

CFE SDM Model Solutions

Fall 2014

1. Learning Objectives:

3. The candidate will understand best practices for ERM processes and Capital Management and their use in setting a risk-return strategy.

Learning Outcomes:

- (3b) Explain ERM and capital management concepts to evaluate and recommend corporate financial and ERM decisions.
 - Apply capital allocation models to a multi-line organization.
 - Compare and contrast various ERM and Capital Management frameworks as to their ability to assess value and articulate the risk-return strategy of an organization.
 - Evaluate the value-added for an organization by jointly evaluating risk measurement and capital allocation.
 - Assess how an ERM process can improve capital efficiency and articulate the risk-return strategy.

Sources:

Economic Capital – A Case Study to Analyze Longevity Risk

Commentary on Question:

The goal of this question is to have the candidate demonstrate that they understand what kinds of risks are important to Darwin's new SPIA product and how those risks should be managed.

Solution:

- (a) Describe the shortcomings of utilizing a static RBC calculation for Darwin's SPIA business.

Commentary on Question:

Most candidates did not do well on part (a). They described the general shortcomings of RBC formula instead of those related to SPIA product.

RBC does not have capital charge for longevity risk.

Longevity risk is one of the major risks in the SPIA product.

The reserve tends to converge around a mean when static assumptions are used while dynamic assumptions give much larger tails.

The tail risks are what are important to Darwin in setting capital levels for SPIA.

1. Continued

There is asymmetry in annuity payout patterns.
More beneficiaries will die later than expected rather than sooner than expected.

Economic reserves tend to be larger than RBC.

- (b) Calculate capital for the following risks utilizing a CTE 90 methodology.
- (i) Longevity risk
 - (ii) Capital for asset risk
 - (iii) Total economic capital

Commentary on Question:

Many candidates showed that they understood how longevity and asset risks and total economic capital were calculated with the given information, but some of them did not have the necessary knowledge to solve this part (b).

- (i) Longevity Risk
Capital for longevity risk = liability value discounted at 5.0% - average reserve of all scenarios discounted at 5.0%
 $= 7.31\text{MM} - 6.71\text{MM} = 0.60\text{MM}$
- (ii) Asset Risk
Capital for asset risk = liability value discounted at 4.6% - liability value discounted at 5.0%
 $= 8.92\text{MM} - 7.31\text{MM} = 1.61\text{MM}$
- (iii) Total Economic Capital
Total economic capital = liability value discounted at 4.6% - average reserve of all scenarios discounted at 5.0%
 $= 8.92\text{MM} - 6.71\text{MM} = 2.21\text{MM}$

- (c) List three challenges that Darwin currently faces in managing risk for existing business.

Commentary on Question:

Some of the challenges listed here were found in the background section of Darwin's case study. The candidates needed to identify challenges that have impact on value creation. Candidates did relatively well on this part (c).

Insufficient resources to manage enforce business, especially in the area of risk mitigation and management operation monitoring and reporting – This could be operational risk.

1. Continued

Spread compression – Darwin was slow relative to its peer group in actively managing spread compression in a low interest rate environment – This could be asset liability mismatch risk.

Operational areas are silo-based, resulting in less effective collaboration and cross functional continuous improvement processes – This could be diversification ineffectiveness.

Significant legacy product risk – This could be an example of expense and claims over-run.

Liquidity risk – The company's ability to sell assets to meet cash needs from its product liability is hindered by the market taking advantage of the company during a crisis.

Hedging risk – The VA hedging program might not match with the market Greeks, such as delta, rho, gamma, vega, and cross Greeks.

- (d) Identify one key consideration for Darwin in setting a capital standard for its introduction of the SPIA product. Justify your answer.

Commentary on Question:

The candidates were asked to identify which consideration is most relevant for Darwin. The following are the lists of the considerations for a capital standard. Most of the candidates did not do well on this part (d).

The principle of setting up a capital standard is to recognize longevity risk and to identify ways to set up an appropriate level of capital requirements taking into account appropriate level of diversification.

To recognize longevity risk, economic reserves and capital are determined using a principle-based approach on a stochastic basis.

The best estimate and dynamic assumptions are to be used to calculate economic reserves and capital.

Ways to reduce the capital requirements:

Diversification of risk through issuing life insurance provides some capital risk, but negatively correlated risks cannot be perfectly matched. For example: The 1918 pandemic.

Capital charges can be reduced by demonstrating rating agencies capital management and the steps to manage capital needs.

1. Continued

The securitization of longevity risk can be utilized because markets for longevity derivatives (that is, longevity swaps or bonds) are materialized.

Stochastic models with volatile mortality assumptions are useful in identifying sources of risk and understanding their potential volatility.

2. Learning Objectives:

5. The candidate will understand the decision making process and the lessons learned from the risk taking activities and experiences of other organizations. In particular, the candidate will be able to apply the learning objectives of all the prior sections of the syllabus to the risk management principles embodied within the case studies explored in this section.

Learning Outcomes:

- (5a) Critique financial models, assumptions and decisions including the impact of behavioral finance concepts.
- (5b) Evaluate the robustness and flexibility of the risk management framework and recommend approaches for continual improvement in the framework and processes.

Sources:

Six Mistakes Executives Mark in Risk Management

HBR – JP Morgan – Private Bank

Quantitative Risk Management – Chapter 6

Nudge – Chapter 1

Commentary on Question:

This question aimed to test candidates' understanding of risk management issues related to portfolio management, the shortcomings of using standard deviation to measure risk, and the associated biases. Candidates were expected to not only recall the source material but also apply the knowledge to the situation specified in the stem. Most candidates were able to demonstrate the fallacy of using normal distribution to represent investment return by simple calculation; however, very few could identify the impact tying to the situation. Many candidates also failed to understand the multi-factor risk model in the JP Morgan Case, whose inputs are factors or drivers of portfolio risk rather than different types of risks.

Solution:

- (a) Verify that X is approximately 5,000. Show your calculation.

Commentary on Question:

This was a straight forward question. Most candidates understood it well. Since most of the inputs are given, the calculation requirement was minimal. However, some candidates tried to use VaR 95% to match the extreme downside outcome, which contradicts the study material - extreme downside risk cannot be depicted with a normal distribution.

2. Continued

- 1) Expected Return - "6%" & Standard Deviation - "8.5%"
- 2) Z statistics: $Z=(X-\mu)/\sigma=(-24.29-6)/8.5=-3.56$
- 3) -3.56 corresponds to 0.02 percentile
- 4) The extreme event happens $1/0.0002=5000$

(b)

- (i) Explain why it is inappropriate to assume that all risks can be measured by standard deviation under all circumstances.
- (ii) Explain why standard deviation is an inappropriate risk measure for First Balanced Triple B Portfolio above.

Commentary on Question:

This question aimed to test candidates' understanding of the fallacy of using standard deviation as a risk measure. Part i) was a recall question while part ii) required the candidates to apply it in the situation. Most candidates failed to distinguish the two types of randomness (tame vs. wild) which are the keys to determining if standard deviation is an appropriate risk measure. Asset return belongs to the wild randomness variety, which comes with a fat tail, possible skewness, etc. In part ii), many failed to link their answers to the case and thus did not receive full marks.

- (i) Standard deviation works well in stable times when return volatility is tame and displays relatively small skewness and kurtosis. It will be an inappropriate risk measure when the return has wild volatility and a fat tail. In this case, volatility could lead to underestimating the probability of extreme downside.
- (ii) The portfolio return has wild randomness. The result during 2008 shows that using a measure derived from standard deviation (VaR) seriously underestimated probability of the downside (1 out 5000 year event being realized).

(c)

- (i) Propose four factors that could be included in the risk model based on the asset classes in First Balanced Triple B Portfolio provided in Table 1.
- (ii) Describe four advantages of adopting a multi-factor risk model for the First Balanced Triple B Portfolio.

