

# Exam CFESDM

**Date:** Thursday, October 26, 2023

## INSTRUCTIONS TO CANDIDATES

### General Instructions

1. This examination has 5 questions numbered 1 through 5 with a total of 70 points.

The points for each question are indicated at the beginning of the question. All questions 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.

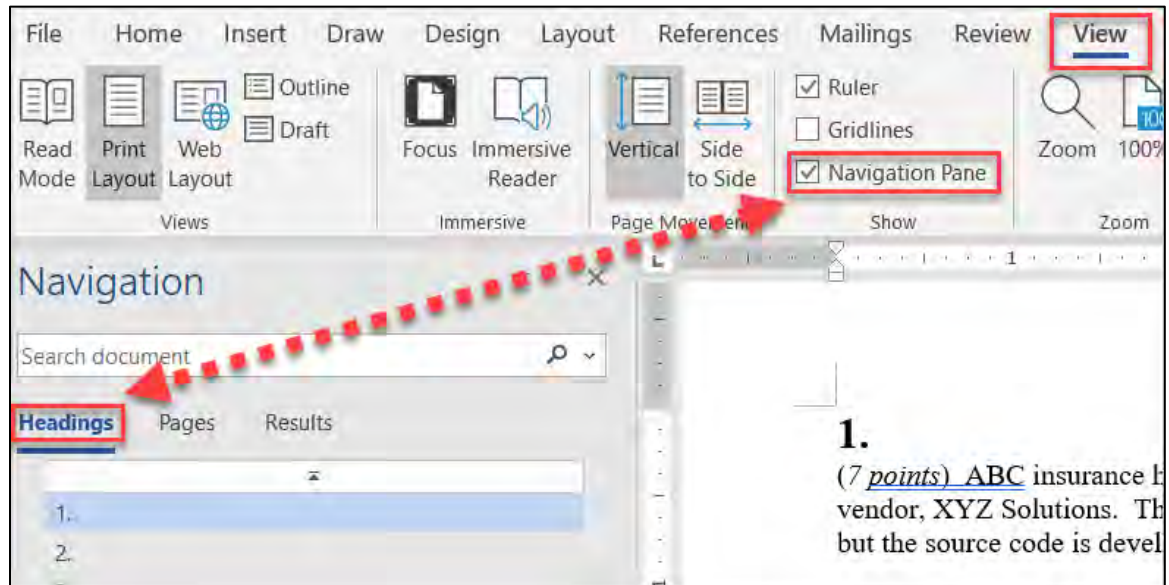
### Written-Answer Instructions

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,  $\beta_1$  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 the five-minute upload period expires.

## Navigation Instructions

Open the Navigation Pane to jump to questions.

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

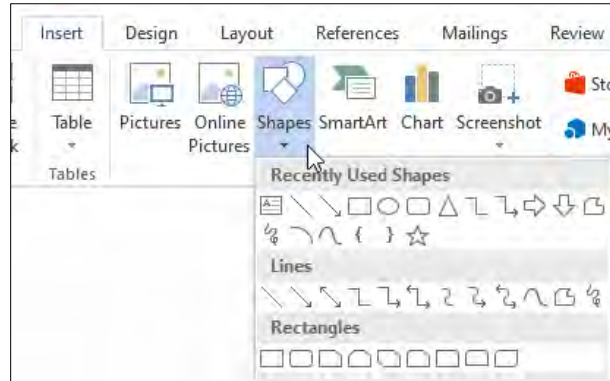


## **CASE STUDY INSTRUCTIONS**

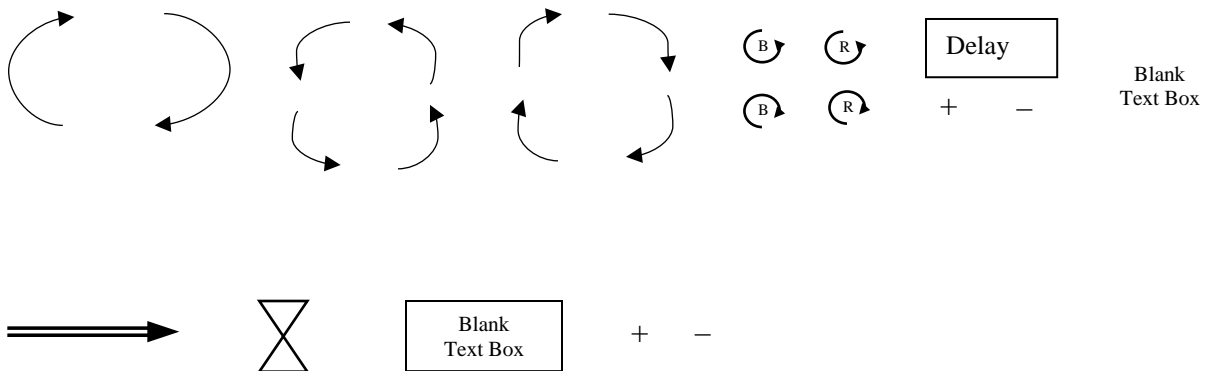
**The case study will be used as a basis for some examination questions. Be sure to answer the question asked by referring to the case study. For example, when asked for advantages of a particular plan design to a company referenced in the case study, your response should be limited to that company. 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.**

