SOCIETY OF ACTUARIES
Strategic Decision Making Exam

Exam CFESDM

MORNING SESSION

Date: Thursday, November 2, 2017
Time: 8:30 a.m. – 11:45 a.m.

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 6 questions numbered 1 through 6.

   b) The afternoon session consists of 4 questions numbered 7 through 10.

   The points for each question are indicated at the beginning of the question. Questions 1, 3 - 6 and 8 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.

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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

Question 1 pertains to the Case Study.
Each question should be answered independently.

1. (*7 points*)

(a) (*1 point*) State the elements of catastrophic risk management important to A.M. Best.

Information on Blue Ocean and RPPC can be found in Section 5 and Section 1 of the Case Study, respectively.

Blue Ocean is planning to expand into:

I. North American Pet Insurance
II. North American Travel Insurance
III. Solar Personal Energy Insurance

(b) (*1 point*) Describe one scenario that could lead to catastrophic losses for each product, I to III. Justify your answer.

Blue Ocean implements a Monte Carlo model to simulate worst-case scenarios.

(c) (*2 points*) Identify six key risk management procedures to ensure Blue Ocean avoids common fundamental Monte Carlo modelling errors resulting from the lack of empiricism.

The Monte Carlo model produced the following simulation results:

Product set	Capital required to sustain a 1-in-100 year tail event following a 1-in-100 year tail event
Existing business with expansion of Pet and Travel insurance	$3.3 billion
Existing business with expansion of Pet and Travel insurance, and offering of Solar Personal Energy insurance	$3.6 billion

In addition to its existing capital base of $3.0 billion, Blue Ocean has the ability to raise $0.5 billion of new capital.

(d) (*3 points*) Assess the simulation results provided above within the context of RPPC's Risk Appetite. Justify your answer.

2. (*10 points*) XYZ, a retail coffee chain, has raised a substantial amount of cash by selling coffee gift cards. Customers may use gift cards to purchase coffee at a later date. XYZ uses the cash raised and its existing credit facility to execute its expansion strategy. This credit facility is secured using all of XYZ's existing properties as collateral. XYZ relies solely on Bank ABC for its borrowings.

XYZ Chief Executive Officer believes that XYZ's liquidity position has improved as a result of the coffee gift card sales. He states, "The more gift cards we sell, the more positive cash flow we generate. Therefore, we won't run into liquidity problems as long as we keep selling gift cards."

(a) (*1 point*) Critique XYZ Chief Executive Officer's statement. Justify your answer.

(b) (*2 points*) Describe two scenarios that may trigger a liquidity crisis for XYZ.

(c) (*2 points*) Describe a mitigating strategy for each scenario in part (b).

(d) (*2 points*) Recommend a metric for XYZ to measure its liquidity risk for each scenario in part (b). Justify your recommendation.

(e) (*3 points*) Explain how to incorporate the metrics in part (d) into XYZ's liquidity risk management framework. Justify your answer.

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

3. (*12 points*) Information on Blue Jay Air (BJA) and Blue Jay Tire (BJT) can be found in Sections 2 and 3 of the Case Study, respectively.

BJT purchased the production facility located in Mobile, Alabama one year ago, and the facility's refitting is nearly complete.

Ginger Harmon, a manager from the Canadian head office, has been asked to join the Production Expansion Committee in order to provide Canadian head office perspective.

(a) (*1 point*) Describe the impact to the team development life cycle introduced by Ginger Harmon joining the Production Expansion Committee.

(b) (*2 points*) Explain why the relationship between BJA and BJT might increase the risk of team failure.