2. Continued

Commentary on Question:

The question aimed to test candidates' understanding of the multi-factor risk model used by JP Morgan. The key was to understand how the model is structured, which includes a number of factors that drive the overall volatility of the portfolio. Part i) required candidates to apply the model to the situation at hand based on what asset classes are in the portfolio. Part ii) asked candidates to identify how the model could be used to help portfolio managers. A number of candidates did not fully understand what the multi-factor model is for (managing investment funds rather than calculating capital requirement). The other common mistake is that some candidates confused risk factor with risk; i.e. even though yields level could contribute to the overall portfolio, it is not the same as interest rate risk exposure (i.e. duration). In part ii), candidates did well to point out that this model could address downside risk in particular scenarios.

(i)

- 1) Treasury/government yield for U.S., G7 or OECD countries.
- 2) Stock index return: i.e. S&P 500, Russell 2000 for small cap.
- 3) Corporate spread.
- 4) Commodities prices/returns.

(ii)

- 1) The model allows portfolio managers to understand how their purchase/sell ideas will impact overall portfolio risk.
- 2) The model allows for "what if" scenario analysis.
- 3) It could be flexible to show what the downside scenarios would consist of, thus helping us understand better if certain factor exposure should be cut to achieve the desired income without a large downside risk.
- 4) It is intuitive to include factors that are specific to certain asset class in the product.

(d)

- (i) Identify flaws associated with VaR as a risk measure.
- (ii) Identify two behavioral biases from the list below associated with comfortably relying on VaR to measure portfolio risk.
 - Status Quo
 - Representativeness
 - Overconfidence
 - Loss Aversion

2. Continued

Commentary on Question:

This question tries to test candidates' understanding of bias coming into play when making the decision to use a legacy risk measure or a model. For the first part, most candidates did great. For the second part, many candidates made the mistake of putting representativeness in there, arguing that in the situation perception of risk relied too much on the past and thus not appropriate for forward looking risk. However, it is not mentioned if this is the case.

- (i) VaR, derived from the standard deviation and does not provide insight into the tail region of a portfolio.
- (ii) Status Quo – Since the rest of the industry is using VaR, risk managers tend to follow suit.
Overconfidence – Due to flaws built in VaR, it is easy to believe the outsized downside outcome is not likely and to build a false sense of confidence.

3. Learning Objectives:

5. The candidate will understand the decision making process and the lessons learned from the risk taking activities and experiences of other organizations. In particular, the candidate will be able to apply the learning objectives of all the prior sections of the syllabus to the risk management principles embodied within the case studies explored in this section.

Learning Outcomes:

- (5a) Critique financial models, assumptions and decisions including the impact of behavioral finance concepts.
- (5b) Evaluate the robustness and flexibility of the risk management framework and recommend approaches for continual improvement in the framework and processes.

Sources:

Nudge – Chapter 1

HBR – Duckworth Asset Management

HBR – Nephila: Catastrophe Risk

Liquidity Risk – Chapter 17

Commentary on Question:

The question focused on the risk aspect of the two alternative investment strategies: equity market neutral and insurance linked investing. A few candidates scored poorly because they failed to understand the two investment strategies. As a result, they did not understand the risk properly.

Solution:

- (a)
 - (i) Describe the equity market neutral strategy as practiced by Duckworth Asset Management team.
 - (ii) Describe three types of instruments used by Nephilia Capital to transfer catastrophe risk.

Commentary on Question:

This is a recall question. Most candidates could recall these strategies well. The most common mistake was that for Duckworth, candidates rarely mentioned using short proceeds to purchase additional long position, resulting in leverage. For part ii), some candidates failed to recall the ILW (Industry Loss Warranties).

3. Continued

- (i)
 - The stock universe should be ranked. The strategy should long the stocks that are expected to outperform while shorting the ones that are expected to underperform.
 - The proceeds from the short position are invested in additional long position.
- (ii)
 - Catastrophe Bond - A securitization instrument for catastrophe risk whose principal repayment is contingent on catastrophic triggers.
 - Industry Loss Warrantee - A securitization product, similar to the index option, whose payoff depends on the aggregate loss of industry after catastrophic events.
 - Direct Reinsurance – Insurance for insurers.
- (b) Describe three risks associated with utilizing Nephila Capital’s strategy. Justify your response.

Commentary on Question:

This question expands from the previous one, testing candidates’ ability to identify risks associated with the insurance linked investment strategy. From a risk perspective, most candidates are capable of identifying common risks associated with insurance space, i.e. model, counterparty, and operation risks. However, from an investor’s perspective, the most significant decision to make is whether to take insurance (or catastrophe) risk and the liquidity risk associated with it. Many candidates failed to identify them.

- Catastrophe risk - The risk of losing interest and principal due to a catastrophic event.
 - Liquidity risk - The risk of not being able to access the market on a frequent basis due to the lack of a market price for some of the instruments associated with the strategy.
 - Legal risk - The risk of a legal dispute related to the reinsurance agreement, the special purpose vehicle, and the offshore entities established.
 - Model risk - Many of the modeling work is done by external providers; the lack of transparency and customization may incur model risk.
- (c)
 - (i) Explain which two behavioral biases from the list below pertain to the investor’s performance expectations.
 - Status Quo
 - Representativeness

3. Continued

- Overconfidence
- Loss Aversion

(ii) Critique the effectiveness of the two investment strategies with respect to the investor's comments.

Commentary on Question:

The question aimed to test candidates' ability to analyze/interpret an investment decision from both a behavioral and an investment perspective. Most candidates did well on picking up the behavioral biases associated with the statement. However, most omitted the flaws associated with their understanding of the strategies.

(i)

- Overconfidence – The investor believes both managers' historical outperformance will repeat in the future.
- Representativeness – Draw the general conclusion that the “winning streak” will continue.

(ii)

- Duckworth uses a market neutral strategy which takes both long and short positions in stocks. The net exposure to the general market is small. The strategy is supposed to have low correlation with the general market, thus it could underperform or outperform purely based on Duckworth's ability to pick securities.
- Nephila is taking a catastrophic risk that has no correlation to the equity market, and whose performance has nothing to do with market going up or down.

(d) Determine x and y in Table 3 that maximizes portfolio return. Show your calculations.

Commentary on Question:

The question aimed to test candidates' ability to consider risk constraints when investing in these alternative strategies. The calculation of the question was very straight forward if the candidates approach the question correctly. Most candidates received partial marks for identifying how the portfolio's liquidity risk is calculated and what the portfolio constraints look like.

3. Continued

Let x denote Nephila allocation and $y=1-x$ denote Duckworth allocation (x is between 0 & 1).

Since Nephila has better return, maximize total return is to maximize x given the following constraints:

Volatility: $\sigma = \sqrt{x^2 \times 10^2 + y^2 \times 6^2} < 10$ given $x + y = 1$, which will always satisfy.

Liquidity:

$$I = \sum_{i=1}^N [(W_i) \times (\frac{P_i}{P_{*i}})]$$

For Nephila - $0.20 \times 25\% + 0.80 \times 25\% + 0 \times 25\% + 0.60 \times 25\% = 0.40$

For Duckworth - $(1.00 \times 50\% - 1.00 \times 45\% + 1.00 \times 50\% - 1.00 \times 47\%) / (50\% - 45\% + 50\% - 47\%) = 1.00$

And $0.40 \times (1-x) + 1.00 \times x \leq 0.85 \quad \Leftrightarrow x \leq 75\%$

Maximum of x is 75%. Therefore allocating 75% to Nephila and 25% to Duckworth is the optimal strategy

4. Learning Objectives:

4. The candidate will understand organizational behavioral concepts and apply strategic management frameworks to corporate financial and ERM business problems.
5. The candidate will understand the decision making process and the lessons learned from the risk taking activities and experiences of other organizations. In particular, the candidate will be able to apply the learning objectives of all the prior sections of the syllabus to the risk management principles embodied within the case studies explored in this section.

