

# Exam CFESDM

**Date:** Thursday, October 24, 2024

## INSTRUCTIONS TO CANDIDATES

### General Instructions

1. This examination has 6 questions numbered 1 through 6 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.

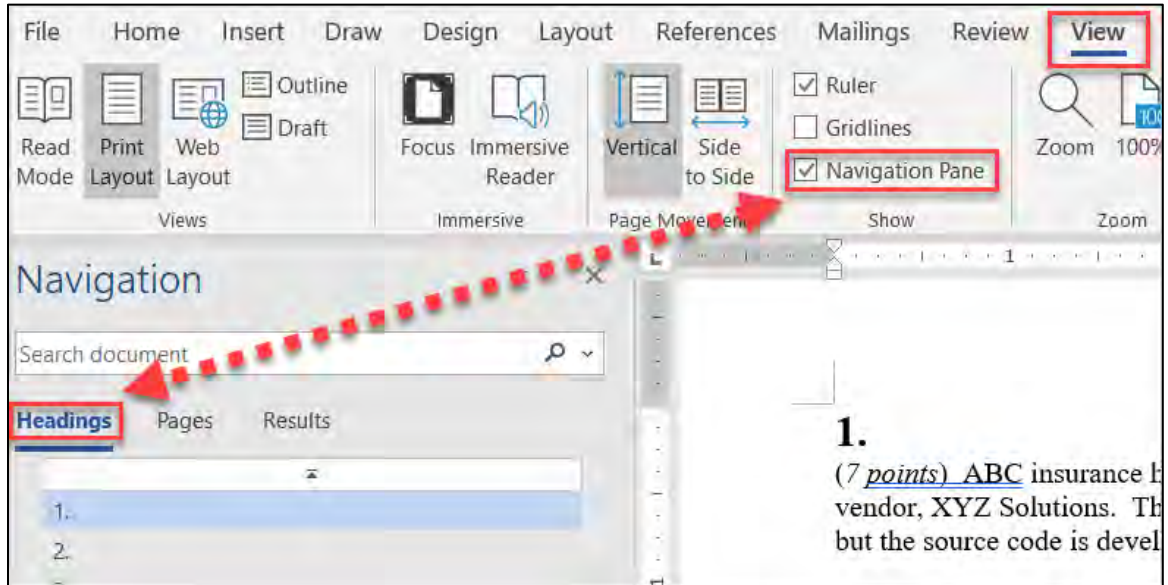
### Written-Answer Instructions

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 unique candidate number in the filename. To maintain anonymity, please refrain from using your name and instead use your candidate number.
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:

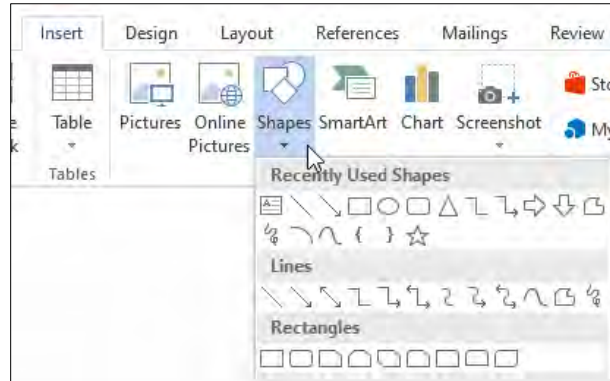


## **CASE STUDY INSTRUCTIONS**

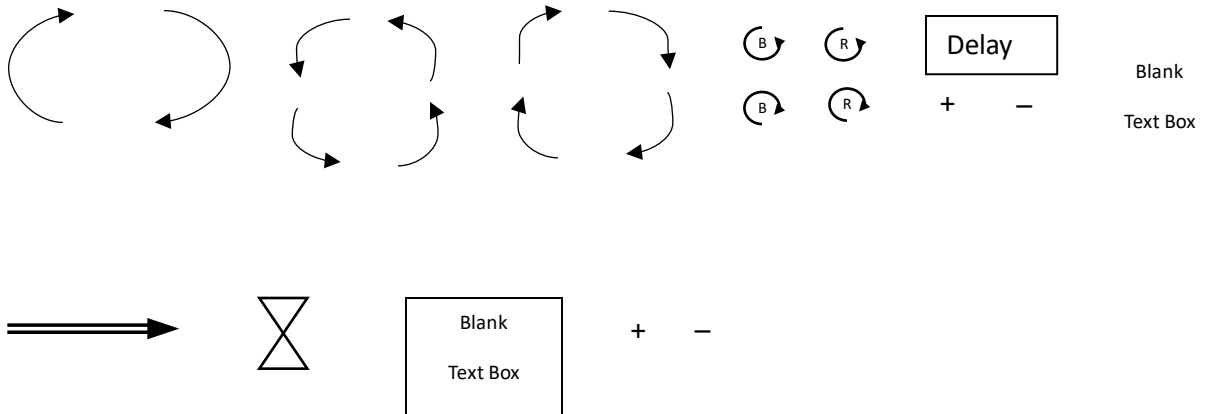
**The case study will be used as a basis for all examination questions. Be sure to answer the question asked by referring to the case study. For example, when asked for advantages of a particular plan design to a company referenced in the case study, your response should be limited to that company. Other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



