

Exam CFED

Date: Friday, April 29, 2022

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This examination has 10 questions numbered 1 through 10 with a total of 100 points.

The points for each question are indicated at the beginning of the question. Questions 1-7 and 9-10 pertain to the Case Study.
2. 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 provided in this document.

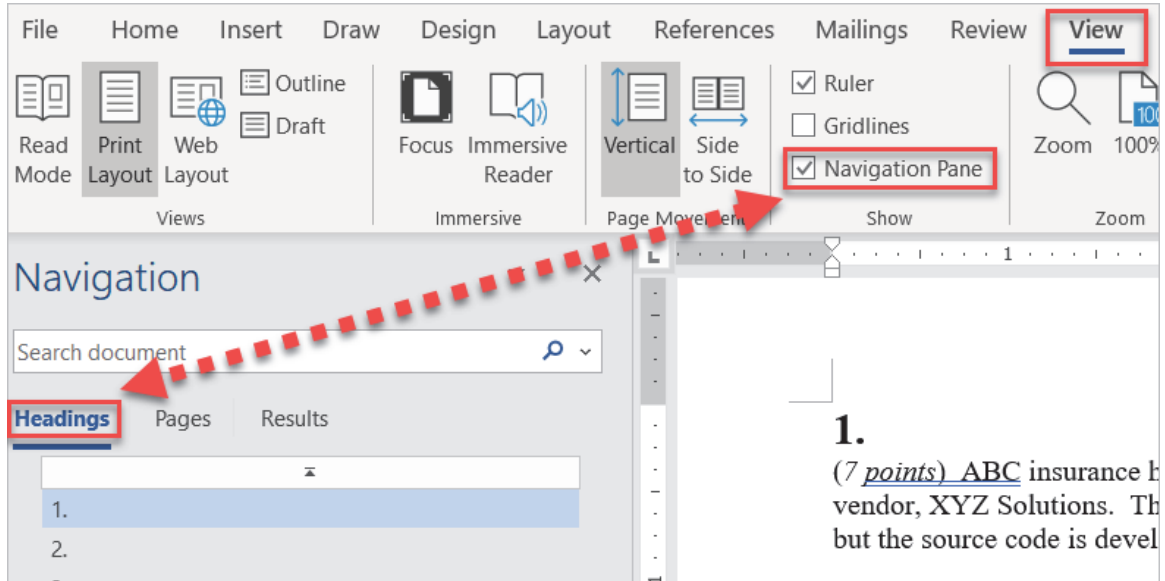
Written-Answer Instructions

1. Each question part or subpart should be answered either in the Word document or the Excel file as directed. Graders will only look at work in the indicated file.
 - a) In the Word document, answers should be entered in the box marked ANSWER. The box will expand as lines of text are added. There is no need to use special characters or subscripts (though they may be used). For example, β_1 can be typed as beta_1 (and ^ used to indicate a superscript).
 - b) In the Excel document formulas should be entered. Performing calculations on scratch paper or with a calculator and then entering the answer in the cell will not earn full credit. Formatting of cells or rounding is not required for credit.
 - c) Individual exams may provide additional directions that apply throughout the exam or to individual items.
2. The answer should be confined to the question as set.
3. Prior to uploading your Word and Excel files, each file should be saved and renamed with your five-digit candidate number in the filename.
4. The Word and Excel files that contain your answers must be uploaded before time expires.

Navigation Instructions

Open the Navigation Pane to jump to questions.

Press Ctrl+F, or click View > Navigation Pane:



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.

Question 1 pertains to the Case Study.

1.

(10 points) You are an actuary on Darwin's risk management team (Case Study section 6) and are responsible for reviewing the economic capital model developed by Consultants-R-Us.

Anne Kofsky, Vice President of the Life Insurance Division, would like to understand how the sub-portfolios of the newly proposed IUL product may impact the company's profitability during a 1-in-20 year risk scenario. For this analysis she has specifically requested that you analyze the economic capital model's output at the VaR(95) loss level and use the Shapley method as your capital allocation method.

(a) (2 points) Explain one advantage and one disadvantage for each of the following with respect to Darwin's risk management:

(i) VaR(95) as the risk measure

ANSWER:

(ii) Shapley method as the capital allocation method

ANSWER:

(b) (3 points) Calculate values for the 'Shapley Value Table' using the information provided for the Current UL, IULF, and IULV portfolios in Case Study section 6.7.1. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

(c) (1 point) Explain the impact of the capital allocation from your calculation in part (b) on Darwin's overhead cost allocations.