At one of the meetings, Jack Tavares introduces an analysis of the costs of refitting the Mobile, Alabama production facility. You are given the following:

	Mobile, Alabama – Original Expectations (from 1st quarter of 2016) ($000,000's)						
	2016 (Expected)	2017 (Expected)	2018 (Expected)	2019 (Expected)	2020 (Expected)	2021 (Expected)	2022 (Expected)
Start-Up Costs	(3.85)	(4.62)	(0.92)	-	-	-	-
Production Expenses	-	-	(12.00)	(12.60)	(13.20)	(13.80)	(14.40)
Production Revenue	-	-	14.00	14.70	15.40	16.20	17.00
	IRR @ 01/01/16 5.58%						

3. Continued

	Mobile, Alabama – Revised Expectations (from 4th quarter of 2017) ($000,000's)						
	2016 (Actual)	2017 (Actual)	2018 (Expected)	2019 (Expected)	2020 (Expected)	2021 (Expected)	2022 (Expected)
Start-Up Costs	(3.89)	(5.37)	(0.80)	-	-	-	-
Production Expenses	-	-	(12.00)	(12.60)	(13.20)	(13.80)	(14.40)
Production Revenue	-	-	14.00	14.70	15.40	16.20	17.00
	IRR @ 01/01/16 3.47%						

	Buffalo, New York – Revised Expectations (from 4th quarter of 2017) ($000,000's)						
	2018 (Expected)	2019 (Expected)	2020 (Expected)	2021 (Expected)	2022 (Expected)	2023 (Expected)	2024 (Expected)
Start-Up Costs	(1.40)	(1.70)	(0.30)	-	-	-	-
Production Expenses	-	-	(4.20)	(4.35)	(4.50)	(4.66)	(4.82)
Production Revenue	-	-	4.83	5.05	5.27	5.51	5.76
	IRR @ 01/01/18 5.00%						

Jack reminds the team that there were times in BJT's history when projects were kept alive because management did not want all the time and energy already invested in the project to go to waste.

Jack Tavares: "OK everyone, I just need you to see what I see, and then you can all agree with me and we can move forward. First of all, we started Mobile expecting a nice return of 5.58% at the beginning of the project, and last year came back fine. But this year was not fine, and our return is down to 3.47% because of higher startup costs. This is just unacceptable, even if we get our startup costs back at the end of the year. But, the Buffalo facility remains available, and you see that it gets us back to 5.00%, so we need to cut our losses, get out of Mobile, and move forward. Everyone agree? And don't give me any strife Ginger, this is obvious! I still don't know why senior management sent you here. So, you all agree, right?"

Everyone except Ginger: "Yes."

Question 3 is continued on next page.

3. Continued

(c) (*1 point*) Identify the predominant dimension of Jack Tavares' communication style. Justify your answer.

(d) (*2 points*) Identify two cognitive biases exhibited by Jack Tavares regarding his decision to abandon the Mobile facility for the Buffalo facility. Justify your answer.

Following the Production Expansion Committee meeting, Ginger Harmon is writing a memo addressed to Pierre Beaudry, Jack Tavares, and other committee members reporting the situation and recommending to keep the Mobile facility. She wants to consider the following items:

- Communication style
- Team development
- Political tactic
- Degree of oversight from the board
- Leadership strategy
- Financial analysis

(e) (*6 points*) Describe one element for each item above that is relevant for Ginger Harmon to achieve the goal of persuading senior management to keep the Mobile facility.

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

4. (*13 points*)

(a) (*1 point*)

(i) Identify two reasons the regulatory environment, prior to ORSA, hindered the adoption of risk appetite frameworks across the insurance industry.

(ii) Critique the effectiveness of ORSA of addressing the hindrances listed in part (i) above.

(b) (*1 point*) Compare the following terms with respect to their use in risk monitoring:

(i) Risk capacity

(ii) Risk appetite upper trigger

Information on Darwin Life Insurance Company (Darwin) can be found in Section 7 of the Case Study.

Darwin's senior management is concerned that the business forecast indicates that variable annuity (VA) products will soon breach their risk thresholds.

(c) (*3 points*) Describe three ways, using choice architecture, that Darwin could nudge the VA customers to choose products with reduced investment and insurance risk. Justify your answer.

You are given the following five proposed risk tolerance statements:

I. Limit insurance exposure in areas with large numbers of natural disasters by reducing growth in current distribution channels.
II. Ensure new business insurance premiums remain below 25% of total insurance premiums.
III. Ensure opportunity costs are as low as possible by holding the minimum required statutory capital.
IV. Assets must be allocated to ensure at least 30% of assets are private equities.
V. Ensure the probability of loss of entering new markets or distribution channels is less than 20%.