## **Excel Instructions**

For each question part requiring an answer in Excel, (1) clearly identify the inputs to the calculations, (2) show the necessary interim calculations, adding rows and / or columns, if necessary, and (3) enter the final answer in the cells highlighted in yellow below.

These cells should contain formulas with links to other calculations in the worksheet. Minimize the use of hard-coded figures and maximize the number of interim steps in the calculations that would demonstrate your line of thinking.

**Questions 1 through 6 pertain to the Case Study.  
Each question should be answered independently.**

# 1

*(12 points)*

Information about Blue Jay Air (BJA) can be found in Section 2 of the Case Study.  
Information about Blue Jay Tire (BJT) can be found in Section 3 of the Case Study.

- (a) *(1 point)* List the five key inputs that determine value, according to Damodaran.

ANSWER:

BJA is considering selling BJT. An automobile company, Motors Inc., is interested in purchasing BJT. Motors Inc. operates in a European jurisdiction with one of the highest tax rates in the world. Motors Inc. is bringing a new car to market that requires highly specialized tires that BJT can produce. By acquiring BJT, Motors Inc. will be able to avoid paying a large mark-up to other tire producers.

- (b) *(3 points)*

- (i) Identify one financial synergy that BJA has realized by owning BJT.  
Justify your answer.

ANSWER:

- (ii) Identify one operational synergy that BJA has realized by owning BJT.  
Justify your answer.

ANSWER:

- (iii) Identify one synergy that Motors Inc. would realize by purchasing BJT.  
Justify your answer.

ANSWER:

## 1. Continued

There are four factors that reduce the value created by a divestiture:

- A. Disentanglement costs
  - B. Stranded costs
  - C. Lost synergies
  - D. Stand-alone value
- (c) (4 points) Assess how each factor (A to D) would apply to divestiture of BJT by BJA. Justify your answers.

ANSWER:

- (d) (1 point) Describe two additional concerns BJA must consider for divestiture.

ANSWER:

- (e) (3 points) BJA determines it will divest BJT.

- (i) Compare and contrast public vs private transactions for divestitures.

ANSWER:

- (ii) Recommend whether BJA should sell BJT using a public or private transaction. Justify your answer.

ANSWER:

*Questions 1 through 6 pertain to the Case Study.  
Each question should be answered independently.*

**2.**

(9 points) Information about Frenz Corporation (Frenz) can be found in Section 4 of the Case Study.

Frenz is moving away from traditional budgeting and adopting an approach that focuses on shareholder value. A budgeting process based on the theory of economic value added (EVA) is being implemented.

(a) (3 points)

(i) Describe the role of strategic business planning in the budgeting process.

ANSWER:

(ii) Describe how components of the strategic planning process can be incorporated into EVA implementation.

ANSWER:

Recall:  $EVA = [\text{Return on Invested Capital (ROIC)} - \text{Cost of Capital}] \times \text{Average Invested Capital}$

(b) (3 points)

(i) Explain how increasing operating efficiency affects EVA.

ANSWER:

(ii) Explain how changes in taxes affect EVA.

ANSWER:



## 2. Continued

(iii) Explain how increasing leverage affects EVA.

ANSWER:

(iv) Explain how decreasing average invested capital affects EVA.

ANSWER:

One of Frenz's strategic initiatives is to develop a smart phone app.

(c) (3 points) Identify the elements of the smart phone app initiative that would impact Frenz's EVA. Justify your answer.

ANSWER:

**Questions 1 through 6 pertain to the Case Study.  
Each question should be answered independently.**

**3.**

*(11 points)* Information about Frenz Corporation (Frenz) can be found in Section 4 of the Case Study.

There are five steps in the modelling process (I to V):

- I. Problem articulation
- II. Formulation of a Dynamic Hypothesis
- III. Formulation of a Simulation Model
- IV. Testing
- V. Policy Design and Evaluation

(a) *(3 points)*

- (i) Apply steps I and II to the financial risks related to Frenz’s Asian expansion.

