swap 3:
A four year pay-fixed, receive floating swap with quarterly payments will have a duration of approximately:
$(1/4/2) – 0.75(4) = 0.125 – 3.0 = -2.875.$
The required overall duration is 0.3 so the notional principal (NP) must satisfy:
USD 120,000,000(3) + NP (-2.875) = USD 120,000,000(0.3)
So NP = [USD 120,000,000(3-0.3)]/2.875 = USD 112,695,652, which is close to the amount of the original bond.

Conclusion
Swaps 2 and 4 increase duration and are therefore not appropriate.
Swaps 1 and 3 both decrease duration. Smith has stated that he would prefer the notional principal of the swap to be as close as possible to the amount of the original bond. Therefore Swap 3, the four-year quarterly, pay fixed, receive floating swap, is the appropriate swap.

LEVEL III

Question: 9
Topic: Risk Management
Minutes: 16

QUESTION 9 HAS TWO PARTS (A, B) FOR A TOTAL OF 16 MINUTES.

Maple Leaf International is a Canadian corporation with business in Europe and Japan. Maple Leaf's business transactions generate exchange rate risk between the Canadian dollar (CAD) and both the euro (EUR) and Japanese yen (JPY). In order to hedge their exchange rate risk, management endorses the use of currency forwards, options, and swaps. Ian McKinley, chief risk officer, has been asked to present an analysis of the company's currency exposures to Maple Leaf's board of directors and senior managers.

Maple Leaf is long a forward contract on EUR 50 million at 1.63 CAD/EUR, expiring in six months. It is also long 100 JPY put options (European style) with expiration in six months, a strike price of 100 JPY/CAD, and a contract size of JPY 12.5 million. The current spot exchange rates are 1.64 CAD/EUR and 102.5 JPY/CAD. All of Maple Leaf's currency derivatives are traded over the counter (OTC) with North Bank. Key interest rates are displayed in Exhibit 1.

Exhibit 1
Six-month Risk-free Interest Rates
(Annualized)

CAD	3.0%
EUR	4.5%
JPY	0.5%

McKinley makes the following statements regarding the credit risk on currency swaps.

Statement 1: "The credit risk on currency swaps is greatest at the middle of the swap term."

Statement 2: "The credit risk on currency swaps is bilateral and isolated to the Maple Leaf-North Bank contracts."

A. i. **Determine** *one* reason related to credit risk that makes *each* of McKinley's statements incorrect.

Note: Simply reversing the statements will receive no credit.

ii. **Discuss** *one* method to reduce credit risk associated with Maple Leaf's OTC currency derivative positions.

(6 minutes)

LEVEL III

Question: 9
Topic: Risk Management
Minutes: 16

B. i. **Calculate** the amount at risk from a credit loss on the long EUR forward contract. **Determine** which party bears the credit risk. **Show** your calculations.

ii. **Calculate** the amount at risk from a credit loss on the long JPY put option contract. **Determine** which party bears the credit risk. **Show** your calculations.

(10 minutes)

LEVEL III

Question: 9
Topic: Risk Management
Minutes: 16

Reading References:

40. "Risk Management," Ch. 9, *Managing Investment Portfolios: A Dynamic Process*, 3rd edition, Don M. Chance, Kenneth Grant, and John Marsland, (CFA Institute, 2007)
41. "Currency Risk Management," Ch. 11, *Global Investments,* 6th edition, Bruno Solnik and Dennis McLeavey (Addison Wesley, 2009)

Purpose:
To test the principles of Risk Management and credit/counterparty risk.

LOS: 2009-III-14-40-c, d, i, j, k
40. **"Risk Management"**
     The candidate should be able to:
     c)   evaluate the strengths and weaknesses of a company's risk management processes and the possible responses to a risk management problem;
     d)   evaluate a company's or a portfolio's exposures to financial and non-financial risk factors;
     i)   evaluate the credit risk of an investment position, including forward contract, swap, and option positions;
     j)   demonstrate the use of risk budgeting, position limits, and other methods for managing market risk;
     k)   demonstrate the use of exposure limits, marking to market, collateral, netting arrangements, credit standards, and credit derivatives to manage credit risk;