ANSWER:

1. Continued

Anne later shares the results of her requested analysis with the rest of the management team at a meeting. At the meeting Anne said, “The answer is clear. Based on the analysis of the model output, we should sell more of the IUL product than the current UL”.

- (d) (3 points) Explain three reasons why Darwin would make strategic decisions that may disagree with the model results.

ANSWER:

- (e) (1 point) Identify four disclosures you should include in Darwin’s model documentation per the requirements of ASOP 56.

ANSWER:

Question 2 pertains to the Case Study.

2.

(8 points)

- (a) (1 point) Describe the steps of hold-out sampling.

ANSWER:

You are asked to evaluate the performance of Snappy’s artificial intelligence (AI) software used for underwriting (Case Study section 7.1.2). You are given the following information:

- The sample size is 10,000 applications.
- The misclassification rate is 45%.
- 20% of applicants are rejected.
- 60% of rejected applicants should have been rejected.

- (b) (2 points)

- (i) Describe the four outcomes of the confusion matrix for the AI software.

ANSWER:

- (ii) Construct the confusion matrix. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

- (c) (2 points)

- (i) Calculate precision and recall rates based on the confusion matrix from (b)(ii). Show your work.

The response for this part is to be provided in the Excel spreadsheet.

- (ii) Evaluate the performance of the AI software as a simplified underwriting software, using the precision and recall rates calculated in (c)(i). Justify your answers.

ANSWER:

2. Continued

A commercial underwriting software has a precision rate of 90% and recall rate of 35%.

- (d) (2 points) Assess whether Snappy should buy the commercial underwriting software or keep using their current artificial intelligent software.

ANSWER:

- (e) (1 point) Evaluate Snappy's symptomatic and systemic cyber risk vulnerabilities for each of the underwriting software that Snappy is considering:

- (i) Snappy's current artificial intelligence software

ANSWER:

- (ii) The commercial underwriting software

ANSWER:

Question 3 pertains to the Case Study.

3.

(12 points) Frenz is planning to expand into the fast-growing Asian market (Case Study Section 4.4). It is considering the options of leasing vs. buying storefronts to reach new customers.

Financial information for the two options is given below. Assume that all costs and expenses are paid at the beginning of the year and all tax-related items are paid at the end of the year. All numbers are in Euros.

1. Lease Proposal

Lease term:	10 years
Annual Lease Payment (includes rent, equipment, etc.):	12M
Additional Annual Expenses:	9M
Annual Expected Revenue from New Stores (First 10 Years):	50M

2. Purchase Proposal

Initial Purchase Price:	150M
Additional Annual Expenses:	9M
Annual Expected Revenue from New Stores (First 10 Years):	50M
Annual Depreciation for Stores:	5M

You are given the following assumptions:

- Frenz's current tax rate is 20%.
- Frenz's borrowing interest rate is 6%.
- Frenz's weighted average cost of capital (WACC) is 8%.

(a) (4 points)

(i) Explain the steps to compare the leasing option to the buying option.

ANSWER:

(ii) Recommend which option Frenz should select for the new storefronts based solely on the above proposals. Justify your answer.

The response for this part is to be provided in the Excel spreadsheet.

3. Continued

- (iii) Assess the appropriateness of the recommendation in ii) given Frenz's overall financial situation.

ANSWER:

Recently a few Frenz Board members raised concerns that were not considered in the above analysis. They are worried about the effects of:

- Real estate value fluctuation
- Foreign currency risk

- (b) (2 points) Evaluate how each concern will affect the decision between leasing and buying. Justify your answer.

ANSWER:

Frenz has decided to proceed with the lease proposal.

- (c) (2 points)

- (i) Describe the two financing policy choices.

ANSWER:

- (ii) Recommend which financing policy choice in (i) is more appropriate for Frenz when financing the lease payment and operating expenses. Justify your recommendation.

ANSWER:

3. Continued

Frenz is also planning for other possible short-term financing needs across its organization.

(d) (4 points)

- (i) Identify two potential short-term financing needs based on Frenz's risk profile and strategy. Justify your response.

ANSWER:

- (ii) Describe three financing methods that Frenz can use for its short-term financing needs.

