CURATED PAST EXAM ITEMS
- Questions -

CP 311 – Strategic Management

Important Information:

- These curated past exam items are intended to allow candidates to focus on past SOA fellowship assessments. These items are organized by topic and learning objective with relevant learning outcomes, source materials, and candidate commentary identified. We have included items that are relevant in the new course structure, and where feasible we have made updates to questions to make them relevant.
- Where an item applies to multiple learning objectives, it has been placed under each applicable learning objective.
- Candidate solutions other than those presented in this material, if appropriate for the context, could receive full marks. For interpretation items, solutions presented in these documents are not necessarily the only valid solutions.
- Learning Outcome Statements and supporting syllabus materials may have changed since each exam was administered. New assessment items are developed from the current Learning Outcome Statements and syllabus materials. The inclusion in these curated past exam questions of material that is no longer current does not bring such material into scope for current assessments.
- Thus, while we have made our best effort and conducted multiple reviews, alignment with the current system or choice of classification may not be perfect. Candidates with questions or ideas for improvement may reach out to education@soa.org. We expect to make updates annually.

CP 311 Strategic Management Course
Curated Past Exam Questions

These questions are edited versions of the questions in the 2020 to 2024 exams to match the learning objectives and content on the CP311 2025-2026 syllabus.

The related solutions, and excel spreadsheets, are also based on and reference the CP311 2025-2026 syllabus.

The case study that was originally used for each question is linked at the start of each question.

The syllabus learning objective(s) covered in each question are listed at the start as a reference.

Table of Contents (can click on question # to go to question):

1. Fall 2024 SDM Exam (LOs 2d, 2f)

Sources:
Damordaran on Valuation Book: Chapter 13 Value of Control
Damordaran on Valuation Book: Chapter 15 Value of Synergy
Valuation, Measuring and Managing: Ch 32 Divestitures

(*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.

Case Study Fall 2024:
https://www.soa.org/4a2fe3/globalassets/assets/files/edu/2024/fall/case-study/cfesdm.pdf

(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:

2. Fall 2024 SDM Exam (LOs 2b, 2c, 2d)

Sources:
Handbook of Budgeting – Ch. 15 Budgeting of Shareholder Value (start from Economic Value-Added Section)
Handbook of Budgeting – Ch. 6 Strategic Planning and Budgeting Process

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

Cass Study Fall 2024:
https://www.soa.org/4a2fe3/globalassets/assets/files/edu/2024/fall/case-study/cfesdm.pdf

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 = [Return on Invested Capital (ROIC) – Cost of Capital] x 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:

5. Fall 2024 SDM Exam (LOs 1a, 3a, 3c)

Sources:
Data Models and Decisions - Ch. 7 Linear Optimization
Data Models and Decisions - Ch. 9 Discrete Optimization
Understanding Michael Porter – Ch. 2

(*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.

Case Study 2024: https://www.soa.org/4a2fe3/globalassets/assets/files/edu/2024/fall/case-study/cfesdm.pdf

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.

Tire Type	Raw Material Costs per Tire	Labor Costs per Tire	Sales Revenue per Tire
Car Tire	$25	$30	$100
Truck Tire	$100	$100	$300
Airplane Tire	$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 BJTs 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 coffee shop 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:

1 Spring 2024 SDM Exam (LOs 1a, 2d)

Sources:
Strategic Management – Ch. 6: Corporate-Level Strategy
Valuation, Measuring and Managing the Value of Companies – Ch. 18: Using Multiples & Ch. 43: Banks

(*25 points*)
Case Study Spring 2024:
https://www.soa.org/49a9d3/globalassets/assets/files/edu/2024/spring/case-study/spring-2024-cfesdm-case-study.pdf

Information about Big Ben Bank (Big Ben) can be found in Section 5 of the Case Study. Information about Darwin Life Insurance Company (Darwin) can be found in Section 6 of the Case Study.

(a) (*1 point*) Describe the three types of income that Big Ben generates.

ANSWER:

(b) (*4 points*)

(i) Explain why equity discounted cashflows (equity DCF) is an appropriate valuation method for Big Ben. Justify your answer.