Learning Outcomes:

- (4b) Evaluate and apply the concepts of strategic management, recognizing the factors that affect the development and implementation of strategies.
- Demonstrate the importance of analyzing the firm's external environment and the internal organization.
 - Define types of business-level strategies and recommend an appropriate business-level strategy for a given situation.
 - Explain the impact of competitive dynamics on strategic management.
- (5a) Critique financial models, assumptions and decisions including the impact of behavioral finance concepts.

Sources:

When and When Not to Vertically Integrate

Commentary on Question:

This question tested the candidates' understanding of Vertical Market Failure, an important concept introduced in the reading "When and When Not to Vertically Integrate". The candidates were expected to identify the features of VMF, apply them in the case study, and come up with recommendations similar to those introduced in the reading. Most candidates were able to answer some parts. Please see the comments for specific parts below.

Solution:

- (a) List three attributes that characterize a vertical market failure.

Commentary on Question:

Candidates did well in this part as it was very straight forward and directly from the source material. Most of the candidates got "small number of buyers and sellers" correct. Many candidates did not get the "Frequent transaction". Some candidates lost points because they didn't specify whether "number of buyers and sellers" are small and transaction is "frequent".

4. Continued

- A small number of buyers and sellers.
 - High asset specific, durability, and intensity.
 - Frequent transaction.
- (b) Assess why Blue Jay Air is considering the acquisition of aircraft manufacturers based on each attribute identified in part (a). Justify your answer.

Commentary on Question:

Candidates needed to apply the cause of Vertical Market Failure to the case study by first identifying whether each of the features existed. Candidate did not do well on this question. Most of the candidates either did not associate the case study to the VMF features or did not associate it with the Blue Jay Air decision. Many candidates failed to summarize their rationale and arrive at a conclusion based on the three features.

Small numbers of buyers and sellers present in Blue Jay Air means the aircraft market has only a few major buyers and a few major sellers. The small number of buyers and sellers lead to a lot of haggling and attempts at exploitation. This results in high trading risk which promotes vertical integration; therefore, a small number of buyers and sellers will lead to vertical market failure. Blue Jay Air will benefit from vertical integration.

High asset specification is present in Blue Jay Air. In the aircraft market, airlines are the only major consumers of aircraft, and it has low value in alternative uses. Therefore, technical specificity occurs, and the amount of research and development (R&D) investment in the component is high (asset intensity). Therefore, the seller side is composed of groups of bilateral oligopolists tightly bound together, so VMF occurs in a similar manner to a small number of buyers and sellers.

Frequent transactions are not present in Blue Jay Air. The transaction of aircraft purchases/sales are not very frequent. In this case, the transaction frequency is low, which means there is not much haggling or negotiating. Therefore, low transaction frequency will not lead to vertical market failure.

- (c) Recommend an alternative to vertical integration assuming Blue Jay Air decides not to fully vertically integrate. Justify your answer.

4. Continued

Commentary on Question:

Points were given as long as the answer was about quasi integrate and it made sense. Candidates did okay on this question. Most were able get some points, and a number of candidates got full marks on this part. In order to get full marks, an example of quasi integration should be given and explained; moreover, candidates need to explain why it is good for Blue Jay Air in the situation given in the Case Study.

In the spectrum of strategies between to vertically integrate and not to vertically integrate, there is a Quasi-Integration Strategies. Joint ventures or strategic alliances are examples of Quasi-Integration that are applicable in this case. Skylite is owned by the global aerospace and the Defense Corporation; it may be hard to fully acquire Skylite from them. Instead of fully acquiring Skylite, they can consider joint ventures or strategic alliances. Joint ventures or strategic alliances allow firms to exchange certain goods, services, information, or expertise while maintaining a formal trade relationship with others. The potential mutual advantages can be maximized, and the natural conflict in trade relationships can be minimized.

5. Learning Objectives:

1. The candidate will understand measures of corporate value and their uses in risk management.

Learning Outcomes:

- (1c) Compare and contrast various financial reporting bases for use in risk management and corporate decision-making.

Sources:

Economic Capital and Capital Allocation: Beyond Regulatory Compliance

Commentary on Question:

This question was testing the candidates' understanding of Sharpe Ratios and risk adjusted return, as well as their ability to apply similar concepts to non-insurance or banking industries.

Solution:

- (a) Calculate X and Y.

Commentary on Question:

This part of the question introduced the Sharpe Ratio and asked the candidates to perform the calculation. This was well answered. The calculation was straightforward for the majority of the candidates.

$$\text{Sharpe Ratio} = \frac{\text{Expected Portfolio Return} - \text{Risk Free Rate}}{\text{Portfolio Standard Deviation}}$$

Substitute to
find the risk
free rate:

$$0.75 = \frac{(25/250) - \text{Risk Free Rate}}{\sqrt{0.16}}$$

where:

$$\text{Risk Free Rate} = 0.03$$

$$X = \frac{(8/158) - 0.03}{\sqrt{0.04}}$$

$$X = 0.108$$

$$Y = \frac{(21/350) - 0.03}{\sqrt{0.25}}$$

$$Y = 0.06$$

5. Continued

- (b) Identify the current best customer groups in BJA.

Commentary on Question:

The candidates were asked to interpret the Sharpe Ratios from part (a). This question was generally answered well. Full credit was given for identifying the highest Sharpe Ratio segments based on the results of A and explaining that would be the best risk adjusted return. The model solution covers the best groups from each of the customer segmentations. Partial credit was also given to candidates that identified the best customer group across all segmentations.

Within each of the defined customer segmentations, the group with the highest Sharpe Ratio would represent the best risk adjusted return. Higher Sharpe Ratio represents a better return for a given risk.

Based on Sharpe Ratio, the best customer segments for BJA are:

- Business Travelers
- Regional Flights
- Business Class Seats

- (c) Evaluate how the current best customer groups identified in (b) align with BJA's long term strategies. Justify your answer.

Commentary on Question:

To receive full credit, candidates needed to address how BJA's long term strategy aligned with each of the segments identified in (b). If the candidate's answer did not match the model solution for (a) or (b), full credit was given if the long-term strategy was properly assessed based on the candidate's prior answers. Partial credit was given if a candidate only addresses one of the three segments they identified in (b) or if they only addressed one aspect of BJA's long term strategy from the case study.

Blue Jay Air's Long Term Strategy consists of:

- Focusing on business travelers
- Pursuing international expansion
- Implementing a frequent flyer program

The Sharpe Ratio calculation for the business traveler segment is higher than the leisure traveler segment. Blue Jay Air's pursuit of the business segment is justified based on customer profitability.

The Sharpe Ratio calculation for the international traveler segment is lower than the regional traveler segment. Blue Jay Air's pursuit of the international flight segment is not justified based on customer profitability

5. Continued

The Sharpe Ratio calculation for the business class seat segment is higher than the first class and economy class seat segments. Blue Jay Air Strategy focuses on business class seating (i.e. they focus on the business traveler in its frequent flyer program). Blue Jay Air's pursuit of the frequent flyer program and business class seating is justified based on customer profitability.

- (d) Describe three activities BJA could adopt or enhance that would contribute to the success of BJA's long term strategies. Justify your answer.

Commentary on Question:

This was generally well done. Candidates lost points if the strategy they suggested conflicted with their Sharpe Ratio results or if the suggested strategies didn't align with each other. A few candidates pointed out that aspects of the long term strategy were in conflict with the Sharpe Ratio results and specified that they were answering assuming that BJA didn't change their long term strategy. These candidates received full credit for well-justified answers.