ANSWER:

- (iii) Recommend an appropriate financing method for Frenz from (ii) for each need identified in (i). Justify your answer.

ANSWER:

Question 4 pertains to the Case Study.

4.

(13 points) You are an analyst at Blue Jay Air (Case Study Section 2). Management has asked you for support in evaluating BJA's financial statements.

(a) (2 points)

(i) Describe what classification is with respect to financial statements.

ANSWER:

(ii) Identify three specific examples of classification choices that BJA could make.

ANSWER:

(iii) Describe the impact to BJA's financial statements of each choice in (ii).

ANSWER:

Elmer Saunders, BJA Treasurer, says, "The way BJA classifies its revenue is sustainable. The way BJA classifies its expenses between operating and non-operating income is fair and sustainable."

(b) (2 points)

(i) Critique Elmer's statement on revenue.

ANSWER:

(ii) Critique Elmer's statement on expense classification.

ANSWER:

4. Continued

BJA is considering the lease proposal for the international fleet upgrade (Case Study Section 2.7 Exhibit E). The lease can be constructed as a capital lease or an operating lease.

(c) (3 points)

(i) Assess qualitatively the impact on the following financial ratios for each type of lease classification before the 2019 lease accounting rule change:

- I. Debt to equity ratio
- II. Current ratio

ANSWER:

(ii) Recommend what type of lease is more suitable based on BJA's risk profile and your assessment in (i). Justify your recommendation.

ANSWER:

(iii) Analyze how the recommendation in (ii) may be affected after 2019 by the new lease accounting rules.

ANSWER:

BJA management is also debating if its current financial reporting is too conservative and asks for your assessment.

(d) (1 point) Describe the problem caused by bias in financial reporting.

ANSWER:

4. Continued

(e) (5 points)

- (i) Explain the implications of taking a more aggressive financial reporting approach.

ANSWER:

- (ii) Explain three changes specific to BJA's current financial reporting that would make its accounting approach more aggressive.

ANSWER:

- (iii) Assess whether BJA management should favor a conservative bias or an aggressive bias.

ANSWER:

- (iv) Propose financial reporting changes, if any, to the approach you supported in (iii) that might be appropriate in a pandemic scenario. Justify your response.

ANSWER:

Question 5 pertains to the Case Study.

5.

(11 points) You are an analyst working for Kitty Dunn, Chief Accounting Officer at Frenz. Frenz created Ishmael Roasters at the beginning of 2019, a coffee house chain in the country of Mobia with a local currency of Mobucks, with the plan to allow local operations to develop without interference.

- (a) (1 point) Explain why there are special translation procedures for countries with high inflation.

ANSWER:

You are provided the following data about Ishmael and Mobia. The income statement for Frenz can be found in Case Study section 4.5.

	Mobia General Price Index	Euros per Mobuck
12/31/2019	100	1.0
Average	150	0.7
12/31/2020	225	0.5

Ishmael Income Statement Information		
<i>Mobucks in thousands</i>	2020	2019
Cost of Sales	5,000	1,500
Gross Profit	23,800	12,200
Operating Income	5,000	1,800
Interest Expense	500	300
Income Tax Expense	900	300
Taxes Paid	1,000	100
Net Income	3,600	1,200

5. Continued

You gathered the following information:

1. The average Mobia General Price Index in 2019 was 60.
2. Ishmael's current income tax rate is 20%.
3. There are no purchasing power gains or losses.
4. All differences in Accounting Profit and Taxable Income are temporary.
5. Frenz and Ishmael depreciate equipment on a straight-line basis over 10 years.
6. Mobia's tax authorities permit depreciation on a straight-line basis over 7 years.

After reviewing the financial information, Kitty says to you, "based on these reports, I do not see any risks or downside potential. Ishmael's margins for Gross Profit, Operating Income, and Net Income are up, indicating a growing profit center for Frenz."

(b) (4 points)

- (i) Translate Ishmael's income statement for use by Frenz.

The response for this part is to be provided in the Excel spreadsheet.

- (ii) Critique Kitty's response regarding Ishmael's recent performance.

The response for this part is to be provided in the Excel spreadsheet.

Kitty informs you that Ishmael's income statement includes a deferred tax liability related to the use of coffee bean roasting equipment that was purchased for 250,000 Mobucks in the beginning of 2019, and it does not have any salvage value.