ANSWER:

(ii) Explain three pitfalls of equity DCF valuation.

ANSWER:

1. **Continued**

(c) (*2 points*)

(i) Critique the use of Price-to-Earnings as a metric for comparing the value of financial institutions.

ANSWER:

(ii) Recommend a more appropriate ratio for comparing the value of financial institutions. Justify your answer.

ANSWER:

1. Continued

Big Ben is considering decreasing its commercial banking business as it may not be creating sufficient value. The balance sheet and income statement specific to the commercial banking business as well as a template that your colleague used in a similar valuation a few months ago are included in the exam Excel file.

(d) (*6 points*) Assume that Big Ben's growth rate, as defined for equity DCF, will be 3.5% every year after the year 2027.

(i) Calculate the value of the commercial banking business equity using an equity DCF model as of January 1, 2024. Show your work.

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

(ii) Recommend whether Big Ben should decrease its commercial banking operations. Justify your answer.

ANSWER:

Two initiatives are being considered to improve the value creation of the commercial banking business:

1. Create an online reward system which incentivizes customers to increase their deposits.

2. Create an employee incentive program to increase the loan portfolio.

If Big Ben creates an incentive program to increase the loan portfolio, management wants to maintain the existing risk culture at Big Ben as well as the profitability of the loan business. Your colleague recommends using growth in interest income as the measure that will determine incentive compensation.

(e) (*2 points*)

(i) Critique your colleague's recommendation.

ANSWER:

(ii) Recommend an alternative metric. Justify your answer.

ANSWER:

1. Continued

Big Ben and Darwin have a common owner, but operate independently from one another, with different distribution channels and technologies. Big Ben's CFO has approached Darwin's CFO to discuss using a common customer service software under a single contract.

(f) (*2 points*)

(i) Explain the diversification strategy being proposed.

ANSWER:

(ii) Explain how this diversification strategy can be value-creating.

ANSWER:

(iii) Explain a potential risk of using a common customer service software. Justify your response.

ANSWER:

1. Continued

Big Ben's CFO and Darwin's CFO are also considering transferring Big Ben's marketing core competency to Darwin.

(g) (*3 points*)

(i) Describe how to transfer a core competency.

ANSWER:

(ii) Explain two ways value is created for Darwin by transferring the marketing core competency from Big Ben.

ANSWER:

(iii) Explain two potential pitfalls in transferring Big Ben's marketing core competency to Darwin.

ANSWER:

3. Spring 2024 SDM Exam (LOs 3a, 3b, 3c)

Sources:
Data Models and Decisions - Ch. 5

(*20 points*)
Case Study Spring 2024:
https://www.soa.org/49a9d3/globalassets/assets/files/edu/2024/spring/case-study/spring-2024-cfesdm-case-study.pdf

Information about Seaplane Expeditions and Aviation Company (SEA) can be found in Section 7 of the Case Study.

SEA is evaluating whether to make a change to a scheduled service route. The original route has constant economics with one flight per day. The new route will have variable economics described in the table below, with 0 to 3 flights per day.

A 100-day simulation model will be constructed using the following information. A template can be found in the exam Excel File.

<table>
<tr><th></th><th>Input</th><th>Original</th><th>New</th></tr>
<tr><td>N</td><td>Flights (per day)</td><td>1</td><td>0,1,2, or 3
<table><tr><th>N (Flights)</th><th>Binomial</th></tr><tr><td>Probability</td><td>50%</td></tr><tr><td>Number</td><td>3.0</td></tr></table></td></tr>
<tr><td>P</td><td>Price per flight</td><td>$1,000</td><td><table><tr><th>P (Price)</th><th>Normal</th></tr><tr><td>μ</td><td>$1010</td></tr><tr><td>σ</td><td>200</td></tr></table></td></tr>
<tr><td>R</td><td>Total revenues (per day)</td><td>$1,000</td><td>N x P</td></tr>
<tr><td>C</td><td>Cost (per day)</td><td>$800</td><td><table><tr><th>C (Cost)</th><th>N</th></tr><tr><td>$800</td><td>0</td></tr><tr><td>$800</td><td>1</td></tr><tr><td>$1,550</td><td>2</td></tr><tr><td>$2,300</td><td>3</td></tr></table></td></tr>
<tr><td>I</td><td>Income (per day)</td><td>$200</td><td>R - C</td></tr>
</table>

3. Continued

It is assumed that each variable is independent with no additional impacts on supply and demand.