- **Business Travelers:** Implement the loyalty program and propose a focus on frequent business travelers.
- **Regional Flights:** The long term strategy of expanding internationally should be abandoned in favor of expanding the regional flight offering. BJA could consider adding shuttle service between frequent destinations or an affiliation agreement with another carrier.
- **Business Class Seats:** Consider fewer first class seats in order to provide more business class seats or add regional class seats to smaller regional aircrafts.

6. Learning Objectives:

2. The candidate will understand various approaches to measuring and managing credit and liquidity risk.

Learning Outcomes:

- (2b) Assess and critique credit and liquidity risk metrics for their impact on risk strategies, their uses in risk management and decision making.

Sources:

Liquidity Risk – Ch.2

Matz and Neu: Liquidity Risk Measurement and Management

Commentary on Question:

This question tests the candidates' ability to understand the concepts and strategies of liquidation and apply them among alternative strategies.

Solution:

- (a) List advantages and disadvantages of immediate liquidation (all positions are liquidated over a period of one day) and uniform liquidation (all positions are liquidated over in a series of installments over a period of few days) strategies.

Commentary on Question:

The candidates are supposed to demonstrate the understanding of concepts related to liquidity costs and market feedback. Most candidates did well on this part (a).

Under immediate liquidation strategy,

- Advantage: The portfolio is liquidated before the end of the day, minimizing price risk.
- Disadvantage: The full effect of market impact is realized, leading to high liquidation cost.

Under uniform liquidation strategy,

- Advantage: The market impact is spread over a few days, leading to a lower cost of liquidation, as compared to immediate liquidation strategy.
- Disadvantage: The portfolio remains exposed to price risk over a longer period of time.

- (b) Calculate the volatility of proceeds from each of the two liquidation strategies. (Assume uncorrelated daily returns.)

Commentary on Question:

Candidates were expected to demonstrate their understanding of “secondary” risk concepts as applied to Liquidity risk and its market price. Most candidates did not know where to begin.

6. Continued

Volatility of proceeds from Immediate Liquidation

The immediate liquidation minimizes market risk exposure. Volatility of proceeds from Immediate Liquidation: since there is no uncertainty of units price on day 1 the volatility is zero.

Volatility of proceeds from Uniform Liquidation

The multi-day variance is the sum of daily variances, given no correlation between daily returns. For each day's variance apply the variance of portfolio of two assets. To calculate volatility several inputs are needed: total units held, number of units liquidated each day, and proceeds from each asset. Immediate liquidation affects the bid price per the Fund's characteristics. Uniform liquidation is assumed not to impact bid price. Since information is provided 'per 1000' units the below calculations use 1000 units liquidated per day. Other liquidation patterns were also acceptable.

Total Number of Units

"Market Value" is a theoretical value only and should be determined as the mid-point between bid and ask prices;

Large Cap Index Fund $2,000 = 0.4 * 10,000,000 / [(1,940 + 2,060) / 2]$

Corporate Bond Index Fund $2,308 = 0.6 * 10,000,000 / [(2,580 + 2,620) / 2]$

Day 1 Proceeds and Volatility: Variance is 0 since there is no uncertainty of units price on Day 1 the volatility is zero.

Although not needed to calculate the volatility the proceeds on Day 1 are:

From sale of Large Cap Index Fund = $1,000 * 1,940 = 1,940,000$

From sale of Corporate Bond Index Fund = $1,000 * 2,580 = 2,580,000$

Day 2 Proceeds: there are 1,000 (1,308) units remaining in Large Cap (Corporate Bond)

Same as Day 1

Day 2 Proceeds Variance $9,825,670,000 = (1,940,000 * 0.05)^2 + (2,580,000 * 0.005)^2 + 2 * (0.1) * (1,940,000 * 0.05) * (2,580,000 * 0.005)$

Day 3 Proceeds: there are 0 (308) units remaining in Large Cap (Corporate Bond)

From sale of Large Cap Index Fund = 0

From sale of Corporate Bond Index Fund = $308 * 2,580 = 794,640$

Day 3 Proceeds Variance $15,786,318 = (0 * 0.05)^2 + (794,640 * 0.005)^2 + 2 * (0.1) * (0 * 0.05) * (794,640 * 0.005)$

6. Continued

$$\text{Total Proceeds Variance} \quad 9,841,424,793 = 0 + 9,825,670,000 + 15,786,318$$

$$\text{Volatility} \quad 99,204 = 9,841,424,793^{0.5}$$

- (c) Recommend liquidation strategy A, B or C. Justify your answer.

Commentary on Question:

The candidates should set up the criteria to decide which liquidation strategy would be appropriate to finance the minimum modernization cost of \$9 million and provide the reason for that. They should also explain why the other strategies are not suitable. Candidates performed well on this part (c).

Strategy A: $\$9,100,000 - \$100,000 = \$9,000,000$ is equal to modernization cost of at least \$9 million. While the expected proceeds are likely low at \$9.1 million, there is a very small volatility associated with this strategy. So \$9 million ($=\$9.1 \text{ million} - \0.1 million) is still adequate to meet funding costs for modernization cost of \$9 million.

Strategy B: $\$9,500,000 - \$1,100,000 = \$8,400,000$ is less than \$9 million of modernization cost.

Strategy C: $\$9,800,000 - \$1,400,000 = \$8,400,000$ is less than \$9 million of modernization cost.

While the strategies B and C are likely to give larger proceeds, there is a good chance that the volatilities might reduce the expected proceeds so leaving inadequate funding for modernization.

So strategy A is recommended.

7. Learning Objectives:

4. The candidate will understand organizational behavioral concepts and apply strategic management frameworks to corporate financial and ERM business problems.

Learning Outcomes:

- (4a) Apply organization behavior concepts.
 - Describe the communication process and explain the strategic importance of communication to organizations.
 - Describe the fundamentals of decision making and explain decision-making styles and influences.
 - Describe common types and causes of organizational conflict and apply the elements of a basic negotiation process.
 - Assess how the behavior of individuals and groups in organizations drives organizational decisions and performance.
- (4b) Evaluate and apply the concepts of strategic management, recognizing the factors that affect the development and implementation of strategies.
 - Demonstrate the importance of analyzing the firm's external environment and the internal organization.
 - Define types of business-level strategies and recommend an appropriate business-level strategy for a given situation.
 - Explain the impact of competitive dynamics on strategic management.
- (4c) Use organizational behavior and strategic management concepts to evaluate and recommend corporate financial and ERM decisions.

Sources:

Strategic Management - Ch 3

Strategic Management - Ch 2

Strategic Management - Ch 4

SDM-CS-L255

Commentary on Question:

This question was intended to test candidates' general knowledge of strategic decision making concepts. It was well done overall. Some candidates mixed the concept of barriers to entry with competitive advantages. Candidates who received full credits were able to tie their answers with the Frenz case study.

Solution:

- (a) State the business strategy that Frenz currently practices within the retail food industry.

7. Continued

Commentary on Question:

This question was generally well done. Most candidates were able to identify the correct strategy and provide some explanation. Partial credit was given if the candidate only named the strategy without an explanation.

Frenz practices a focused market differentiation strategy. Frenz targets the high-end coffee market and operates focused stores in financial districts and high socio-economic areas. Frenz also differentiates itself by continuously providing innovative products to its customers.

(b)

- (i) Identify an example for Frenz for each category.
- (ii) Classify each example in part (i) as either a strength or weakness. Justify your answer.

Commentary on Question:

Part i) only required candidates to identify one example for each type of resource. Most candidates did well. Part ii) required candidates to provide a justification to support their answer. Candidates needed to relate their justification specifically to Frenz in order to receive full credit.

- (i) Tangible resource - The company-owned coffee stores are tangible resources to Frenz. Frenz has stores in most European and North American major cities with wifi access.
Intangible resource – A well-recognized and respected brand as the premier coffee house is an intangible asset to Frenz.
Capabilities - Frenz has a renowned marketing capability. Many years of investment in marketing has achieved economy of scale for Frenz.
- (ii) Company-owned stores are strengths to Frenz because they are capable of generating cash revenue for Frenz. The stores also give Frenz the ability to reach its target market directly. They also sell non-coffee products in the stores to enhance the overall Frenz experience, which aligns with Frenz's mission.