(c) (2 points)

- (i) Calculate the associated deferred tax asset/liability as of December 31, 2020. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

- (ii) Explain the implications of a change in the deferred tax asset/liability for a company.

ANSWER:

5. Continued

Assume Mobia's Fiscal Year 2020 corporate tax rate increased to 35% on December 31, 2020.

(d) (3 points)

(i) Calculate Ishmael's profitability. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

(ii) Assess the implications on Ishmael's financial condition and cash flow.

The response for this part is to be provided in the Excel spreadsheet.

(e) (1 point) Evaluate whether any of the information provided in part b, item 1 through 6, seems unlikely to be accurate.

ANSWER:

Question 6 pertains to the Case Study.

6.

(9 points) Darwin is developing an LTC rider attached to its traditional and universal life product offerings (Case Study section 6.7.2).

- (a) (1 point) Identify the departments at Darwin responsible for the three lines of defense in considering the risk profile of this rider.

ANSWER:

- (b) (2 points) Explain how each of the following levers of ERM board oversight can be applied to the LTC rider:

- (i) Policy
- (ii) Assurance

ANSWER:

6. Continued

Darwin engages you, a lead consultant at Consultants R Us (CRS), to examine the capital implications of the LTC rider. Your analysis produces the following results:

Risk-Adjusted Return	\$100,000
Regulatory Capital	\$520,000
Economic Capital	\$625,000

Aaliyah Jackson, the CRO of Darwin, provides the following additional information on the LTC rider:

Book Value of LTC rider	\$10 million
Cost of Equity Capital	15%
Growth of LTC Rider (g)	13%

(c) (1 point)

(i) Calculate the Market Value (MV) of the LTC rider. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

(ii) Determine if the rider creates shareholder value.

ANSWER:

6. Continued

You discuss the entry into the LTC rider market with Darwin's Board. The Board is unwilling to offer this rider without a risk mitigation strategy. They ask you to consider reinsuring some of the risk. You produce the following table:

Results Net of Reinsurance	
Risk-Adjusted Return	\$50,000
Regulatory Capital	\$260,000
Economic Capital	\$300,000

(d) (3 points)

(i) Calculate the ceded RAROC. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

(ii) Explain to the Board the implications of the ceded RAROC calculation in part (i).

ANSWER:

(e) (2 points)

(i) Recommend two key risk indicators Darwin's Board may want to see for this LTC rider, based on information in the case study.

ANSWER:

(ii) Identify the characteristics of effective KRIs that justify your recommendation for each of your key risk indicators from part (i).

ANSWER:

Question 7 pertains to the Case Study.

7.

(11 points) Susan Feather, CEO of Blue Jay Air (BJA), is urging the risk management committee (Case Study section 2.4) to establish a more formal cyber risk management framework.

- (a) (1 point) Describe the three key roles that enable cyber risk management within an organization and the function performed by each role.

ANSWER:

- (b) (3 points)

- (i) Describe three classes of cyber risk factors.

ANSWER:

- (ii) Identify examples for each of these classes in (i) within BJA.

ANSWER:

BJA is exposed to fluctuations in oil prices and has chosen to eliminate the variability of market prices through hedging. BJA currently uses a series of staggered forwards to hedge oil price fluctuations.

- (c) (1 point) Describe two advantages and two disadvantages of hedging fuel costs with forwards.

ANSWER:

7. Continued

The fuel requirement for the next three months is estimated to be 300 million gallons. BJA is considering two alternative hedge strategies:

- I. Hedge only 50% of the fuel requirement with forward contracts locking in the price at the current spot price.
- II. Create a three-way collar using fuel options.

Spot price of crude oil is \$1.85 per gallon. Prices of 3-month fuel options are given below:

Strike	Call Options	Put Options
1.50	0.14	0.23
1.85	0.49	0.16
3.00	0.22	0.02

In three months, the spot price increases to \$1.98 per gallon.

(d) (3 points)

- (i) Calculate BJA's net position after three months if hedge strategy I was implemented. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

- (ii) Calculate BJA's net position after three months if hedge strategy II was implemented. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

- (iii) Evaluate hedge strategies I and II relative to BJA's risk appetite.

ANSWER:

7. Continued

The company has recently incurred large losses due to the fuel cost hedge program. Susan mentions that maybe they should consider purchasing an oil refinery instead continuing with the hedge program.

