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**SOCIETY OF ACTUARIES**  
**Strategic Decision Making Exam**

# Exam CFESDM

## MORNING SESSION

**Date:** Thursday, April 27, 2017

**Time:** 8:30 a.m. – 11:45 a.m.

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### INSTRUCTIONS TO CANDIDATES

#### General Instructions

1. This examination has a total of 100 points. It consists of a morning session (worth 60 points) and an afternoon session (worth 40 points).
  - a) The morning session consists of 5 questions numbered 1 through 5.
  - b) The afternoon session consists of 4 questions numbered 6 through 9.

The points for each question are indicated at the beginning of the question. Questions 2 – 4, 6, 8, and 9 pertain to the Case Study, which is enclosed inside the front cover of this exam booklet.

2. Failure to stop writing after time is called will result in the disqualification of your answers or further disciplinary action.
3. While every attempt is made to avoid defective questions, sometimes they do occur. If you believe a question is defective, the supervisor or proctor cannot give you any guidance beyond the instructions on the exam booklet.

#### Written-Answer Instructions

1. Write your candidate number at the top of each sheet. Your name must not appear.
2. Write on only one side of a sheet. Start each question on a fresh sheet. On each sheet, write the number of the question that you are answering. Do not answer more than one question on a single sheet.
3. The answer should be confined to the question as set.
4. When you are asked to calculate, show all your work including any applicable formulas.
5. When you finish, insert all your written-answer sheets into the Essay Answer Envelope. Be sure to hand in all your answer sheets because they cannot be accepted later. Seal the envelope and write your candidate number in the space provided on the outside of the envelope. Check the appropriate box to indicate morning or afternoon session for Exam CFESDM.
6. Be sure your written-answer envelope is signed because if it is not, your examination will not be graded.

Tournez le cahier d'examen pour la version française.



## **CASE STUDY INSTRUCTIONS**

**The case study will be used as a basis for some examination questions. Be sure to answer the question asked by referring to the case study. For example, when asked for advantages of a particular plan design to a company referenced in the case study, your response should be limited to that company. Other advantages should not be listed, as they are extraneous to the question and will result in no additional credit. Further, if they conflict with the applicable advantages, no credit will be given.**



**\*\*BEGINNING OF EXAMINATION\*\***  
**Morning Session**

- 1.** (9 points) Cheery Ice Cream is a retail vendor of ice cream across the US.

As temperatures increase, Cheery sells more product.

Cheery expects its profits to be \$10 million over the next four weeks if national temperatures average 80 degrees. Profits rise or fall by \$1 million for every increase or decrease of 1 degree in average temperature (e.g. if average temperature is 85 degrees, expected profits are \$15 million, if the average is 75 degrees expected profits are \$5 million).

Cheery is considering a four week weather derivative contract with an investment bank to lock in profits at the \$10 million level via a forward contract based on average temperatures over the four-week period. The strike price equals the national average temperature of 80 degrees; the profit/loss of the contract mirrors the profit profile of the business.

- (a) (1 point) Describe the risks for Cheery and the investment bank under this contract.

Over the first week of the contract, temperatures are forecasted to be unseasonably high – 90 degrees, and are expected to return to the average for the subsequent three weeks.

- (b) (1 point) Quantify the impact on the risk exposures for each party due to this new forecast.
- (c) (1 point) Recommend two alternatives for Cheery to manage its weather risk. Justify your recommendations.
- (d) (1 point) Propose how both parties could reduce their credit risk exposure created by this contract. Justify your answer.
- (e) (2 points) Evaluate whether this contract creates wrong way risk or right way risk from both parties' perspectives. Justify your answer.
- (f) (1 point) Propose an additional derivative contract that the investment bank could enter into that would reduce its risk exposure to weather risk. Justify your answer.
- (g) (2 points) Critique the risk profile of the investment bank if it enters into both the contract with Cheery and the proposed contract in part (f).

**Question 2 pertains to the Case Study.**  
**Each question should be answered independently.**

**2.** (13 points)

- (a) (1 point) Identify two benefits and two drawbacks of vertical integration.

Information on Blue Jay Air (BJA) can be found in Section 2 of the Case Study.

BJA's current aging fleet is not suitable to carry out its goals for expansion into international business travel. The company is considering vertically integrating by acquiring an aircraft manufacturer with the dual purpose of upgrading its aging fleet and expanding into a further stage of the airline industry chain.

The following four factors are generally considered for vertical integration:

- I. Assure Supply
- II. Capture More Value
- III. Infrequent Large Transactions
- IV. Number of Buyers and Sellers

- (b) (2 points) Evaluate whether the current airline industry conditions outlined in the Case Study would support BJA's vertical integration, based on the above four factors (I to IV). Justify your answers.
- (c) (2 points) Evaluate how BJA's vertical integration would align with four of BJA's key long term objectives. Justify your answers.

Consider BJA's financial position.

- (d) (2 points) Describe two significant concerns that BJA would face post vertical integration. Justify your answer.

## 2. Continued

Assume BJA has decided to proceed with quasi-integration.

- (e) (1 point) Recommend the type of quasi-integration strategy that Blue Jay Air should proceed with based on your assessments in parts (b), (c) and (d). Justify your recommendation.
- (f) (4 points) Assess how the integration impacts BJA's market position with respect to:
  - (i) Business level strategy
  - (ii) Corporate level strategy
  - (iii) Competitive position according to the Industrial Organization Model
  - (iv) Any one of BJA's core competencies
- (g) (1 point) Evaluate if the integration increases Blue Jay Air's potential to earn above-average returns. Justify your answer.