A well-recognized and respected brand is a strength to Frenz because it enhances Frenz's reputation as the premier coffee house in the world. It helps maintain customer loyalty as well as attract new customers to Frenz.

7. Continued

Marketing capability is a strength for Frenz. It allows Frenz to achieve economy of scale, which leads to cost saving and creates a higher barrier to entry for competitors. Strong marketing capabilities will also help Frenz in expanding to new developing markets.

- (c) Assess Frenz's competitive advantages resulting from investing in a Vietombia coffee bean production facility.

Commentary on Question:

This question was designed to test candidates' understanding of the four factors of competitive advantage. Most candidates did well on this question. Some candidates failed to note that the Vietombia coffee beans are substitutable by Costa Rica coffee beans and lost credit on that part.

By investing in the Vietombia coffee bean production facility, Frenz is able to gain sustainable competitive advantages which are assessed by the following aspects.

Valuable - The Vietombia coffee bean production facility allows Frenz to develop super-premium coffee products which will add value to the Frenz brand name as a premium coffee house. The production facility will also allow Frenz to produce the super-premium coffee products at relatively lower cost due to the exclusive contract and economy of scale, therefore creating additional value to Frenz.

Rare - The Vietombia government is willing to sign an exclusive contract with Frenz and such opportunities are rare. It is also rare that Vietombia coffee beans are produced in large quantities elsewhere, so it is difficult for competitors to acquire this coffee bean in similar quantity.

Costly to Imitate - The initial set up cost for such vertical integration is very large. Frenz will need a large amount of capital and significant cash flow strain to acquire the Vietombia facility. Similarly, it is equally costly for competitors to set up such production facilities elsewhere. Therefore, it is costly to imitate.

Non-substitutable - There is a substitute to the Vietombia coffee beans, the Costa Rica coffee beans, so this competitive advantage is substitutable. However, Costa Rica beans are very expensive, making substitution difficult to achieve.

- (d) Explain the barriers to entry that Frenz's competitors would face that arise from a successful Vietombia coffee bean production facility.

7. Continued

Commentary on Question:

This question required the candidate to provide two barriers to entry and provide justification related to Frenz. Simply stating the barrier to entry without proper justification will not receive full credit.

The first barrier to entry created by acquiring the Vietombia production facility is the cost saving and economy of scale. The mass production facility allows Frenz to secure its supply chain of super-premier coffee beans in high quality and large quantities. In comparison, competitors will need to either spend more money in acquiring Costa Rica beans or invest in smaller production facilities that produce Vietombia beans in order to compete with Frenz in the super-premier coffee market, but both options are more costly than Frenz's options.

The second barrier to entry is the exclusive government contract and capital intensive investment. The government contract shows Frenz has developed great reputation and relationship with the suppliers. Such relationship and reputation is difficult for a new competitor to develop within a short period of time. In addition to the contract, it also takes a large amount of capital to set up a production facility, and new entrants to the market may not have access to such capital resource immediately.

- (e) Critique purchasing Jiffy Java versus investing in the Vietombia production facility based on Frenz's strategic goals.

Commentary on Question:

This is the toughest question part where it requires candidates to utilize the information in the previous parts to answer properly. We are looking for candidates who provide solid arguments to support their suggestions. Candidates who are able to critique both sides with relevant arguments linking to the case study will receive full credit.

First, we would like to show that acquiring Jiffy Java does not align with Frenz's strategic goals. Frenz's goal is to become the most recognized coffee brand in the world. Jiffy Java currently has a well-established brand in Europe, where Frenz also has a large market share. Acquiring Jiffy Java will not help with Frenz's growth goals of expanding into the North American market and other developing markets.

Secondly, Frenz has a focused differentiation strategy that positions itself as a premier coffee house and targets at specific customer groups who are generally not price sensitive. Jiffy Java practices a cost leadership strategy that operates on limited menu items with inexpensive options. Jiffy Java does not fit well with Frenz's strategy and can potentially hurt Frenz's reputation since Frenz is known for its innovative products and the excellent Frenz experience.

7. Continued

Lastly, acquiring the Vietombia coffee bean productions facility enhances Frenz's general strategy by introducing exotic, super-premier coffee products to the Frenz collection of products. The new products will increase Frenz's competitive advantages as an innovative developer. Vertical integration at this level will also allow Frenz to achieve bigger economy of scale and operate more efficiently.

Overall, investing in Vietombia's production facility will be a better option for Frenz.

8. Learning Objectives:

1. The candidate will understand measures of corporate value and their uses in risk management.

Learning Outcomes:

- (1c) Compare and contrast various financial reporting bases for use in risk management and corporate decision-making.

Sources:

Managerial Accounting for CERAs and FSAs, 2013

Commentary on Question:

This question required candidates to understand how expense allocation methodologies impact earnings. The question was generally well-answered. Some candidates calculated expense changes and recommended approaches without specifically addressing the earning impact. In order to receive full credit, an explanation of the impact to profitability and an appropriate recommendation was required.

Solution:

- (a)
 - (i) Quantify the impact of the new proposal on the profitability of the Term, Traditional Life and Universal Life lines of business in 2013 calendar year.
 - (ii) Assess the Senior Accountant's proposal with regard to performance measurement.
 - (iii) Recommend whether to adopt Senior Accountant's proposal. Justify your answer.
 - (i) Overhead using new proposed method (all numbers are in 000's):

UL: Overhead = $40,000 \times 40,000/400,000=4,000$
Under the original method, overhead was \$20,000, so the impact is an increase in profitability by $\$20,000-\$4,000 =\$16,000$

Trad: Overhead = $40,000 \times 100,000/400,000=10,000$
Under the original method, overhead was \$10,000, so the impact is \$0. No change in profitability.

Term: Overhead = $40,000 \times 200,000/400,000=20,000$
Under the original method, overhead was \$2,300, so the impact is a decrease in profitability by $\$20,000-\$2,300 =\$17,700$

8. Continued

(ii) Pro: Fewer resources to operate and easy to implement.

Con: Lines of business with many policies (i.e., Term) subsidize LOBS with few policies (i.e., UL). This will lead to distorted earnings and poor decision-making due to inability to see true profitability of each line of business.

(iii) Do not adopt. The new method, while saving resources, does not contribute to an accurate performance measurement. This could lead to poor decision-making.

(b)

(i) Assess the impact of the rising interest rates on ULBankIt and non-ULBankIt products from both the policyholders' and Darwin's perspectives.

(ii) Assess the impact of this decision on the competitiveness of the ULBankIt product.

Commentary on Question:

This question required candidates to understand the impact of different credit rates on policyholders and providers. In order to receive full credit, candidates needed to understand the difference between crediting current money rates and portfolio credit rates. Candidates also needed to illustrate that as interest rate increases, the new policyholder's credit rates are jeopardized by the existing portfolio performance.

(i) New money rates (current year available investment returns) are much higher than the previous years' credit rates. The 3-year weighted portfolio rate is lower than the current new money rate. ULBankIt policyholders will have less investment income if credited at the portfolio rate than with a stand-alone new money rate. Zero sum game implies the inforce is subsidized.

Credited rates for BankIt will be lower than if credited the new rate, so policyholders might decide to go with another product that has higher crediting rates based on the current year's performance only.

(ii) The product will be more competitive because credited rates will be more in-line with the new money rate currently offered in the market.

9. Learning Objectives:

2. The candidate will understand various approaches to measuring and managing credit and liquidity risk.
5. The candidate will understand the decision making process and the lessons learned from the risk taking activities and experiences of other organizations. In particular, the candidate will be able to apply the learning objectives of all the prior sections of the syllabus to the risk management principles embodied within the case studies explored in this section.