(d) (*8 points*) Evaluate the appropriateness of each of I to V above as a risk tolerance statement and its applicability to Darwin. Justify your answer.

Question 5 pertains to the Case Study.
Each question should be answered independently.

5. (*8 points*) Information on Blue Jay Tire (BJT) can be found in Section 3 of the Case Study.

Great Tires (GT) is a European tire company with similar size to BJT which has recently entered the North American market. Unlike BJT, GT specializes in manufacturing tires for commercial vehicles. GT is based entirely in its home country, and its manufacturing plant has a reputation of high efficiency. GT has a Lost Time Injury Frequency Rate (LTIFR) of 3.0.

Below are the profit measures for GT and BJT for 2014 based on the same reporting basis.

	GT	BJT
Gross Margin	35%	24%
Operating Profit Margin	5%	11%
Return on Equity	2%	4%

(a) (*2 points*)

(i) Describe each profit measure shown in the table above.

(ii) Evaluate which company, GT or BJT, exhibits better financial performance based on the overall assessment of these profit measures. Justify your answer.

(b) (*3 points*) Identify three Risk Factors from the Case Study that BJT is positioned to manage better than GT in the North American market. Justify your answer.

As a response to GT's competitive threat, RPPC is planning to sell BJT.

(c) (*1 point*)

(i) Define Market Consistent Embedded Value (MCEV).

(ii) Identify the three components of MCEV.

(d) (*2 points*) Evaluate whether MCEV is appropriate to determine the value of BJT. Justify your answer.

Question 6 pertains to the Case Study.
Each question should be answered independently.

6. (*10 points*) Information on Darwin Life Insurance Company can be found in Section 7 of the Case Study.

Darwin's top goals for this quarter are to continue to drive growth and to increase profits. The valuation team's goal is to increase its audit score from 3.5 to 5. However, the financial reporting resources have been strained by recent transfers to other areas to support Darwin's growth initiatives.

The following actions were taken by the valuation team during the quarter-end process:

- Due to time and resource constraints, the policy count and account value reconciliations were not completed prior to submitting final reported results. However, reconciliations were deemed to be completed and placed in the binder provided to the auditors. There were some policies missing from the inforce files, but the total missing account value was immaterial. A note was recorded that no adjustment was made due to immateriality, and that further investigation would be done after the quarter close.
- Assumption updates were made to the valuation model that produced more favorable reserve results. These assumption updates were founded on credible experience studies; however, they were completed late in the quarter. Consequently, the version of the model saved in the test folder for independent review did not include all of the changes. No calibration was done to the reserve model with these assumption updates. The team ran the quarter end reserves on the model version on their directory as opposed to the production version saved in the test folder. The plan is to catch up on the model approvals during the following quarter by including all changes made to the model this quarter and next quarter in one version for review.
- Thresholds were documented for the trending results – anything higher/lower than 30% of previous quarter needs an explanation. The largest change in the past 5 years was 15%, so the likelihood of needing to provide explanations anytime soon is quite low. Formulas were also added to the file, instead of just a visual check.
- Two additional controls were added to the binder. These included verifying the quarter-end date on the extract matches the date on the summary report, and receiving sign-off from accounting stating that reserves have been booked to the ledger.

6. **Continued**

As a result of these actions, profits increased this quarter and the company received a superior score of 4.5 on the external audit.

(a) (*2 points*) Describe three significant failures of risk management illustrated by the quarter-end process. Justify your answer.

(b) (*2 points*) Recommend the order in which the three failures identified in part (a) should be addressed. Justify your ranking.

(c) (*2 points*) Critique the audit firm's scoring mechanism and overall approach.

(d) (*2 points*) Compare and contrast Darwin with Volkswagen in the context of failures of risk management.

(e) (*2 points*) Recommend one material improvement to Darwin's risk management and one material improvement to Harmon & Strauss's audit process to address the failures identified in parts (a), (b) and (c). Justify your recommendations.

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

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