## Drawing Models in a CBT Setting

The following shapes are commonly used when modelling dynamic process and complex systems, such as those in *Business Dynamics* (Sternan, John D., 2000). Not all shapes may be needed, nor should this be considered an exhaustive list of possible shapes. Candidates may copy, paste, and manipulate shapes to answer questions where a sketch is required. For reference, candidates can also insert a variety of shapes using either Microsoft Excel or Microsoft Word under the insert menu:



*Selected shapes used in Business Dynamics:*



**Questions 1 through 5 pertain to the Case Study.  
Each question should be answered independently.**

**1**

(14 points) Information about Blue Jay Air (BJA) can be found in Section 2 of the Case Study.

BJA has historically used Incremental Budgeting. Susan Feather wants to start using Zero Based Budgeting (ZBB). The department managers prefer to use incremental budgeting.

- (a) (1 point) List the six problems for top management created by the traditional incremental approach.

ANSWER:

- (b) (2 points)

- (i) Explain how the evaluation of alternatives under ZBB reinforces a particular method of securing an increase in Economic Value Added (EVA). Justify your answer.

ANSWER:

- (ii) Identify a change made to BJA's Operations that is an example of (i). Justify your answer.

ANSWER:

## 1. Continued

A new initiative to expand BJA's current IT team has been proposed by the IT manager. The proposal is to add new, highly specialized staff to build and maintain the new customer relationship management (CRM) system and mobile application for customer engagement in order to expand the Lucky 7 program.

- (c) (3 points) Explain how a decision package would consider the IT manager's proposed initiative during the ZBB process.

ANSWER:

BJA's management team is also considering discontinuing the Lucky 7 program or maintaining it in the current form.

- (d) (2 points)

- (i) Identify the type of each alternative being considered by BJA's management team. Justify your answer.

ANSWER:

- (ii) Explain why the ZBB process would reject these alternatives.

ANSWER:

## 1. Continued

Susan decided to implement ZBB without further consulting any of the departments, advising that it will lead to better decisions. Some of the results of the ZBB process are:

- IT's request to hire staff to build and maintain the new CRM system was approved.
- Some elements of the business lounge refresh were deferred to later years.
- A request to continue BJA's travel agency program was denied.
- Market research into adding a dedicated vacation destination route was denied.

The managers in areas where requests were deferred or denied are upset with the change. These managers have been accustomed to their budgets being increased each year.

(e) (6 points)

- (i) Describe the five principles of the dual operating system approach.

ANSWER:

- (ii) Critique Susan's approach to implementing ZBB with respect to the dual operating system approach.

ANSWER:

- (iii) Recommend how Susan and senior leadership can communicate the choice of ZBB to department managers to ensure successful change management.

ANSWER:

*Questions 1 through 5 pertain to the Case Study.  
Each question should be answered independently.*

## 2.

(17 points) Information on Snappy Life Insurance (Snappy) can be found in Section 7 of the Case Study.

Snappy is struggling to hire staff to produce financial projections. To solve this problem, Snappy is considering acquiring Snarky Solutions (Snarky). Snarky produces robust financial projections as a service for other life insurance companies, the same as what are desired by Snappy.

Select assumptions are in the table below.

	<b>Snappy</b>	<b>Snarky</b>	<b>Combined</b>
EBIT (000s)	3,781	500	4,581
Tax rate	25%	25%	25%
Total Capital Invested (000s)	15,000	1,500	16,500
Pre-tax Return on Capital	25.2%	33.3%	27.8%
Debt to Capital Ratio	10%	10%	10%
Cost of Capital	7.98%	8.34%	
Reinvestment Rate	40%	50%	41.2%
Growth Rate	7.56%	12.5%	
Terminal Growth Rate	4.25%	4.25%	4.25%
Terminal Reinvestment Rate	53.54%	51.21%	53.23%



## 2. Continued

(a) (4 points)

- (i) Calculate the value of Snappy using Discounted Cashflows for the next 5 years. Show your work.