LOS: 2009 III-14-41 e, f
41. **"Currency Risk Management"**
     The candidate should be able to:
     e)   explain the issues that arise when hedging multiple currencies;
     f)   discuss the use of options rather than futures/forwards to insure and hedge currency risk;

LEVEL III

Question: 9
Topic: Risk Management
Minutes: 16

Guideline Answer:

PART A
i.
Statement 1
Notional principal must be exchanged at the beginning and end of the contract. Because the notional principal tends to be a large amount relative to the periodic payments, the potential for loss caused by the counterparty defaulting on the final notional principal payment is great. The greatest credit risk on currency swaps tend to occur closer to the contract end date.

Statement 2
If Maple Leaf or North Bank defaults to a third party and must declare bankruptcy, the swap between Maple Leaf and North Bank may also go into default. Hence, the default risk is not isolated exclusive to the contract written between Maple Leaf and North Bank. However, the risk is bilateral as either party could end up as the net payer.

ii.
There are a variety of measures Maple Leaf can take to reduce its exposure to North Bank. Maple Leaf could:

- reduce exposure to a single party and diversify to other counterparties

- require daily bilateral settlement

- demand collateral to cover any exposure

- substitute exchange traded instruments for the OTC contracts

- insist its OTC positions be marked-to-market and settled periodically

- require payment netting

- utilize a variety of credit derivatives to hedge exposure to North Bank

LEVEL III

Question: 9
Topic: Risk Management
Minutes: 16

PART B
i.
Maple Leaf is long the forward contract on EUR.

Term = 6 months until expiration
Spot rate = 1.64 CAD/EUR
Forward rate = 1.63 CAD/EUR
Canadian interest rate = 3%
EUR (European) interest rate = 4.5%

The value of the forward contract, CAD per EUR, is then equal to the spot exchange rate discounted at the foreign interest rate minus the forward rate discounted at the domestic interest rate.

$$\frac{1.64}{(1.045)^{0.5}} - \frac{1.63}{(1.03)^{0.5}} = -0.001786$$

-0.001786 × EUR 50,000,000 = CAD 89,300 (or CAD 89,314.13 exactly) is the current amount at risk for a credit loss from default by the long party (Maple Leaf).

Alternatively, the credit loss can be calculated as PV (owned) – PV (owed)

With the change in exchange rates, a revised forward rate can be calculated:
$$F = S \times (1+R_D)^{0.50} / (1 + R_F)^{0.50}$$
$$= 1.64 \times (1+0.03)^{0.50} / (1 + 0.045)^{0.50}$$
$$= 1.628187$$

The difference at maturity between what is owned and owed is:
1.628187 – 1.63 = -0.001813

The present value of the change will be:
$$PV = -0.001813 / (1.03)^{0.50} = -0.001786 \times 50,000,000$$
$$= CAD\ 89,314$$

North Bank bears the credit risk that Maple Leaf will not pay because the EUR forward contract has negative value to Maple Leaf, the long party.

Question:	9
Topic:	Risk Management
Minutes:	16

ii.
Maple Leaf is long a European put option, and thus it has the right to sell JPY at JPY 100 per CAD in six months.

All of the credit risk associated with a currency option is borne by the long side of the option contract, i.e., Maple Leaf. This is because the long party seeks a payoff from the writer of the option should the option finish in-the-money. Because this is an OTC European option, with no payments required until expiration, Maple Leaf does not face any current risk until then. It does, however, face potential credit (counterparty) risk.

If exchange rates remain unchanged until then, the risk to Maple Leaf can be calculated as:

$$\frac{1}{100} - \frac{1}{102.5} = 0.000244 \times 12,500,000 \, JPY \times 100 \, contracts = 305000 \text{ CAD}$$

On a per contract basis, Maple Leaf would expect a payoff of CAD 3,050 (or CAD 3,048.78 exactly).

For an exchange-traded option prior to expiration, the current market value of the put option would be the amount at risk.

LEVEL III

Question: 10
Topic: Monitor/Rebalance
Minutes: 15

QUESTION 10 HAS TWO PARTS (A, B) FOR A TOTAL OF 15 MINUTES.