ANSWER:

- (ii) Explain how steps III through V can be used to model the financial risks related to Frenz’s Asian expansion.

ANSWER:

### 3. Continued

The sub-system diagram below illustrates Forrester's 'market growth model'.



- (b) (3 points) Describe Frenz's current state with respect to six of the flows from the sub-system diagram.

ANSWER:

- (c) (3 points) Labor shortages are expected to persist in the medium to long term. You have been asked to evaluate how this will affect Frenz with respect to its Operational Risk.

- (i) Identify one flow in the sub-system diagram from Frenz to the Market that is impacted by the labor shortage. Justify your answer.

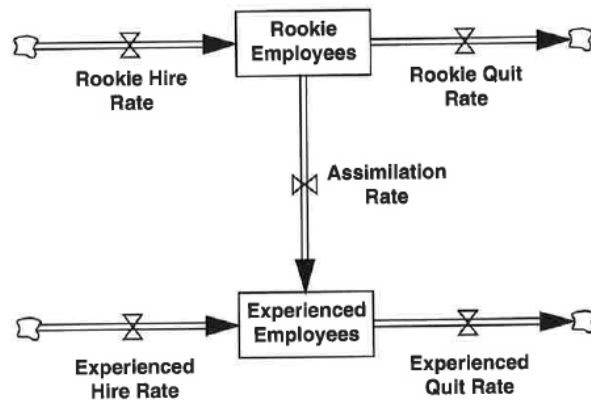
ANSWER:

- (ii) Identify one flow in the sub-system diagram from the Market to Frenz that is impacted by the labor shortage. Justify your answer.

ANSWER:

### 3. Continued

Frenz is considering a program that focuses on employee advancement rather than hiring externally to reduce overall employee turnover and help manage overall labor risk. A consultant had previously provided a following model for Frenz's employee base.



(d) (2 points)

(i) State the hypothesis to be tested for Frenz.

ANSWER:

(ii) Recommend two changes to the model to test the hypothesis.

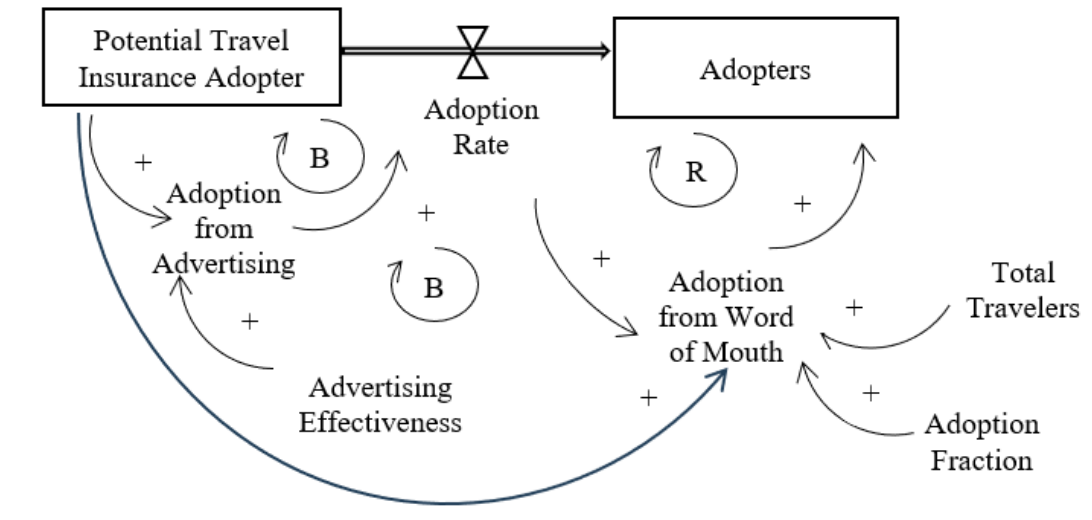
ANSWER:

**Questions 1 through 6 pertain to the Case Study.  
Each question should be answered independently.**

**4.**

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

(9 points) An intern suggests using a Bass Diffusion Model for the growth of Darwin’s travel insurance business. He presented a causal loop diagram below:



(a) (5 points)

(i) Explain why a Bass Diffusion Model is appropriate for modeling the growth of Darwin’s travel insurance business.

ANSWER:

(ii) Identify three errors in the suggested model.

ANSWER:

(iii) Explain three limitations of the Bass Diffusion Model when applied to Darwin’s travel insurance business.

ANSWER:

#### 4. Continued

Your coworker fits historical data to the model and prepares new projections. The coworker is confident that revenues will triple in the next five years based on the model results.

