SOCIETY OF ACTUARIES
Strategic Decision Making Exam

Exam CFESDM

AFTERNOON SESSION

Date: Friday, May 2, 2014
Time: 1:30 p.m. – 3:45 p.m.

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This afternoon session consists of 5 questions numbered 9 through 13 for a total of 40 points. The points for each question are indicated at the beginning of the question. Questions 9, 11, and 13 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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Exam CFESDM-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****
Afternoon Session
Beginning with Question 9

Question 9 pertains to the Case Study.
Each question should be answered independently.

9. (*7 points*)

(a) (*1 point*) Identify two advantages of activity based costing.

Information on Frenz Corporation is in Section 4 of the Case Study. There is a discussion between Kitty Dunn and Jeff Bemowski regarding Overhead Allocation.

(b) (*2 points*)

(i) (*1 point*) Identify Frenz's current costing type. Justify your answer.

(ii) (*1 point*) Identify Bemowski's proposed costing type. Justify your answer.

Marketing intelligence has obtained the following competitor's information:

Coffee A's Costing Data

Product	Unit Price	Annual Volume	Coffee based Sales in millions	Allocated Overhead in millions
Coffee	$2.00	1,260	$2,520.00	$882.00
Latte	$4.00	252	$1,008.00	$352.80
Flavoured Latte	$5.00	378	$1,890.00	$661.50
Mocha Latte	$5.00	147	$735.00	$257.25
Americano	$3.00	63	$189.00	$66.15
Total	$3.02	2,100	$6,342.00	$2,219.70

9. Continued

(c) (*1 point*) Compare Frenz's current costing approach to Coffee A's.

Marketing intelligence has also obtained the following retailer's information:

Retailer B Costing Data			
		Overhead per	Total Overhead
Supplier Shipments:	5	$30.00	$150
Sales Hours:	300	$1.83	$550
Stores:	2	$1,500.00	$3,000
			$3,700

(d) (*1 point*) Compare Frenz's current costing approach to Retailer B's.

(e) (*2 points*) Identify a more appropriate costing approach for Frenz to reflect profitability of both its coffee and non-coffee sales. Justify your answer.

10. (*9 points*) Bollinger Company has a Defined Benefit Pension Plan (BPP). When employees leave or retire from Bollinger, they must elect within 30 days to receive their BPP benefits in the form of a life annuity commencing at age 65 or as an immediate lump sum equal to the present value of their age 65 benefit. The lump sums are determined using prevailing market interest rates and a contemporary mortality table specified in the plan agreement.

Any current and future unfunded BPP liabilities are expected to be funded by a combination of return on BPP's assets and Bollinger's cash contributions. The annual minimum required contribution is equal to 20% of the unfunded liability as of the prior year valuation date.

BPP is prohibited from making payments to anyone other than Bollinger's employees.

(a) (*2 points*)

(i) Describe liability-side and asset-side liquidity risks.

(ii) Provide an example for each of these risks for BPP.

(b) (*2 points*)

(i) Describe actions that Bollinger can take to implement a Purchased Liquidity Management method to manage BPP's liquidity risk exposure.

(ii) Describe actions Bollinger can take to implement a Stored Liquidity Management method to manage BPP's liquidity risk exposure.

The CRO of Bollinger suggests holding a cash reserve equal to the average of the last three years of BPP benefit payouts. Based on the historical VaR analysis, maintenance of this reserve will satisfy BPP's liquidity requirement for any given year with 95% certainty.

(c) (*2 points*) Propose an alternative method to the CRO's suggestion for estimating cash reserves to cover the liquidity requirement. Justify your proposal.

As part of the Bollinger's planned restructuring efforts, the BPP plan agreement was amended so that the lump sum option is determined using 75% of the prevailing market interest rates.

(d) (*3 points*) Assess the impact of this amendment on BPP's liquidity risk exposure.