(a) (*12 points*) Complete the 100-day simulation model template provided in the exam Excel File to answer the following items.

(i) Calculate the expected income for the 100-day simulation of the original route and the new route. Show your work.

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

(ii) Calculate the probability that the new route earns more than the original route on any given day. Show your work.

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

(iii) Calculate the probability that SEA will lose money on the new route on any given day. Show your work.

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

3. **Continued**

(b) (*4 points*)

(i) Identify four limitations of the current model architecture. Justify your answers.

ANSWER:

(ii) Recommend how to address each limitation identified in part (i).

ANSWER:

(iii) Describe the expected impacts on the model results if the recommendations in part (ii) are adopted.

ANSWER:

(c) (*4 points*) Recommend whether SEA should implement the new route. Justify your answer.

ANSWER:

1 Fall 2023 SDM Exam (LOs 2a, 2b, 2c, 2d, 2f)

Sources:
Handbook of Budgeting – Ch. 30 ZBB
Handbook of Budgeting – Ch. 2 Balanced Scorecard-based Budgeting & Performance Management
Handbook of Budgeting – Ch. 15 Budgeting of Shareholder Value (excl. pp 667-676)

(*8 points*)
2023 Fall Case Study:
https://www.soa.org/4ac521/globalassets/assets/files/edu/2023/fall/exams/fall-2023-cfesdm-exam-case-study.pdf

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:

2. Fall 2023 SDM Exam (LOs 2d, 2f)

Sources:
Damodaran on Valuation – Chapter 15

(*10.5 points*)
2023 Fall Case Study:
https://www.soa.org/4ac521/globalassets/assets/files/edu/2023/fall/exams/fall-2023-cfesdm-exam-case-study.pdf

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.

	Snappy	**Snarky**	**Combined**
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:

5. Fall 2023 SDM Exam (LOs 3a, 3b, 3c)

Sources:
Data, Models, and Decisions - Ch. 7 Linear Optimization, Data, Models, and Decisions - Ch. 8 Nonlinear Optimization

(*18 points*)
2023 Fall Case Study:
https://www.soa.org/4ac521/globalassets/assets/files/edu/2023/fall/exams/fall-2023-cfesdm-exam-case-study.pdf

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 = (Revenue – Expenses) / 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:

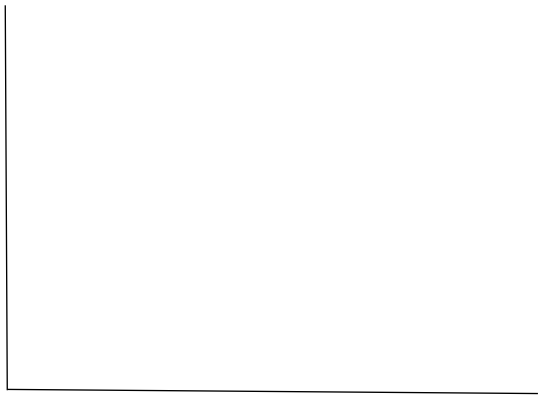
(b) (*2 points*) State the constraints.

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:

1. Spring 2023 SDM Exam (LOs 2a, 2b, 2c, 2e)

Sources:
Handbook of Budgeting – Ch. 30 Zero-Based Budgeting
Handbook of Budgeting – Ch. 2 Strategic Balanced Scorecard-based Budgeting & Performance Management

(*8 points*)
2023 Spring Case Study:
https://www.soa.org/49ac19/globalassets/assets/files/edu/2023/spring/exams/spring-2023-exam-cfesdm-case-study.pdf

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

BJA produced a Balanced Score Card, shown in case study Section 2 Exhibit 4.

