SOCIETY OF ACTUARIES
Exam AFE
Advanced Finance/ERM

Exam AFE

MORNING SESSION

Date: Friday, November 4, 2011
Time: 8:30 a.m. – 11:45 a.m.

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This examination has a total of 120 points. It consists of a morning session (worth 60 points) and an afternoon session (worth 60 points).

   a) The morning session consists of 5 questions numbered 1 through 5.

   b) The afternoon session consists of 5 questions numbered 6 through 10.

   The points for each question are indicated at the beginning of the question. Questions 1 - 4 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 since 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 AFE.

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.

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Exam AFE-Front Cover

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

Questions 1 – 4 pertain to the Case Study.
Each question should be answered independently.

1. (*9 points*) You are assisting Bill Buck in preparing a memo to address Zoolander's liquidity risk.

(a) (*1 point*) Define liquidity risk.

(b) (*3 points*) Evaluate the liquidity risk for each of Zoolander's four lines of business.

(c) (*2 points*) Bill is modeling various liquidity scenarios in response to Kelly's concerns about both reputational and market-wide liquidity crunch events. Consider the following scenarios:

I. Zoolander makes front-page news for alleged deceptive sales practices.

II. Bond trading in the open market has ceased except for government securities.

For each scenario:

(i) Classify the scenario as a reputational or a market-wide liquidity crunch event. Justify your response.

(ii) Describe the consequences of the scenario that could threaten Zoolander's ability to operate as a going concern.

(d) (*3 points*) Consider the following actions that Zoolander can take to improve its liquidity risk profile:

A. Revise product design to increase surrender charges.
B. Reallocate the fixed income portfolio to hold more Treasury securities.
C. Establish a $2 million line of credit with a bank at a cost of $20,000 per annum.

Evaluate the appropriateness of each action as a means of Zoolander improving its liquidity risk profile.

Questions 1 – 4 pertain to the Case Study.
Each question should be answered independently.

2. (*11 points*) Bill Buck is attempting to quantify the strategic and operational risks faced by Zoolander.

(a) (*1 point*) Define and describe both strategic risk and operational risk.

(b) (*2 points*) Explain the benefits of a value-based ERM approach in measuring both strategic and operational risks.

(c) (*4 points*) Based on Cobalt's assessment of the strategic risks faced by Zoolander and Zoolander's proposed risk appetite statement:

(i) Identify four of the major strategic risks facing Zoolander. Support your answer.

(ii) For each of the strategic risks identified in part (i), recommend an approach to manage it, and explain why your recommendation is appropriate for Zoolander.

Bill Buck is conducting a Failure Modes and Effects Analysis (FMEA) to quantify the major operational risks at Zoolander. One operational risk he identifies is the risk of errors in the disability claims process.

(d) (*1 point*) Identify the major components of the FMEA technique.

(e) (*3 points*) Apply the FMEA technique to the operational risk in the disability claims process. Use estimated values as needed.

Questions 1 – 4 pertain to the Case Study.
Each question should be answered independently.

3. (*14 points*) The Board of Directors has asked you to review the incentive compensation program at Zoolander.

(a) (*6 points*)

(i) Describe concerns regarding Zoolander's incentive compensation program as an effective tool to align management and shareholder objectives.

(ii) Recommend improvements to Zoolander's incentive compensation program to mitigate the concerns identified in part (i). Justify your recommendations.

(b) (*6 points*) Zoolander is contemplating an incentive compensation program that is based on the change in baseline company value between current and prior periods, where baseline company value is defined as present value of distributable earnings.

(i) Assess how the new incentive program may alter the behavior of senior management.

(ii) Evaluate the new incentive program from the perspective of Kelly Ratings & Analysis.

(c) (*2 points*) Describe two advantages and two disadvantages of using an Economic Capital model in support of Zoolander's incentive compensation program.

Questions 1 – 4 pertain to the Case Study.
Each question should be answered independently.

4. (*10 points*) Zoolander is rolling out the new VA Plus product line. However, Tomas Lyon is concerned that the additional equity risk exposure may cause the required statutory capital to exceed Zoolander's risk limit in the near future.

(a) (*3 points*) John Badger suggests that his dynamic hedging program will be an effective tool in managing the VA equity risk exposure.

(i) Describe three challenges VA writers face in dynamically hedging their VA guarantee risks.

(ii) For each challenge in part (i), explain the specific concerns Zoolander faces in dynamically hedging its VA Plus product.

(b) (*3 points*) Danielle Wolfe suggests altering the product design to reduce VA equity risk exposure.

(i) Recommend product features that would reduce equity risk exposure on a typical VA guarantee. Justify your recommendations.

(ii) Evaluate the feasibility of Zoolander implementing each feature recommended in part (i).

(c) (*4 points*) Wanda Fox suggests using reinsurance to transfer some of Zoolander's GMDB risk. The following two reinsurance premium structures are available:

I. Premium equals (constant factor) × (account value)
II. Premium equals (YRT mortality rate) × (net amount at risk)

(i) Define the amount reimbursed by the reinsurer in a typical GMDB reinsurance treaty.

(ii) For each of the following scenarios:

Scenario 1: Up equity market
Scenario 2: Down equity market

Describe the premium and benefit cash flows for the two reinsurance structures, I and II.

(iii) Recommend one of the two reinsurance premium structures. Justify your response.

5. (*16 points*) Snake River Casualty (SRC), a property-casualty insurer, is using an ERM model to evaluate how various management actions will impact the value of the firm. The ERM model is a longitudinal valuation model where the value of a firm is the default-risk-adjusted present value of its expected earnings. You are given the following assumptions for the ERM model:

Annual Premiums	$100 million
Loss Ratio	70%
Expense Ratio	20%
Yield on Assets	5%
Tax Rate	20% (unlimited loss carry forwards/carrybacks allowed)
Current Capital	$5 million
Minimum Required Capital	$2 million

- The firm manages capital such that it is constant over time.
- All premium and expense cash flows occur at the beginning of the year.
- All claim cash flows occur at the end of the year.
- Bankruptcy costs and residual value to shareholders in the event of bankruptcy are zero.
- The firm earns investment income on written premium, less expenses, plus capital.
- Probability of default of the firm = $0.7/(21C - 14)$, where C is capital in $ millions.

(a) (*3 points*) Calculate the value added of SRC. Show your work.

SRC is considering the optimal level of capital that maximizes the value added of SRC.

(b) (*2 points*) Risk-priority and return-priority decision making is a two-step process:

I. Recalculate risk and return metrics.
II. Evaluate risk-return tradeoff.

List the steps to accomplish each of I and II.

(c) (*6 points*) Calculate the optimal level of capital. Show your work.

(d) *(5 points*) SRC is considering a new claims management system that would:

- Decrease the probability of default to $0.1/(21C - 2)$.
- Increase the expense ratio to 21%.

Evaluate whether SRC should implement the new claims management system. Show your work.

****END OF EXAMINATION****
MORNING SESSION

USE THIS PAGE FOR YOUR SCRATCH WORK

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