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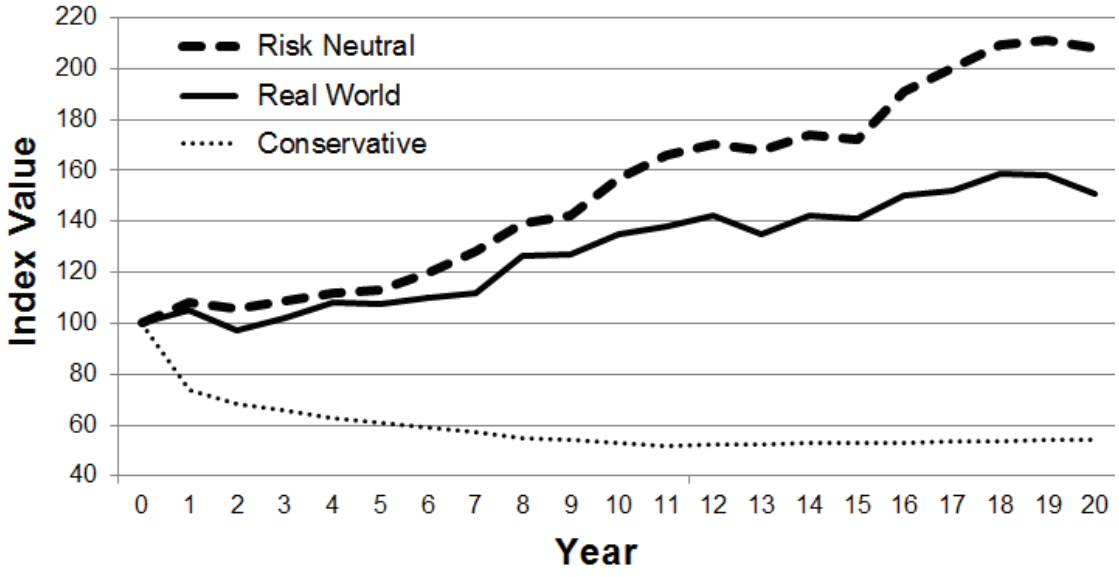
Question 11 pertains to the Case Study.
Each question should be answered independently.

11. (*8 points*) Brandon Kaladin, CEO, has requested more analysis supporting Darwin's proposed new Universal Life product with Secondary Guarantee. Your manager, Anne Kofsky, has asked you to perform simulations of the product's general account value, for risk management purposes.

As an experienced modeler, you performed both Risk-Neutral (RN) and Real-World (RW) calibration of the stochastic models used for interest rates, equity returns, and credit risk.

Being pleased with your work, Ann has asked you to accompany her as she presents the results to Mr. Kaladin. The graph below is part of your presentation. The lines labeled Real World and Risk Neutral are the VaR(90) of the 100,000 simulated paths of the account value. The line labeled as Conservative is the VaR(10) of the simulated paths under Real-World calibration:



During Anne's presentation she comments that the use of RN calibration within models used for risk management can be justified. In response, the CEO yells:

"I don't remember what exactly Risk Neutral and Real World probabilities are, but my professor from my MBA program told me that Risk-Neutral calibration should only be used for pricing, and Real-World calibration for risk management! Are you telling me this is wrong? Why is the Risk Neutral line higher than the Real-World line at all durations?"

11. Continued

To your surprise, Anne looks to you, with a look of desperation. You recognize the chance to impress the CEO:

(a) (*3 points*) Compare and contrast Risk-Neutral and Real-World calibration. Include comments on the assumptions and data underlying each type of calibration.

(b) (*3 points*) Justify your claim that Risk-Neutral calibration can be used for risk management, and conversely, that Real-World calibration can be used for pricing.

(c) (*2 points*) Explain to the CEO why the line labeled Risk Neutral is higher than the line labeled Real World.

12. (*8 points*) Orlean Company's pension plan uses a Liquidity Index as developed by Jim Pierce at the Federal Reserve. After large benefit payouts, the cash reserves decreased, resulting in a Liquidity Index of 87%.

(a) (*1 point*) Explain what it means to have an 87% portfolio Liquidity Index.