(a) (*2 points*)

(i) Identify a leading measure on the balanced score card. Justify your answer.

ANSWER:

(ii) Identify a lagging measure on the balanced score card. Justify your answer.

ANSWER:

(iii) Identify an efficiency measure on the balanced score card. Justify your answer.

ANSWER:

(iv) Identify an effectiveness measure on the balanced score card. Justify your answer.

ANSWER:

1. Continued

BJA uses Incremental Budgeting. Susan Feather wants to switch to Zero Based Budgeting (ZBB). The following new initiatives are recommended by the department managers.

A – Expand the current IT team and acquire employees with mobile app development expertise
B – Update employee training courses and increase the frequency of employee training
C – Renovate and improve amenities in business lounges in major hubs
D – Reduce staff working hours and staffing for short domestic flights

(b) (*2 points*)

(i) State the two questions that the ZBB Ranking Process answers.

ANSWER:

(ii) Define "decision package" as it relates to the ZBB Ranking Process.

ANSWER:

(iii) Explain how management would use the ZBB Ranking Process to compare different initiatives.

ANSWER:

(c) (*2 points*) Recommend a relevant decision unit to use during the ZBB Ranking process for each initiative (A – D). Justify your answers.

ANSWER:

All of the initiatives have a similar return on investment.

(d) (*2 points*) Recommend a ranking for the initiatives (A – D). Justify your answer.

ANSWER:

2. Spring 2023 SDM Exam (LOs 1a, 1b, 2d, 2f)

Sources:
Understanding Michael Porter.
Strategic Management - Chapter 6
Damodaran on Valuation:

- Chapter 13 Value of Control
- Chapter 14 Value of Liquidity
- Chapter 15 Value of Synergy

Valuation, Measuring and Managing the Value of Companies – Ch. 18: Using Multiples

(*18 points*)
2023 Spring Case Study:
https://www.soa.org/49ac19/globalassets/assets/files/edu/2023/spring/exams/spring-2023-exam-cfesdm-case-study.pdf

Information on Darwin Life Insurance Company (Darwin) can be found in Section 6 of the Case Study.
Information on Snappy Life Insurance Company (Snappy) can be found in Section 7 of the Case Study.

Darwin is considering three acquisition targets (I – III) to increase firm value.
Information on I – III can be found in Section 6A of the Case Study.

I. ABC
II. XYZ
III. Yolo

(a) (*1.5 points*) Identify the best target (I – III) based on each of the following criteria. Justify your answer.

(i) Growth potential

ANSWER:

(ii) Volatility

ANSWER:

(iii) Value

ANSWER:

2. Continued

Darwin is considering acquiring Snappy as an alternative to the three companies above.

(b) (*0.5 points*) Explain how the valuation of Snappy may differ from I – III due to it being privately owned.

ANSWER:

When asked about Snappy's strategy, Frank Veltro replied "Our strategy is to be the best. Whatever our competitors do, we will do it better and for a lower price."

(c) (*2.5 points*)

(i) Define "strategy" according to Porter.

ANSWER:

(ii) Critique Frank's statement.

ANSWER:

Darwin plans to acquire Snappy.

(d) (*2.5 points*)

(i) Define economies of scope.

ANSWER:

(ii) Define corporate-level core competency.

ANSWER:

(iii) Identify the value-creating diversification strategy Darwin is pursuing by acquiring Snappy. Justify your answer.

ANSWER:

2. Continued

(e) (*0.5 points*) Propose one way Darwin's acquisition of Snappy could increase the value of the combined firm through value of control. Justify your answer.

ANSWER:

(f) (*1 point*) Propose one way Darwin's acquisition of Snappy could increase the value of the combined firm by creating an operating synergy. Justify your answer.

ANSWER:

(g) (*1 point*) Propose one way Darwin's acquisition of Snappy could increase the value of the combined firm by creating a financial synergy. Justify your answer.

ANSWER:

Snappy is planning to begin selling variable annuities. The estimated NPV for the project is $10 million. Gabriela Martinez says, "If we acquire Snappy today, the value of synergy will be $10 million on this project alone, in addition to other aspects of the acquisition."