Jackson Miller, a portfolio manager at Big Trust Bank, arranges a meeting with a client, Jin Huang, to review the performance of her portfolio and discuss Big Trust's market outlook.

At the meeting, Miller suggests examining Huang's portfolio rebalancing strategy to ensure that her portfolio stays consistent with her long-term objectives. The target strategic asset allocation for her portfolio and the corridor widths for Huang's percentage-of-portfolio rebalancing strategy are shown in Exhibit 1.

Exhibit 1
Huang's Strategic Asset Allocation and Corridor Widths

Asset Class	Target Weight	Corridor Widths
Domestic equity	25%	+/- 2.5%
Non-domestic equity	30%	+/- 3.0%
Domestic bonds	30%	+/- 3.0%
Risk-free securities	10%	+/- 1.0%
Alternative investments	5%	+/- 0.5%

Miller informs Huang that Big Trust recently revised its market outlook. Revised expectations are as follows:

- An increase in the price of gold, which is a component of the alternative investments asset class;
- Lower volatility of domestic bond prices as the economy becomes less sensitive to changes in oil prices;
- Lower transactions costs for non-domestic equities resulting from expanded electronic trading.

Huang asks how these revisions will affect the corridor widths associated with the percentage-of-portfolio approach to rebalancing.

A. **Determine**, for *each* revised expectation, whether the stated asset class corridor width in Exhibit 1 should be wider, narrower, or unchanged. **Justify** *each* of your responses with *one* reason.

Note: No calculations are required.

Answer Question 10-A in the Template provided on page x.

(9 minutes)

LEVEL III

Question:	10
Topic:	Monitor/Rebalance
Minutes:	15

Miller meets with another client, Harriet Kilpatrick. Kilpatrick recently married and plans to have children in the near future. Her current portfolio, which has a value of 2 million U.S. dollars (USD), is invested in equities and risk-free securities. She asks Miller to develop a rebalancing strategy that will prevent her portfolio from dropping below USD 1.25 million.

Miller states that Big Trust's investment outlook predicts that equity prices will be trending upward. Kilpatrick says that she also wants to minimize her allocation to risk-free securities during a rising market in equities.

Miller tells Kilpatrick that his clients use one of three types of rebalancing strategies: a buy-and-hold strategy, a constant mix strategy, or a constant-proportion portfolio insurance (CPPI) strategy.

B.   **Select** the *most* appropriate rebalancing strategy for Kilpatrick's portfolio. **Justify** your selection with *two* reasons.

   Answer Question 10-B in the Template provided on page x.

   (6 minutes)

LEVEL III

Question: 10
Topic: Monitor/Rebalance
Minutes: 15

Template for Question 10-A
Note: No calculations are required.

Asset class and revised expectation	Determine, for *each* revised expectation, whether the stated asset class corridor width in Exhibit 1 should be wider, narrower, or unchanged. (circle one)	Justify *each* of your responses with *one* reason.
Alternative investments: An increase in the price of gold, which is a component of the alternative investments asset class;	Wider Narrower Unchanged	
Domestic bonds: Lower volatility of domestic bond prices as the economy becomes less sensitive to changes in oil prices;	Wider Narrower Unchanged	
Non-domestic equity: Lower transactions costs for non-domestic equities resulting from expanded electronic trading.	Wider Narrower Unchanged	

LEVEL III

Question: 10
Topic: Monitor/Rebalance
Minutes: 15

Template for Question 10-B

Select the *most* appropriate rebalancing strategy for Kilpatrick's portfolio. (circle one)	Justify your selection with *two* reasons.
buy-and-hold constant mix CPPI	1. 2.

LEVEL III

Question: 10
Topic: Monitor/Rebalance
Minutes: 15

Reading References:
"Monitoring and Rebalancing," Ch. 11, *Managing Investment Portfolios: A Dynamic Process*, 3rd edition, Robert D. Arnott, Terence E. Burns, Lisa Plaxco, and Philip Moore (CFA Institute, 2007)

Purpose:
To test knowledge and use of rebalancing strategies.