Learning Outcomes:

- (2a) Apply credit and liquidity risk concepts.
 - Describe and analyze credit, counterparty, liquidity, and wrong-way risk.
 - Assess and critique results of various credit and liquidity models for their impact on decision making.
 - Assess credit value adjustment
- (5a) Critique financial models, assumptions and decisions including the impact of behavioral finance concepts.
- (5b) Evaluate the robustness and flexibility of the risk management framework and recommend approaches for continual improvement in the framework and processes.

Sources:

Investments - Ch 12

HBR - Duckworth Asset Management Inc.

HBR - Air Canada- Risk Management

Counterparty Credit Risk, Gregory, Jon, 2nd edition - Ch 15

Commentary on Question:

Commentary listed underneath question component.

Solution:

- (a) Identify two behavioral finance concepts exhibited in John's statement. Justify your answer.

Commentary on Question:

This question asked the candidates to understand the listed behavioral finance concepts. Many of them could be applied to the scenario and credit was given based on the quality of the answer. Additional credit was not given for duplicative answers.

9. Continued

1) Forecasting errors

John gave too much weight to recent experiences ("based on last month's rate") compared to prior beliefs when making forecasts.

2) Sample size neglect and representativeness

John's statement is based on only one month history of the three-month Libor rate. The sample size is too small.

(b)

- (i) Describe right way risk and its impact on counterparty risk and Credit Value Adjustment.
- (ii) Analyze the wrong way and/or right way risk from the the investment bank' perspective.
- (iii) Analyze the wrong way and/or right way risk from the the investment bank' perspective.

Commentary on Question:

This question asked the candidate to understand right-way and wrong-way risk and apply it to swap, CSD payers, and receivers' scenarios. Candidates generally demonstrated an understanding of right-way and wrong-way risk. In order to receive full credit, the candidates needed to demonstrate understanding of the dependence between credit quality and exposure. Many candidates failed to recognize that BJA was highly leveraged, and this impacted their credit quality relative to a normal business scenario. Some candidates failed to fully answer part (iii). Part (iii) required the candidate to identify both the right-way and wrong-way risk that would be present in the scenario.

- (i) Right-way risk is the favorable (negative) dependence between credit quality and risk exposure. When credit quality (counterparty risk) is reduced, the risk exposure (CVA) should also be reduced.
- (ii) BJA is a highly leveraged capital intensive company with significant exposure to the interest rate volatility. Higher interest rates require a higher return on debit. As a highly leveraged company, this increases the default probability of BJA.
As interest rate increases, the value of the floating payments received from BJA will increase. As the floating rate receiver, the investment bank's exposure to BJA will also increase.

9. Continued

When the credit quality decreases (higher default possibility of BJA), the investment bank's exposure to BJA increases. Therefore, from the investment bank's perspective, there exists wrong-way risk.

- (iii) Similarly, BJA is a highly leveraged capital intensive company with significant exposure to the interest rate volatility. Lower interest rates require a lower return on debit. As a result, BJA will be at a lower risk of default.

As interest rate decreases, the value of the fixed interest rate received from BJA will increase. As a fixed rate receiver, the investment bank's exposure to BJA will increase.

When the credit quality increases (lower default possibility of BJA), the investment bank's exposure to BJA also increases. Therefore, from the investment bank's perspective, there exists right-way risk. On the other hand, low interest rate may be indicative of a recession where defaults are more likely (less travelers, less income). As a result, as the credit quality decreases (higher default possibility of BJA), the investment bank's exposure to BJA increases. In this case, the investment bank faces wrong way risk.

- (c) Determine if the CDS index hedge position experienced a loss or gain based on movements of Barron's Confidence Index between October 2013 and October 2014. Justify your answer.

Commentary on Question:

This question required the candidates to understand that the increasing confidence index would increase the lending appetite of banks and reduce the overall credit spread in the market. Most candidates were able to make a connection between the confidence index and the CDS index, but few addressed the connection to credit spread directly. Those that did not address the credit spread were given partial credit based on their explanation of the CDS loss.

The increasing of the confidence index is indicative of the increasing lending appetite of banks. As a result, the credit spread is shrinking. The shrinking credit spread results in a lower required return on debit. As a highly leveraged company, BJA's default possibility is also reduced.

The investment bank enters into a long position in the CDS index to hedge the counterparty risk from BJA. If BJA's default possibility reduces, the value of CDS is depreciated. Therefore, the investment bank's CDS Index hedge position will experience loss.

9. Continued

- (d) Identify the wrong way risk that exists in this CDS index hedging position based on interest rates movements and change in Credit Adjustment Value of BJA. Justify your answer.

Commentary on Question:

The intent of this question was for the candidate to realize that while in Part (c) growing confidence resulted in narrowing the credit spread in the market, the default probability of BJA is also reduced, and this is positively correlated with the bank's exposure to BJA impacting CVA. If candidates did not make this connection, partial credit was given to candidates that had a plausible alternate explanation for the increasing CVA related to BJA.

Due to increasing confidence index, the credit spread shrinks (as described in part c). As a fixed rate receiver, the swap held by the investment bank increases in value, and its counterparty risk exposure to BJA increases.

The default risk of BJA is declining (as described in part b) due to the lower credit spread. As a result, the investment bank is facing wrong-way risk as its counterparty risk, and exposure moves in the same (positive) direction. $CVA = \text{the credit spread} \times EPE$ and as the credit spread decreases, the CVA is also declining, assuming EPE is remaining relatively unchanged.

10. Learning Objectives:

3. The candidate will understand best practices for ERM processes and Capital Management and their use in setting a risk-return strategy.

Learning Outcomes:

- (3a) Explain ERM principles and frameworks.
 - Describe the best practices and frameworks for ERM processes under various industry forums and regulatory guidelines and standards.
 - Explain the principles driving the direction of new regulation and industry standards in risk governance.
 - Describe the components of a risk appetite statement. Design and develop a risk appetite statement and risk return strategy.

Sources:

Risk Appetite Statements: What's on your Menu?

ASB ASOP #46 Risk Evaluation in Enterprise Risk Management

Risk Appetite Linkage with Strategic Planning

Commentary on Question:

The question tested candidates on the components of the risk appetite statement, the application of ASOP46 principles, and the use of CTE earnings in stress testing. Overall, candidates did not do well on this question. In particular, they seemed to have trouble in the application of ASOP 46 and clearly showing the link between ASOP 46 principles and examples from the case study.

Solution:

- (a) Describe each of these five components.

Commentary on Question:

In general, we were looking for candidates to define each of the components of the risk appetite statement. The best responses went into further detail and also described attributes/considerations of the components.

i) Principles

- Reflect organization's enterprise risk management objectives and risk taking philosophy.
- Provides foundational context for remaining sections of risk appetite statement.
- Examples of principles covered in the risk appetite statement:
 - Strategic alignment
 - Stakeholder interests
 - Alignment with corporate values and culture
 - Risk management capacity and capability

10. Continued

- Total portfolio perspective
- Returns commensurate with risk

- ii) Tolerance limits
 - Quantitative financial benchmarks that set out amounts of risk an organization is prepared to take on in specified key risk categories.
 - Key mechanism for cascading principles into more explicit management guidance.
 - Considerations in designing tolerance limits include:
 - What risk metrics to use to define risk tolerance limits?
 - Should tolerance limits be structured as maximums or targets?
 - At what organizational level will risk tolerance limits be defined?
 - Will risk tolerance limits be based on gross or net risk exposures?

- iii) Criteria & attributes
 - Supporting guidance in the form of additional quantitative and/or qualitative measurements that provide further context and definition to risk appetite principles.
 - Quantitative measures – examples include key financial ratios (e.g. debt service coverage, financial strength ratings, liquidity ratios, risk adjusted return metrics) or various key notional limits that have been calibrated.
 - Qualitative – an example includes assessing level of alignment with corporate values.