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

- (ii) Calculate the value of Snarky using Discounted Cashflows for the next 5 years. Show your work.

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

The CEO of Snappy life, Veltro, believes that as a result of the acquisition annual EBIT will increase by \$300,000, starting in the first year.

Assume the following.

- The beta of the combined firm is 0.81.
- The Reinvestment Rate for 5 years is 41.2%.
- Snarky will not agree to be acquired for less than \$10 million.

(b) (4.5 points)

- (i) Calculate the value of the synergy. Show your work.

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

- (ii) Calculate an additional financial metric to evaluate Snappy's acquisition of Snarky. Justify your answer.

ANSWER:

- (iii) Discuss whether or not Snappy should pursue an acquisition of Snarky based on your answers in (i) and (ii).

ANSWER:

## 2. Continued

Snappy life has the option to use Snarky services instead of acquiring the company. The annual cost is expected to be \$500,000.

- (c) (2 points) Explain how Snappy can compare acquiring Snarky versus paying Snarky to produce projections as a service.

ANSWER:

Snarky's financial projection services rely on the skills of several key employees at the company.

- (d) (1.5 points) Describe an incentive structure for the key employees at Snarky. Justify your answer.

ANSWER:

Snappy's Board feels that the odds of realizing long-term benefits by acquiring Snarky are low as Snappy is near the middle of the power curve of generating economic profits.

- (e) (2 points)

- (i) Define economic profit.

ANSWER:

- (ii) Explain the Board's concern.

ANSWER:

## 2. Continued

Snappy has an opportunity to purchase equipment that non-technical individuals can use to perform complex mathematical calculations and financial projections for prices far below market value.

(f) (3 points)

- (i) List the five moves that can help an organization move up the power curve.

ANSWER:

- (ii) Evaluate whether or not purchasing the equipment is an opportunity for Snappy to move up the power curve. Justify your answer.

ANSWER:

*Questions 1 through 5 pertain to the Case Study.  
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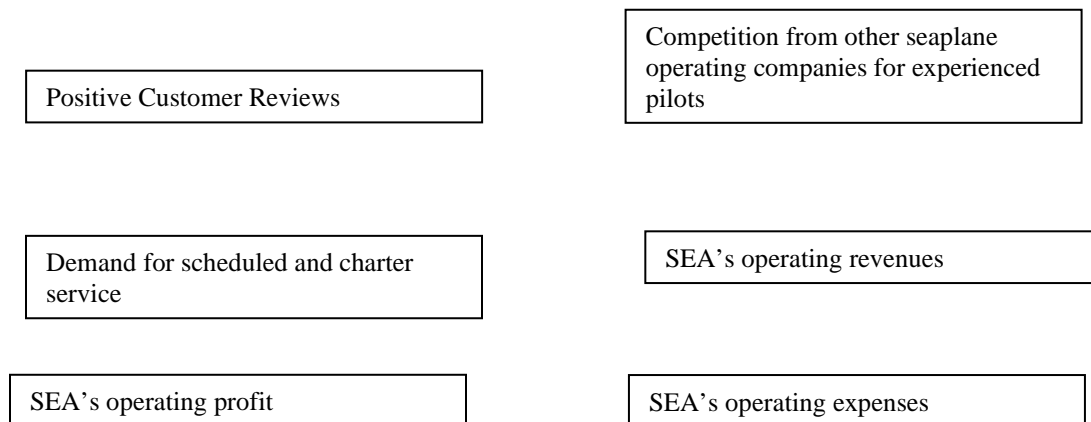
**3.**

(10 points) Information on Seaplane Expeditions and Aviation Company (SEA) can be found in Section 8 of the Case Study.

The Pacific Northwest's seaplane industry is highly competitive. For SEA to be successful, it will need to expand its current workforce.

SEA has experienced significant growth over the past years but recent sales on charters have been declining. The talent market has also been highly competitive, and SEA has been struggling to retain experienced pilots.

- (a) (2.5 points) Sketch a causal loop diagram using the nodes below to illustrate the variables that have impacted SEA's profits.