**Question 3 pertains to the Case Study.**  
**Each question should be answered independently.**

**3.** (13 points) Information on Blue Ocean can be found in Section 5 of the Case Study.

Blue Ocean intends to have the following three product offerings as part of the Renewable Energy Insurance Business:

- Guarantee Energy Production (number of units generated)
- Guarantee Energy Price (sale price per unit)
- Both

(a) (2 points) Describe how the insurance risk of the Renewable Energy Insurance Business differs from Blue Ocean's existing insurance risks.

(b) (2 points) Identify the risk management capabilities that Blue Ocean needs in order to manage the Renewable Energy Insurance Business. Justify your answer.

(c) (2 points) Recommend an RPPC subsidiary for Blue Ocean to partner with to build the required capabilities needed to manage the risk of the Renewable Energy Insurance Business. Justify your answer.

Blue Ocean is performing stress tests on the three product offerings of the Renewable Energy Insurance Business to ensure income and capital adequacy. Two stress scenarios are modeled:

- I. A scenario with high energy rates for the first five years followed by low energy rates over the next two years.
  - II. A scenario with low energy rates for the first five years followed by high energy rates over the next two years.
- (d) (4 points) Describe the impact to income and capital under each stress scenario for each product offering. Justify your answer.



### **3. Continued**

Berkshire Hathaway is also considering launching its own Renewable Energy Insurance product.

- (e) *(1 point)* Describe two characteristics of property and casualty insurance that are priorities for Berkshire Hathaway.
- (f) *(2 points)* Evaluate whether Renewable Energy Insurance aligns with Berkshire Hathaway's priorities. Justify your answer.

***Question 4 pertains to the Case Study.  
Each question should be answered independently.***

- 4.** (15 points) Information on Big Ben Bank and Darwin Life Insurance can be found in Sections 6 and 7 of the Case Study, respectively.
- (a) (6 points) Describe how Darwin is exposed to each of the following three risks:
- (i) Market
  - (ii) Liquidity
  - (iii) Operational

Exhibit 2 of Section 6 of the Case Study describes Big Ben Bank's Internal Capital Adequacy Assessment Process. In particular, the Assessment of Risk is based on the following three criteria:

- I. Materiality of risk
  - II. Relevance to economic capital
  - III. Whether to include in the economic capital model
- (b) (7 points) Assess each of the three risks for Darwin identified in part (a) according to criteria I, II and III based on Big Ben's Assessment of Risk process. Justify your answer.
- (c) (2 points) Explain how Darwin should embed its economic capital results into its risk management framework. Justify your answer.

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5. (10 points) XYZ, a US bank, measures its liquidity risk using the liquidity index and financing gap methods. You are given the following:

XYZ Bank Liquidity Profile	2010	2015
Liquidity Index	82%	90%
Financing Gap	2,000	669

- (a) (1.5 points)
- (i) Describe the liquidity index and financing gap methods.
  - (ii) Explain the change in liquidity profile from 2010 to 2015 based on the table above by stating if the liquidity profile of XYZ either (I) did not change, (II) improved or (III) deteriorated. Justify your answer.

XYZ's liquefiable assets and liabilities for year end 2015 are as follows:

	Assets
Cash	1,589
Loans	23,394
Assets held for trading	6,793
<b>Total Assets</b>	<b>31,776</b>

	Liabilities & Equity
Long term deposits	22,725
Trading liabilities	6,793
Equity	2,258
<b>Total Liabilities &amp; Equity</b>	<b>31,776</b>

- (b) (2 points) Assess XYZ's liquidity risk as of year-end 2015 based on a balance sheet liquidity analysis. Show your work.
- (c) (2 points) Identify three common shortcomings of using the liquidity analyses in parts (a) and (b) to assess the liquidity profile of a financial institution. Justify your answer.

## 5. Continued

ABC is a hotel located in France. XYZ guarantees ABC's loyalty program redemptions.

XYZ Bank has provided the following information regarding its finances:

- The only expected non-discretionary cash-flows (CFs) over the next 6-month period are coupon payments from floating rate assets.
- XYZ's liquidity reserve is backed by cash and as such is assumed to earn no income.

The CFs below relate only to XYZ's ABC portfolio and are shown in Euros.

000's	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
Customer Driven CFs	-1000	-200	-600	-100	-900	-1250
Non-Discretionary CFs	+1200	+300	+700	+150	+1000	+1300

- (d) (1 point) Determine the cash flow cushion for each month of the 6-month period. Show your work.

In two weeks, France will vote to either remain in or leave the European Union. If France votes to remain, there will be no impact to commerce. If France votes to leave (FREXIT), the following is expected to happen immediately:

- Redemptions of ABC's loyalty program are expected to increase by 30% for two months following the vote.
- Coupon payments that XYZ receives on floating assets are expected to increase by 2.9% for the foreseeable future.

- (e) (3.5 points)
- Determine the amount of standby liquidity reserves needed under the FREXIT scenario if XYZ's liquidity risk framework requires the bank to be able to sustain a liquidity crisis for at least 6 months. Show your work.
  - Propose two strategies XYZ can use to mitigate the additional exposure arising from potential FREXIT in the near term. Justify your proposal.
  - Identify one additional risk that arises from each of the above two proposed mitigation strategies in part (ii). Justify your answer.

**\*\*END OF EXAMINATION\*\***  
**Morning Session**

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