- (e) (1 point) Assess whether or not BJA should pursue Susan's idea. Justify your answer.

ANSWER:

- (f) (2 points)

- (i) Explain two other significant financial risks that are not fully hedged at BJA.

ANSWER:

- (ii) Recommend a suitable strategy to manage BJA's risk exposure for each risk identified in part (i). Justify your response.

ANSWER:

8.

(10 points) You are an actuary at JKL Insurance Company (JKL) which has a steadily growing annuity business in addition to its term life products. Over the years, longevity risk has become an emerging concern as policyholders live longer due to mortality improvements. You are tasked with managing the longevity risk of the life and annuity block of business.

(a) (1 point) Define the following two types of longevity risk.

- I. Idiosyncratic
- II. Aggregate

ANSWER:

Your coworker believes that the law of large numbers and risk pooling means that JKL's longevity risks will be diversified away.

(b) (1 point) Critique your coworker's understanding of each longevity risk in part (a) based on his statement above.

ANSWER:

8. Continued

The CFO of JKL is risk-averse, so she wants the hedging strategy's cash flows to offset the longevity risk as closely as possible but is not willing to pay an upfront premium. The company's policyholders tend to be younger than the industry average.

You are asked to explore the following longevity risk management strategies:

- I. Q forwards
- II. Pension buy-out
- III. Indemnity-Based Longevity Contracts
- IV. Longevity Bonds

(c) (4 points) For each of I to IV,

(i) Describe the longevity risk management strategies.

ANSWER:

(ii) Describe the pros and cons.

ANSWER:

(d) (2 points) Recommend one longevity risk management strategy from I to IV for JKL. Justify your recommendation.

ANSWER:

(e) (2 points) Explain two advantages and two disadvantages of addressing JKL's longevity risk using each the following:

(i) Reinsurance

ANSWER:

(ii) Securitization.

ANSWER:

Question 9 pertains to the Case Study.

9.

(8 points)

- (a) *(1 point)* Describe the two major criticisms of traditional absorption costing systems.

ANSWER:

Kitty Dunn is reviewing Frenz's overhead allocation method in response to the email from Jeff Bemowski in which he suggests allocating overhead equally to all stores. (Case Study Section 4.5, Exhibit B)

- (b) *(2 points)*

- (i) Critique Kitty's cost allocation method.

ANSWER:

- (ii) Critique Jeff's cost allocation method.

ANSWER:

9. Continued

Larry, an intern in the accounting department, proposes an approach that assigns overhead to the different stores based on the amount of goods a store sells relative to the total amount of goods produced for all stores.

$$\text{Overhead Allocated to Each Store} = \frac{\text{Store's Cost of Goods Sold}}{\text{Total Goods Produced for All Stores}} \times \text{Total Overhead}$$

(c) (3 points)

(i) Critique Larry's proposed method.

ANSWER:

(ii) Explain whether Larry's proposed method addresses a shortcoming of Kitty's method.

ANSWER:

(iii) Explain whether Larry's proposed method addresses a shortcoming of Jeff's method.

ANSWER:

(d) (2 points) Recommend two changes to the current allocation method to better reflect cost drivers for the individual stores. Justify your recommendation.

ANSWER:

Question 10 pertains to the Case Study.

10.

(8 points) You are an analyst at Blue Jay Tire (BJT) assessing the possible product expansion. (Case Study Section 3.4). BJT management has asked about the Growth and Cost Synergies that might be realized if BJT acquires True North Tire Company (TNT).

(a) (4 points)

(i) Compare and contrast Growth Synergies and Cost Synergies.

ANSWER:

(ii) Describe the three types of Growth Synergies.

ANSWER:

(iii) Provide an example for each type of Growth Synergy in (ii) that BJT might realize.

ANSWER:

(b) (2 points)

(i) Describe the two main reasons for transfer pricing within firms.

ANSWER:

(ii) Explain how each of the reasons in (i) may apply if BJT acquires TNT.

ANSWER:

10. Continued

Projected profitability will impact BJT's decision to acquire TNT. After reviewing TNT's projected tire production costs, the BJT CEO states: "BJT can make easy profits if TNT increases production. BJT can pay TNT the cost of increased production and sell the additional tires at a premium in the market."

- (c) (2 points) Critique the CEO's statement.

ANSWER:

****END OF EXAMINATION****