ANSWER:

### 3. Continued

(b) (3 points) Describe how each of the following scenarios would change the model in (a):

(i) Individual SEA employees receive a bonus for positive customer reviews.

ANSWER:

(ii) Customers may view the flight history of pilots and choose to fly with the best and most experienced pilots.

ANSWER:

(iii) Significant increase in fuel costs around the world, coupled by a rise in interest rates and inflation.

ANSWER:

SEA's seaplane pilot school trains the next generation of seaplane pilots. Not all applicants are admitted and not all pilots in training graduate.

(c) (2 points) Sketch and label a stock and flow diagram for pilot training including the below components.

Applicants

Trained Pilots

Pilots in Training

ANSWER:

### 3. Continued

An HR consultant in the industry offered an assessment to SEA.

*“With so much competition, retaining experienced pilots is too difficult! To ensure SEA has enough resources to carry out its international expansion strategy, SEA should constantly hire as many new pilots as possible because we should assume we will always be losing experienced pilots.”*

- (d) (2.5 points) Critique this statement.

ANSWER:
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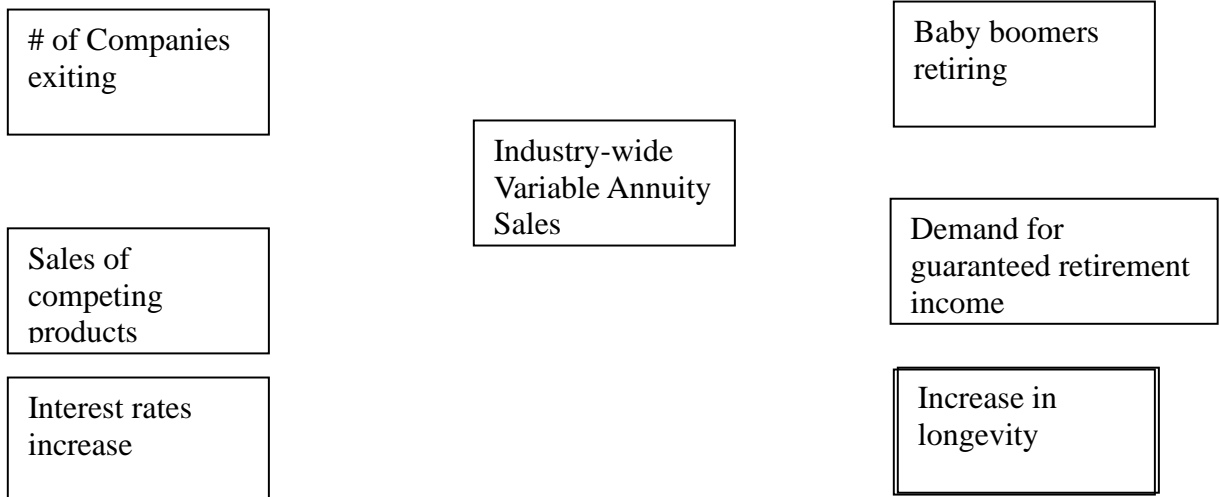
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**4.**

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

Darwin has been pursuing sales of Variable annuity (VA) products. Darwin's analysis of the market and underlying drivers have yielded a number of forces influencing the sales of VA products.

- (a) (3 points) Sketch the causal links, identifying their polarity, to complete the diagram below. Include at least three delays.



- (b) (1 point) List the three fundamental modes of dynamic behavior.

ANSWER:

#### 4. Continued

(c) (7 points) VA sales are expected to follow the Projected Inforce Statistics from Exhibit 5 in the Case Study.

(i) Describe one relevant operational consideration for determining the mode of dynamic behavior of Darwin's VA sales.

ANSWER:

(ii) Identify a result from Darwin's sensitivity testing from Exhibit 5 in the Case Study that is relevant to determining the mode of dynamic behavior of Darwin's VA sales. Justify your answer.

ANSWER:

(iii) Describe the complex pattern of dynamic behavior of Darwin's VA sales based on your answers to (i) and (ii).

ANSWER:

(iv) Describe a response to the operational consideration identified in (i) that would create a compensating feedback loop. Justify your answer.

ANSWER:

(v) Describe a response to the operational consideration identified in (i) that would not create a compensating feedback loop. Justify your answer.

ANSWER:



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**5.**

(18 points) Information on Blue Jay Air (BJA) can be found in Section 2 of the Case Study.