LOS: 2009-III-16-46-d, f, h, j
"Monitoring and Rebalancing"
 The candidate should be able to:
 d) discuss the benefits and costs of rebalancing a portfolio to the investor's strategic asset allocation;
 f) discuss the key determinants of the optimal corridor width of an asset class in a percentage-of-portfolio rebalancing program, including transaction costs, risk tolerance, correlation, asset class volatility, and the volatility of the remainder of the portfolio, and evaluate the effects of a change in any of these factors;
 h) explain the performance consequences, in up, down, and nontrending markets, of (1) rebalancing to a constant mix of equities and bills, (2) buying and holding equities, and (3) constant-proportion portfolio insurance (CPPI);
 j) judge the appropriateness of constant mix, buy-and-hold, and CPPI rebalancing strategies, when given an investor's risk tolerance and asset return expectations.

LEVEL III

Question: 10
Topic: Monitor/Rebalance
Minutes: 15

Guideline Answer:

PART A
Template for Question 10-A
Note: No calculations are required.

Asset class and revised expectation	Determine, for *each* revised expectation, whether the stated asset class corridor width in Exhibit 1 should be wider, narrower, or unchanged. (circle one)	Justify *each* of your responses with *one* reason.
Alternative investments: An increase in the price of gold, which is a component of the alternative investments asset class;	Wider Narrower (Unchanged)	A change in the forecast is unrelated to any variable that affects the optimal width of the corridor, including transaction costs, risk tolerance, correlations, and volatilities.
Domestic bonds: Lower volatility of domestic bond prices as the economy becomes less sensitive to changes in oil prices;	(Wider) Narrower Unchanged	The optimal corridor width is inversely related to asset class volatility. Movement away from the target weight is potentially more costly for a high volatility asset class.
Non-domestic equity: Lower transactions costs for non-domestic equities resulting from expanded electronic trading.	Wider (Narrower) Unchanged	Lower transaction costs make it easier for rebalancing benefits to offset the costs.

LEVEL III

Question: 10
Topic: Monitor/Rebalance
Minutes: 15

PART B
Template for Question 10-B

Select the *most* appropriate rebalancing strategy for Kilpatrick's portfolio. (circle one)	Justify your selection with *two* reasons.
buy-and-hold constant mix	1. The CPPI strategy dynamically provides a floor to the portfolio value, consistent with Kilpatrick's objectives.
(CPPI)	2. When equities are trending up, CPPI will buy equities, constant mix will sell equities, and buy-and-hold will make no transactions. The greater investment in equities with CPPI allows Kilpatrick to minimize exposure to risk-free securities in rising equity markets, consistent with her objectives.

Question: 11
Topic: Performance Evaluation
Minutes: 18

QUESTION 11 HAS TWO PARTS (A, B) FOR A TOTAL OF 18 MINUTES.

A fund sponsor has adopted a formal policy to guide its manager evaluations. Cecilia Velasco and Alberto Roca, two staff members, are discussing the performance of hedge fund managers and traditional fund managers.

Velasco and Roca begin by discussing how to evaluate hedge fund managers. Velasco suggests that hedge fund performance should be evaluated by comparing the manager's performance with the median of a universe of hedge funds with similar mandates.

A.   **Justify**, with *three* reasons, why Velasco's suggestion for evaluating hedge fund manager performance is inappropriate.

(6 minutes)

Velasco and Roca also appraise the performance of two traditional European equity managers. As part of the monitoring process, they have collected the information shown in Exhibit 1. Assume that it is appropriate to compare the performance of the two managers.

Exhibit 1
Five-year Performance Data ending 30 April 2009
(Annualized)

Performance Measure	Manager #1	Manager #2
Rate of return (%)	21.13	21.13
Sharpe ratio	1.17	1.21
M^2 (%)	18.72	19.27
Active risk (%)	2.17	4.18
Information ratio	0.52	0.27
Treynor measure (%)	19.15	17.17
Risk-free rate (%)	2.75	2.75

B.   **Determine**, for *each* case below, the *most* appropriate performance measure from Exhibit 1 to compare Manager #1 and Manager #2. **Identify**, in *each* case, which manager outperformed. **Explain** what caused the difference in performance between the two managers.

i.   Reward per unit of systematic risk incurred
ii.   Reward per unit of total risk incurred
iii.   Reward per unit of risk earned by deviating from the benchmark's holdings

Answer Question 11-B in the Template provided on page x.