- iv) Key applications
 - Set out terms of reference for how document/guidance should be linked to organization's overall risk management framework and decision making process.
 - Risk appetite statement should be fully integrated into performance management and compensation processes.

- v) Governance & control
 - Set out applicable approval protocols for statement's embedded limits and operating requirements.
 - Risk appetite statement subject to explicit change management controls and minimum review/refresh requirements.
 - Set out specific accountabilities for ongoing monitoring and reporting of compliance and escalation procedures for operational breaches in relation to limits and requirements.

10. Continued

- (b) When evaluating risks, ASOP 46 calls for the actuary to consider information about an organization's own risk management system as appropriate for the assignment. Assess four considerations within Darwin's risk management framework that align with ASOP 46 for new products.

Commentary on Question:

This question required candidates to apply section 3.1.b of ASOP 46 to the case study. In general, candidates did a poor job on this question. Many listed examples from the case study without any further explanation and did not clearly show how they linked back to ASOP 46.

ASOP 46 requires that in performing risk evaluation, the actuary considers information about the organization's own risk management system as appropriate. Information may include:

- i) Risk tolerance of organization
- ii) Risk appetite of organization
- iii) Components of organization's ERM control cycle
- iv) Knowledge and experience of management and board of directors regarding risk assessment and risk management
- v) Actual execution of organization's ERM control cycle

Assessment

Darwin risk management framework aligns with ASOP 46 because

- i) Risk tolerance – risk appetite statement provides clear tolerance limits (e.g. probability of 15% statutory equity loss in one year < 5%).
- ii) Risk appetite – ERM committee charter requires the committee to align risk preferences and appetite with strategy. This was demonstrated in the development of the ULSG MVA product where the CEO asked the CRO to assess if the additional risk-taking is aligned with their risk appetite.
- iii) Components/Execution of ERM control cycle – Stochastic and deterministic scenario-based stress tests are performed annually.
- iv) Knowledge and experience of management and board of directors – Senior management is involved in the risk evaluation process at Darwin. It formalized its risk management function with the creation of an ERM Committee in 2007 followed by a new CRO position in 2008.

Note that this is a sample solution. There are other examples in the case study which could have been used in the answer.

- (c) Assess the results at CTE 95, CTE 97.5 and CTE 99.

10. Continued

Commentary on Question:

This question tested candidates on the application of earnings CTE, which is often used in stress and scenario testing. In general, we were looking for candidates to provide commentary/conclusions on the new product given the base and shocked impacts.

Some areas of weaknesses observed in some of the responses were:

- *Merely summarizing results without providing any insight or conclusions on what the results mean (e.g. New product lowers earnings in shocked and baseline scenario at CTE99).*
- *Only commenting on the base impacts and not providing any insights on the shocked impacts.*

	CTE95	CTE97.5	CTE99
Enterprise Baseline [A]	68,000	15,000	(1,000)
Enterprise Baseline with New Product [B]	70,108	14,850	(1,350)
Shocked Model with New Product [C]	69,793	14,664	(1,890)
Impact of New Product to Baseline Earnings [B]-[A]	2,108	(150)	(350)
Impact of Shock to Baseline with New Product [C] - [B]	(315)	(186)	(540)

Impact of New Product:

- New product increases earnings except for at CTE97.5 and CTE99 → That means the new product is adding tail risk to the company

Impact of Shock with New Product

- The sensitivity has a larger impact in CTE99 compared to CTE97.5 → That implies the new product has higher sensitivity in the tail.

Compliance with Risk Appetite Statement

- The GAAP earnings are positive in all model runs at CTE95 → Based on this, we can conclude that the new product is compliant with the requirement that the probability of negative GAAP earnings in one year is less than 5% in Darwin's risk appetite statement.

- (d) List two relevant ASOP 46 requirements for stress and scenario testing.

10. Continued

Commentary on Question:

This question tested candidates' understanding and application of Section 3.4 of ASOP 46, which deals with stress and scenario testing. To get full marks, candidates should identify two considerations from section 3.4 of ASOP 46 and make clear why it is relevant.

In general, candidates lost marks for:

- *Failing to correctly identify a consideration from Section 3.4 of ASOP 46.*
 - *Not explaining why the selected ASOP 46 considerations were relevant to the example in the question.*
1. ASOP 46 requirement: 3.4.1.e – The actuary should consider whether the assumed interdependencies are appropriate under the stress/scenario testing assumptions.
 - John Smith shocked the interest rate assumption, but kept all other assumptions constant. He should have considered that other assumptions (e.g. lapse rates, expense inflation rate) could have changed as a result of the interest rate shock.
 2. ASOP 46 requirement: 3.4.3.e – The actuary should consider the time element in stress testing. Some secondary effects under a scenario might occur in a later time period than the stress itself.
 - John Smith only provided the impact of the shock for fiscal year 2013. He should have also looked at results beyond 2013 because the interest rate shock could have also had secondary impacts after the initial shock.

Note that this is a sample solution. Other ASOP requirements could also be applied to this example.

11. Learning Objectives:

4. The candidate will understand organizational behavioral concepts and apply strategic management frameworks to corporate financial and ERM business problems.
5. The candidate will understand the decision making process and the lessons learned from the risk taking activities and experiences of other organizations. In particular, the candidate will be able to apply the learning objectives of all the prior sections of the syllabus to the risk management principles embodied within the case studies explored in this section.

Learning Outcomes:

- (4a) Apply organization behavior concepts.
 - Describe the communication process and explain the strategic importance of communication to organizations.
 - Describe the fundamentals of decision making and explain decision-making styles and influences.
 - Describe common types and causes of organizational conflict and apply the elements of a basic negotiation process.
 - Assess how the behavior of individuals and groups in organizations drives organizational decisions and performance.
- (4b) Evaluate and apply the concepts of strategic management, recognizing the factors that affect the development and implementation of strategies.
 - Demonstrate the importance of analyzing the firm's external environment and the internal organization.
 - Define types of business-level strategies and recommend an appropriate business-level strategy for a given situation.
 - Explain the impact of competitive dynamics on strategic management
- (5b) Evaluate the robustness and flexibility of the risk management framework and recommend approaches for continual improvement in the framework and processes.
- (5c) Assess the risk of the status quo alongside any other risky and or risk management decision.

Sources:

Strategic Management – Chapter 1

Strategic Management – Chapter 2

HBR – Disney's The Lion King

11. Continued

Commentary on Question:

This question tested the candidates' ability to apply strategic management concepts to the case study scenarios and a hypothetical acquisition for RPPC. Most candidates were able to correctly answer the basic questions, but many had difficulty justifying and tying their answers to the strategic management concepts.

Solution:

- (a) Identify X, Y and Z in table below. Justify your answer.

Commentary on Question:

This question tested the candidates' ability to identify the competitive advantages of the RPPC subsidiaries as opposed to core competencies. Most candidates were able to identify the specific competitive advantages, but gave weak responses to justify their answers. Full credit was given to those candidates who were able to use the competitive advantage attributes of valuable, rare, costly to imitate, or non-substitutable in their justification.

Frenz Corporation's competitive advantage is global premier coffee brand/reputation as a result of strong marketing operations. Frenz is one of the most respected and recognized brands in the world. Frenz has made investments in marketing capabilities over many years which have allowed it to achieve significant economies of a scale that is costly to imitate. Its reputation as a premier coffee brand is accentuated (made more valuable) by distributing in high-end establishments and retail outlets.

Blue Ocean P&C Company's competitive advantage is its ability to innovate and explore new insurance areas profitably. It has been successful in the marine insurance market and is now expanding into pet and travel insurance in new regions. It is also considering an offering within the emerging renewable energy sector. Being an innovator or first in market would be valuable and rare competitive advantages.