Prior to the large payout, the pension fund assets were allocated as follows:

Asset Type	Original Allocation	Unit Price		
		Bid	Ask	Fire Sale
US Large Cap	15%	0.95	1.05	0.90
US Small Cap	20%	0.90	1.10	0.80
Private Placements	10%	0.85	1.15	0.75
Corporate AA Bonds	30%	0.97	1.03	0.95
Mid-term Treasuries	20%	0.99	1.01	0.98
Cash	5%	1.00	1.00	1.00

(b) (*3 points*)

(i) Provide two considerations for rebalancing the assets to increase the Liquidity Index.

(ii) Propose an approach that the company could use to restore the Liquidity Index to 90% without any contributions to the plan.

Orlean's management recently hired a consultant to review the liquidity position of the pension plan. The consultant proposes using its proprietary liquidity metric to manage the liquidity risks. The consultant also proposes the following allocation based on the liquidity metric.

Asset Type	Proposed Allocation	Yield	Yield Variance	Proprietary Liquidity Metric
US Large Cap	27%	10%	18%	5.0
US Small Cap	27%	12%	24%	5.0
Private Placements	15%	8%	10%	7.5
Corporate AA Bonds	20%	6%	8%	1.5
Mid-term Treasuries	10%	2%	4%	0.5
Cash	1%	0.1%	0%	0.0
Total	**100%**	**8.5%**	**14.8%**	**4.2**

(c) (*1 point*) Identify two significant changes from the original to the proposed asset allocation.

(d) (*3 points*) Explain two concerns with the proposed asset allocation.

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Question 13 pertains to the Case Study.
Each question should be answered independently.

13. (*8 points*)

(a) (*3 points*) Compare U.S. Solvency and EU Solvency II with regard to the following components:

(i) Liability Valuation

(ii) Asset Valuation

Information on Darwin Life Insurance Company, including a section on liquidity and capital, is provided in Section 7 of the Case Study. Darwin currently manages its business on the U.S. statutory capital basis. Darwin targets a 300% Risk Based Capital (RBC) ratio.

Darwin is considering a change to the EU Solvency II capital basis. The following are the financial projection and solvency results by line of business under both bases. The Corporate line of business is not presented but is included in the Darwin column.

Exhibit 1: Business Plan Balance Sheet Assets and Required Capital on a U.S. Statutory basis

Statutory Assets (000,000s)						
	VA*	**UL****	**Traditional**	**Term**	**Other**	**Darwin**
2012	2,976	2,102	1,006	530	6,324	13,188
2015	5,560	2,617	1,158	799	6,364	16,598
Required Capital (000,000s)						
	VA*	**UL****	**Traditional**	**Term**	**Other**	**Darwin**
2012	165	93	36	19	279	615
2015	182	93	47	32	317	696

*Variable Annuities **Universal Life

13. Continued

Exhibit 2: Business Plan Balance Sheet Assets and Required Capital an EU Solvency II basis

Solvency II Assets (000,000s)						
	VA*	**UL****	**Traditional**	**Term**	**Other**	**Darwin**
2012	2,827	1,850	865	498	5,755	11,795
2015	5,198	2,264	979	739	5,696	14,875
Required Capital (000,000s)						
	VA*	**UL****	**Traditional**	**Term**	**Other**	**Darwin**
2012	215	102	35	15	335	702
2015	239	103	46	26	385	800

*Variable Annuities **Universal Life

Darwin management has proposed the following revision to the planned sales in anticipation of the EU capital requirements.

Sales Projection (000,000s)

Business Line	**2012 Actual**	**2015 Plan**	**2015 Revised**
Traditional Life	108	140	182
Term	82	118	573
Variable Annuities	812	1,750	1,050
Universal Life	172	271	395
Other	197	213	213
Total	**1,371**	**2,492**	**2,413**

(b) (*5 points*) Explain the merits of the revised sales projection as it pertains to the solvency capital ratio if Darwin is to adopt the EU Solvency II capital basis.

****END OF EXAMINATION****
Afternoon Session

USE THIS PAGE FOR YOUR SCRATCH WORK.