(12 minutes)

LEVEL III

Question: 11
Topic: Performance Evaluation
Minutes: 18

Template for Question 11-B

Case	Determine, for *each* case, the *most* appropriate performance measure from Exhibit 1 to compare Manager #1 and Manager #2.	Identify, in *each* case, which manager outperformed. (circle one)	Explain what caused the difference in performance between the two managers.
i. Reward per unit of systematic risk incurred		Manager #1 Manager #2	
ii. Reward per unit of total risk incurred		Manager #1 Manager #2	
iii. Reward per unit of risk earned by deviating from the benchmark's holdings		Manager #1 Manager #2	

LEVEL III

Question: 11
Topic: Performance Evaluation
Minutes: 18

Reading References:
47.   "Evaluating Portfolio Performance," Ch. 12, *Managing Investment Portfolios: A Dynamic Process*, 3rd edition, Jeffrey V. Bailey, Thomas M. Richards, and David E. Tierney (CFA Institute, 2007)

Purpose:
To test mastery of performance appraisal measures and assessment of appropriate benchmarks for equity managers.

LOS: 2009-III-17-47-f, h, j, p, q
The candidate should be able to:
- f) discuss the properties of a valid benchmark and evaluate the advantages and disadvantages of alternative types of performance benchmarks;
- h) judge the validity of using manager universes as benchmarks;
- j) discuss the issues in assigning benchmarks to hedge funds;
- p) calculate, interpret, and contrast alternative risk-adjusted performance measures, including (in their *ex post* forms) alpha, information ratio, Treynor measure, Sharpe ratio, and M^2;
- q) compare and contrast the information ratio, Treynor measure, and Sharpe ratio and explain how a portfolio's alpha and beta are incorporated into these measures;

LEVEL III

Question: 11
Topic: Performance Evaluation
Minutes: 18

Guideline Answer:

PART A
A median manager benchmark fails all the tests of benchmark validity except for being measurable.

The median manager of a universe is an inappropriate benchmark because:
- it cannot be specified in advance
- it is not investable
- it is ambiguous or not unambiguous
- the appropriateness of the benchmark style cannot be verified
- it is subject to survivorship bias
- it does not reflect current investment opinion
- it is not owned; the fund manager cannot be aware of and accept accountability for the constituents and performance of the benchmark because it is not specified in advance

LEVEL III

Question: 11
Topic: Performance Evaluation
Minutes: 18

PART B
Template for Question 11-B

Case	Determine, for *each* case, the *most* appropriate performance measure from Exhibit 1 to compare Manager #1 and Manager #2.	Identify, in *each* case, which manager outperformed. (circle one)	Explain what caused the difference in performance between the two managers.
i. Reward per unit of systematic risk incurred	Treynor measure	(Manager #1) Manager #2	Manager #1 has achieved a higher **Treynor measure** than Manager #2 (19.15 > 17.17), for the same excess rate of return (21.13-2.75). Therefore, it must be the case that Manager #1's account has been exposed to a lower level of systematic risk (beta). In terms of the SML, Manager #1 has produced returns that have resulted in a slope greater than the slope of Manager #2's returns.
ii. Reward per unit of total risk incurred	Sharpe ratio or M2	Manager #1 (Manager #2)	Manager #2's **Sharpe ratio** is higher than Manager #1's (1.21 > 1.17), for the same excess return (21.13-2.75). Therefore, Manager #1 has taken on a larger amount of total risk as measured by standard deviation. Because Manager #1 has a higher Treynor measure (lower beta) and a lower Sharpe ratio, Manager #1 must have taken more unsystematic risk.

LEVEL III

Question: 11
Topic: Performance Evaluation
Minutes: 18

iii. Reward per unit of risk earned by deviating from the benchmark's holdings	Information ratio	(Manager #1) Manager #2	The "reward per incremental unit of risk earned by deviating from the benchmark's holdings" is the **Information ratio**. Manager #1 has outperformed Manager #2 based on the IR (0.52 > 0.27). This is because Manager #1's active risk or tracking error risk is lower than Manager #2's.