Darwin Life Insurance Company's competitive advantage is its strong relationships with agency and institutional distribution channels. Significant investments in these channels over the years by Darwin would be costly to imitate by competitors. Darwin has also become an innovator in customer service by investing in technology and staff to service both customers and distribution channels. This competitive advantage is also costly to imitate.

- (b) Explain how Disney used the competitive advantages of strategic partners to synergize the success of *Lion King*.

11. Continued

Commentary on Question:

This question tested the candidates' comprehension of the Lion King business review article and how Disney used its strategic partners to help market the movie. Many responses did not describe how Disney utilized their strategic partners' global reach to create consumer demand and multiply profits.

Disney used the competitive advantages of its strategic partners to multiply profits from their creative content. They worked directly with distribution partners, eliminating the middle-man, to get toys and other products on the shelves, which was less costly and allowed Disney more control. They utilized partners such as McDonalds, Burger King, and Coca-Cola, for example, that have global reach and their own large marketing budgets to market Lion King characters to create consumer demand for the movie. This synergy is also difficult to replicate with such a wide array of companies.

- (c) Identify one subsidiary within the RPPC group that can emulate a synergy strategy similar to Disney's experience on the release of *Lion King*. Justify your answer by using the competitive advantages identified in part (b) to illustrate how RPPC can synergize the release of *Finding Molly* sequel.

Commentary on Question:

This question tested the candidates' ability to apply lessons learned in the Lion King business review article to the case study. Most responses indicated the Frenz Corporation as the subsidiary able to emulate the synergy strategy similar to Disney's experience with the Lion King; however, justification should have included Frenz's ability to act as a strategic partner with global reach.

Frenz Corporation is the RPPC subsidiary best suited to act as a strategic partner with Pixel Animation Studio's release of a *Finding Molly* sequel. Frenz has a global reach, much like McDonalds or Burger King had in the *Lion King* example, and can utilize its well-known marketing capabilities to multiply the profits from the movie. For example, Frenz could put characters from the movie on drink cups, create specialty drinks associated with the movie, or sell CDs of the movie soundtrack in their world-wide stores. These could create consumer awareness/demand for the movie and multiply profits.

12. Learning Objectives:

4. The candidate will understand organizational behavioral concepts and apply strategic management frameworks to corporate financial and ERM business problems.

Learning Outcomes:

- (4a) Apply organization behavior concepts.
- Describe the communication process and explain the strategic importance of communication to organizations.
 - Describe the fundamentals of decision making and explain decision-making styles and influences.
 - Describe common types and causes of organizational conflict and apply the elements of a basic negotiation process.
 - Assess how the behavior of individuals and groups in organizations drives organizational decisions and performance.
- (4c) Use organizational behavior and strategic management concepts to evaluate and recommend corporate financial and ERM decisions.

Sources:

Organizational Behavior – Chapter 1

Commentary on Question:

This question tested the candidates' ability to apply organization behavior concepts to a scene from the case study. Most candidates were able to correctly answer the basic questions, but some had difficulty justifying and tying their answers to the organizational behavior concepts.

Solution:

- (a) For both Dunn and Bemowski:
- (i) Characterize the decision style exhibited by each person based on the way information is presented to the other person. Justify your answer.
 - (ii) Identify one cognitive bias for each person that is exhibited during the discussion. Justify your answer by providing an example from the discussion.

Commentary on Question:

This question tested the candidates' ability to identify behaviors of two individuals in a case study scene. Although the case study does not explicitly indicate which decision making paradigms and cognitive biases the participants exhibited, the material is sufficient to make those determinations. Answers utilizing the nudge readings were also accepted. Most candidates were able to correctly identify the specific decision styles and cognitive biases, but many candidates did not justify their responses with examples from the scene.

12. Continued

Dunn exhibits a sensing or thinking decision making style. This is exhibited in Dunn's focus on the rules of the current allocation system, the fact that she wants to carefully gather more data to study, and that they need to follow appropriate steps. "There are rules for how the stores must be set up."

"We are most certainly not going to change anything without studying it first."

"We need to weigh the pros and cons."

One of Kitty Dunn's cognitive biases is the "status quo" bias.

"We are most certainly not going to change anything without studying it first."

Another of her biases is the "sunk-cost" bias.

"Our policy for allocating corporate overhead is pretty straight forward and hasn't changed in several years."

Bemowski exhibits an intuition or feeling decision making style. This is shown by his impatience with studies. He has a particular vision of how he wants his division to be evaluated, and he isn't into the details and goes by instinct instead.

"You financial-types always want more data."

"I can feel it in my bones; you need to get on board or get out of the way."

"I think we need to change, and we need to change it now before..."

One of Jeff Bemowski's cognitive biases is optimism and overconfidence.

"I can feel it in my bones; you need to get on board or get out of the way."

"Call me when this company is serious about making real money."

Another of his biases is representativeness/similarity (stereotyping).

"You financial-types always want more data."

These are just some of the possible answers. Other decision making styles or cognitive biases with good justification also received full credit.

- (b) Rank each consideration for its importance on the group decision to change the overhead allocation for the Frenz non-coffee business. Justify your answer.

Commentary on Question:

The candidates needed to understand that this should ultimately be a group decision in order to get buy-in (satisfaction and commitment) from all parties involved. Most candidates were able to appropriately rank the considerations for a group decision, but they had difficulty adequately justifying their answers using case study material.

The suggested ranking is Satisfaction and Commitment, Nature of the Problem, Cost, and Time (IV, III, II & I). Full credit for the ranking portion of the question was given to answers flipping the top two and bottom two considerations.

12. Continued

Satisfaction and Commitment

Bemowski believes that some of his top sales managers are being hurt by the current allocation approach. Dunn and her team have spent a great deal of time and effort building the current allocation process. In order to gain satisfaction and commitment from both sides to this volatile issue, a group approach should be used to determine any new allocation procedures. Cost allocations also impact performance measurement of managers; the end result needs to be well thought through and satisfying to the majority of the group for proper commitment.

Nature of the Problem

Dunn and Bemowski disagree on whether or not there is in fact a problem. Their cognitive biases get in the way of a productive discussion. This is another reason for using the group decision making approach. Overhead allocation procedures are complex in nature, and there isn't one correct answer to the problem. It is important to use input from all stakeholders – business owners, product managers, accountants, and executive staff – to address the issue. This is best done under a group decision making approach.

Cost

The issue of cost affects multiple parties and could be significant if time to resolution is lengthy. However, if the parties are not satisfied or committed at the end of the process, the cost would be immaterial since they would wind up going through this process again in the near future. Dunn points out that there are rules and processes in place to make changes and would like to take more time. Bemowski thinks the solution is “obvious” and wants it done now, regardless of cost.

Time

There is already an allocation process in place for overhead, so time is the least critical consideration. Dunn would like to maintain the current review process and time table while Bemowski believes the time to act is now. Group approach tends to lengthen the time to a decision, so Dunn should monitor this aspect.

- (c) Recommend a possible course of action with respect to your key considerations.

Commentary on Question:

This question tested the candidates' ability to take the information in part b and utilize the group decision approach to develop a reasonable course of action for Dunn to take. Most candidates gave responses that expanded upon the group decision approach and had specific examples of actions to be taken.

12. Continued

A group decision making approach is warranted in this situation to deal with the complexities of overhead allocation. Dunn should convene a meeting with a group of stakeholders in the allocation process. She could use various techniques such as playing devil's advocate to ensure that all voices are heard. She should also make sure that Bemowski is able to air his thoughts on the subject. These methods should result in strong satisfaction and commitment by all parties. The nature of the problem is complex in that there is no one correct answer; although the allocation process doesn't change the overall profitability of Frenz, it does impact the way each store's profitability and success is viewed by RPPC. The cost and time commitment for this process are not as critical since Frenz already has an allocation process in place, and this could possibly be a revision to it.