The government of New Peabody has proposed a revenue guarantee program for airlines operating routes to the destination. They are proposing a \$100 reimbursement per arriving passenger, up to a maximum of 100 passengers per flight, for airlines meeting the following criteria:

- Profit Margin must be at most 10%, where Profit Margin =  $(\text{Revenue} - \text{Expenses}) / \text{Revenue}$
- The price for a Business class seat must be at most five times the price for an Economy class seat

BJA wants to explore this new potential destination. You are given the following assumptions:

- Aircraft seat configuration:
  - 50 Business class seats
  - 230 Economy class seats
- Fuel cost is \$200,000 per flight
- Total operating expenses are \$150,000 per flight
- Seat occupancy is 70% for Business and 80% for Economy per flight

BJA seeks to maximize profits while maintaining eligibility for the revenue guarantee program.

(a) (2 points) State the objective function.

ANSWER:

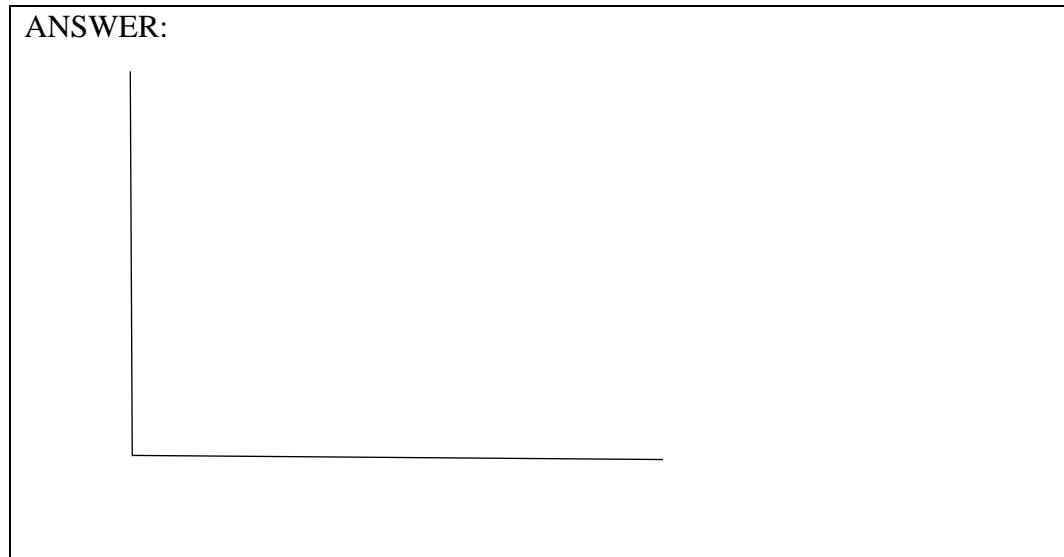
(b) (2 points) State the constraints.

ANSWER:

## 5. Continued

- (c) (2 points) Sketch the feasibility region.

ANSWER:



- (d) (2 points) Determine the optimal prices for each Business and Economy class seat.

ANSWER:

Management has identified additional uncertainty driven by both travel demand and fuel costs, which are assumed to be independent. The following scenarios have been developed and are assumed to occur with equal likelihood:

Demand Scenario	Reimbursement per passenger	Total passenger cap for reimbursement
High	\$50	150
Low	\$200	50

Fuel Cost Scenario	Fuel cost per flight
High	\$500,000
Low	\$50,000

- (e) (1 point) State three areas of flexibility when using the two-stage linear optimization modeling paradigm.

ANSWER:

## 5. Continued

- (f) (1 point) List the possible states arising from the Demand and Fuel Cost Scenarios.

ANSWER:

- (g) (2 points) State the objective function for the new two-stage model.

ANSWER:

Management has identified that the expected seat occupancy assumption is not realistic, because demand should be a function of price. They note that demand continuously and linearly decreases proportional to price.

- Full demand for business class tickets is achieved at \$1000.
- There is no demand for business tickets at \$4000.
- Full demand for economy tickets is achieved at \$500.
- There is no demand for economy tickets at \$2000.

They request the model developed in parts (a) and (b) to be updated to reflect this relationship between price and demand.

- (h) (3 points) State the updated objective function.

ANSWER:

- (i) (1 point) State the updated constraints.

ANSWER:

- (j) (2 points) Recommend two additional enhancements to make the model more realistic. Justify your answer.

ANSWER:

**\*\*END OF EXAMINATION\*\***