- (b) (2 point) Explain two limitations of using historical data to project future results.

ANSWER:

- (c) (2 points) Describe how the model, once calibrated, can be used by Darwin to solve business problems related to its travel insurance business.

ANSWER:

*Questions 1 through 6 pertain to the Case Study.  
Each question should be answered independently.*

**5.**

*(19 points)*

Information about Blue Jay Air (BJA) can be found in Section 2 of the Case Study.  
Information about Blue Jay Tire Co (BJT) can be found in Section 3 of the Case Study.

As part of its expansion plan, the BJT Production Expansion Committee is assessing how it should manage tire production in its newly planned plant.

BJT produces three types of tires: car tires, truck tires, and airplane tires. The sales revenue and expenses of each type are given by the following table.

<b>Tire Type</b>	<b>Raw Material Costs per Tire</b>	<b>Labor Costs per Tire</b>	<b>Sales Revenue per Tire</b>
<b>Car Tire</b>	\$25	\$30	\$100
<b>Truck Tire</b>	\$100	\$100	\$300
<b>Airplane Tire</b>	\$500	\$300	\$2000

At full capacity, the new plant can produce in one year:

- five million car tires, or
- two million truck tires, or
- one million airplane tires.

The plant can also allocate production capacity among the three tire types. As part of the initial plant start-up, BJT will only produce car tires and truck tires.

BJT wants to ensure that its truck tire production remains no higher than 30% of its total car tire production. However, BJT also requires that truck tire production does not fall any lower than 5% of its total car tire production.

## 5. Continued

BJT wants to optimize profit.

Profit = Sales Revenue – Raw Material Costs – Labor Costs

(a) (3 points)

(i) State the objective function.

ANSWER:

(ii) State the constraint functions.

ANSWER:

(b) (3 points) For the optimization problem defined in part (a):

(i) Sketch the feasible region with binding constraints clearly labeled.

ANSWER:

(ii) Calculate the optimal solution. Show your work.

ANSWER:

BJT will begin producing airplane tires at the new plant, thus the optimization model needs to be reassessed.

(c) (2 point)

(i) State the new objective function.

ANSWER:

(ii) State the new constraint functions.

ANSWER:



## 5. Continued

(d) (4 points) BJA determines that BJT will produce airplane tires exclusively for BJA. 10% of BJT's new plant production capacity will be allocated to produce airplane tires. BJA will pay \$900 per airplane tire produced.

(i) Calculate the optimal solution to your model in part (c) given this new information. Show your work.

ANSWER:

(ii) Compare and contrast how BJA and BJT may interpret the optimal solution in part (i).

ANSWER:

(iii) Explain the limitations of this type of linear optimization model analysis.

ANSWER:

(e) (5 points) Evaluate the North American tire industry under each of Porter's Five Forces.

ANSWER:

(f) (2 points) Explain how BJT's value chain allows it to differentiate itself within the North American tire industry.

ANSWER:

*Questions 1 through 6 pertain to the Case Study.  
Each question should be answered independently.*

**6.**

(10 points) Information about Big Ben Bank (Big Ben) can be found in Section 5 of the Case Study.

Big Ben has a strategic initiative to expand its digital banking presence. Growth scenarios for the digital banking market and associated probabilities are as follows:

First Year		Subsequent Years	
Growth Rate	Probability	Growth Rate	Probability
0%	50%	-5%	25%
10%	50%	0%	50%
		5%	25%

Big Ben is considering the following entry options into the digital banking market:

Entry Option	Capital Expenditure*	Value of Existing Bank	Time to Close	Ownership Percentage
Partner**	\$4M	\$8M	0 Years	50%
Buy	\$7M	\$6.2M	1 Year	100%
Build	\$3.5M	n/a	1 Year	100%

\*The Capital Expenditure is paid at time zero.

\*\*The Partnership is assumed to only last two years. Big Ben agrees to return its share of the value of the digital bank at the end of the partnership at cost.

The value of each entry option is equal to the value of Big Ben’s share of the bank when acquired, plus appreciation at 12% (in addition to market growth).

A Decision Tree that considers only the next three years is provided in Excel. Assume a discount rate of 0%.

- (a) (4 points) Calculate the Expected Monetary Value (EMV) of each entry option using the decision tree provided. Show your work.

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

**6. Continued**

- (b) (3 points) Recommend four ways to improve the decision tree model used in part (a).

ANSWER:

- (c) (3 points)

- (i) Explain why partnering or buying an existing digital bank rather than building its own may be beneficial for Big Ben from a strategic management perspective.

ANSWER:

- (ii) Recommend an entry option for Big Ben. Justify your answer.

ANSWER:

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