
SOCIETY OF ACTUARIES
Foundations of CFE Exam

Exam CFEFD

AFTERNOON SESSION

Date: Tuesday, October 28, 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 9-12 pertain to the Case Study.
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 CFEFD.
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****
Afternoon Session
Beginning with Question 9

Questions 9 – 12 pertain to the Case Study.
Each question should be answered independently.

9. (8 points)

- (a) (1 point) Describe the Weighted Average Cost of Capital (WACC) method to value a project.

Blue Jay Air is considering a booking system enhancement project. The business risks inherent to the project are similar to the overall business risks of Omega Airline, a peer competitor of Blue Jay Air (section 1.2.6 of the case study).

The project will generate free cash flows of \$15 million per year in perpetuity and requires an initial investment of \$50 million. Blue Jay Air is considering the two funding strategies below:

- I. Target interest coverage ratio of 30% of project free cash flows
 - II. Permanently increase debt by \$100 million
- (b) (2 points) Explain whether the WACC method is appropriate for evaluating the project.
- (c) (3 points) Recommend the preferred funding approach from strategies I and II based solely on project value. Show your work.
- (d) (2 points) Identify risks specific to Blue Jay Air of choosing a funding approach based solely on the calculated project value.

**Questions 9 – 12 pertain to the Case Study.
Each question should be answered independently.**

10. (9 points) You are a consultant hired to advise Frenz Corporation.

The following operational benchmarks apply to Frenz’s competitors at year end 2012:

	Net Working Capital (\$ millions)	Operating Cycle (days)	Cash Conversion Cycle (days)
25 th Percentile	160	30	10
50 th Percentile	230	70	50
75 th Percentile	320	100	70

(a) (3 points) Assess Frenz’s operational performance relative to its competition using the following metrics. Show your work.

- (i) Net working capital
- (ii) Operating cycle
- (iii) Cash conversion cycle

The CEO believes that Frenz can improve its capital management by either issuing 90-day commercial paper to finance its inventories or by negotiating a 2/10, Net 40, trade credit with its suppliers to lengthen the time it has use of its funds. The CEO has asked you to compare the two potential strategies.

(b) (3 points) Complete the following table.

	Effective Annual Cost (%)	Net Working Capital (\$ millions)	Cash Conversion Cycle (days)
90-day Commercial Paper (4% discount to face value)			
2/10, Net 40, Supplier Trade Credit			

10. Continued

(c) (2 points)

- (i) Contrast the two potential strategies.
- (ii) Recommend which capital management strategy Frenz should implement. Support your recommendation.

Before hearing your final recommendation, the CEO informs you,

“We’re moving ahead with the issuance of commercial paper to finance inventories. I know this strategy will work because I’ve seen it work at other companies. I know we’ll see immediate improvements against industry benchmarks.”

(d) (1 point) Describe the heuristic biases the CEO is relying upon.

Questions 9 – 12 pertain to the Case Study.
Each question should be answered independently.

- 11.** (6 points) Julia Reich, RPPC Dynasty’s recently appointed CRO, is fond of saying, “RPPC is really just a portfolio of great companies.” You have been asked to assist Ms. Reich in determining how RPPC’s share of Blue Jay Tire’s earnings relates to RPPC’s earnings for tomorrow’s board meeting.

You have the following information:

	Historical Average Annual Earnings (\$ millions)		Beta (β)
	Mean	Standard Deviation	
RPPC	10,000	1,000	1.0
Blue Jay Tire	2,000	?	0.8

RPPC’s Beta is 1.0 since it represents the entire organization. You assume the variance contributed by Blue Jay Tire’s firm-specific risk is zero.

- (a) (1 point) Calculate the standard deviation of earnings for Blue Jay Tire. Show your work.
- (b) (1 point) Calculate the covariance of the earnings for Blue Jay Tire with the earnings of all of RPPC.
- (c) (1 point) Estimate the correlation of Blue Jay Tire’s earnings with RPPC’s earnings using the information you calculated in (a) and (b).
- (d) (2 points) Describe four caveats of estimating the correlation between earnings using the above methodology.

Ms. Reich appreciates your work, but she is concerned. “This only works if the distribution of earnings for Blue Jay Tire is the same as the distribution of RPPC’s earnings,” she states.

- (e) (1 point)
 - (i) Evaluate your work in light of her concern.
 - (ii) Propose an alternate methodology for deriving the earnings dependence of a subsidiary with the larger RPPC organization.

**Questions 9 – 12 pertain to the Case Study.
Each question should be answered independently.**

12. (9 points) You work in the Risk Department for Big Ben Bank, which is conducting scenario testing. A colleague has stated that the VaR and CTE risk measures already being used are sufficient and believes stress testing is unnecessary.

- (a) (1 point) Critique your colleague's statement.
- (b) (2 points) Describe the three main forms of scenarios used in stress testing.

Big Ben's CRO suggests using stress testing to analyze the following risks:

- I. Sovereign
- II. Strategic
- III. Operational
- IV. Regulatory

- (c) (4 points)
 - (i) Propose a stress test specific to Big Ben for each of the four risks. Support your proposals.
 - (ii) Identify the form of scenario from your answer to (b) used in each proposed stress test in (c)(i).

Big Ben performs your suggested stress tests which reveal significant unmitigated risks.

- (d) (2 points) Recommend two strategies to mitigate each of the following:
 - (i) Operational Risk
 - (ii) Sovereign Risk

13. (8 points) You work for Telfair Insurance, a property insurer with a single line of business. Telfair is considering buying reinsurance.

(a) (1 point) Identify three characteristics of an efficient reinsurance market.

Telfair asked three reinsurers for premium quotes to cover the one-year cost of excess claims. Each reinsurer assumed the following for Telfair:

- No expense loading
- Expected reinsured claims of 100
- Standard deviation of reinsured claims of 400

Your assistant collected the quotes and used publically available data to create the following table:

Reinsurer	Premium Quote	Average Correlation Between Reinsurer's Existing Business and Telfair's Excess Claims	Reinsurer Equity Cost of Capital
X	147.87	0.15	10%
Y	141.26	0.10	14%
Z	135.20	0.20	12%

You are given the following values from the cumulative normal distribution:

x	92.5%	95.0%	97.5%	99.0%	99.5%	99.9%
$\Phi(x)$	1.44	1.64	1.96	2.33	2.58	3.09

Telfair's CRO asks you to evaluate the quotes assuming conditions required for normality and the mean-variance diversification model, where:

$$\text{Premium} = \text{Expected Loss} + r_c \times z_\epsilon \times \sqrt{\sigma_{ij}}$$

The CRO indicates: "The financial strength and ability of the reinsurer to pay claims are the most important criteria."

(b) (4 points)

- (i) Recommend which quote Telfair should accept using the CRO's criteria. Justify your recommendation.
- (ii) Evaluate the appropriateness of the CRO's assumptions. Support your evaluation.

13. Continued

Telfair's CFO is concerned that reinsurance prices may be unusually high due to an inefficient market and the current state of the reinsurance underwriting cycle.

- (c) (3 points)
- (i) Briefly describe the cause of the underwriting cycle.
 - (ii) Describe three ways an insurance securitization can resolve reinsurance market inefficiencies.
 - (iii) Summarize the steps Telfair would take to issue insurance-linked cat bonds as a substitute for buying reinsurance.

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

USE THIS PAGE FOR YOUR SCRATCH WORK