(h) (*1.5 points*) Critique Gabriela's statement.

ANSWER:

Your colleague computes firm values using two valuation models (see the attached Excel spreadsheet):

A. Stable-growth model
B. Two-stage model

(i) (*2 points*)

(i) Recommend which model (A or B) is appropriate for valuing Darwin prior to the acquisition. Justify your answer.

ANSWER:

2. Continued

(ii) Recommend which model (A or B) is appropriate for valuing Snappy prior to the acquisition. Justify your answer.

ANSWER:

(iii) Describe the model for valuing the combined firm once the acquisition is complete. Justify your answer.

ANSWER:

The due diligence team has completed an initial analysis of Darwin's acquisition of Snappy, included in the Excel spreadsheet. The team provides the below assumptions for you to complete additional analysis.

- Pre-acquisition, Snappy is not optimally managed and the cost of capital can be lowered from 8% to 7% if management is changed.
- Post-acquisition, the combined firm will save $1 million in costs per year.
- Assume a tax rate of 21% for both Darwin and Snappy.

(j) (*1.5 point*) Calculate the value of control. Show your work.

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

(k) (*1.5 point*) Calculate the value of synergy. Show your work.

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

Darwin will pay $60 million for Snappy.

(l) (*2 points*) Evaluate the decision with respect to the answers in parts i, j, and k.

ANSWER:

3. Spring 2023 SDM Exam (LOs 1a, 1b)

Sources:
Understanding Michael Porter – Ch. 3

(*4 points*)
2023 Spring Case Study:
https://www.soa.org/49ac19/globalassets/assets/files/edu/2023/spring/exams/spring-2023-exam-cfesdm-case-study.pdf

Information on Frenz can be found in Section 4 of the Case Study.

Frenz has launched a new drink.

One year after the launch of the new drink the following results were recorded:

(000s)	Prior year	Current year
Total Revenue	438,035	481,839
Total Expense	371,524	412,392
After-Tax Net Income	66,511	69,447
Total Liabilities	135,740	144,320
Total Invested Capital	119,536	143,443

Market Share	15%	17%

Lotte Janssen, CEO of Frenz, makes the following statements regarding the results:

X. Bringing this new drink to market has given us a competitive advantage.
Y. The operational effectiveness initiatives we've put in place will be an additional competitive advantage.
Z. Our competitive advantages are best demonstrated by better-than-expected growth in our sales and increased market share.

(a) (*4 points*)

(i) Explain any flaws in each of Lotte's statements (X – Z)**.**

ANSWER:

3. **Continued**

(ii) Describe the use of return on invested capital (ROIC) according to Porter.

ANSWER:

(iii) Calculate Frenz's ROIC for current year and prior year. Show your work.

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

(iv) Evaluate Frenz's ROIC results assuming the industry average is 40% over the same period. Justify your answer.

ANSWER:

4. Spring 2023 SDM Exam (LOs 3a, 3b, 3c)

Sources:
Data Models and Decisions - Ch. 5

(*20 points*)
2023 Spring Case Study:
https://www.soa.org/49ac19/globalassets/assets/files/edu/2023/spring/exams/spring-2023-exam-cfesdm-case-study.pdf

Information on Frenz can be found in Section 4 of the Case Study.

Frenz is evaluating the opportunity to enter into an exclusive production agreement with the government of Vietombia in order to optimize the company's supply chain. Robert Kaplan, CFO of Frenz, directs you to the risk assessment provided in Section 4 Exhibit 2b of the case study to understand the risk of losses with and without this agreement.

(a) (*2 points*) Critique the model in Section 4 Exhibit 2b. Justify your answer.

ANSWER:

You construct a model to simulate Frenz's annual revenue and expenses. In the accompanying Excel spreadsheet, you are given the model parameters and a pre-populated set of 10,000 uniform independent random variables.

Assume:

- Each variable in the model is independent.
- Frenz can order beans instantly based on demand, without holding excess stock of coffee beans.
- Sales are limited to total amount of beans actually supplied.

(b) (*12 points*)

(i) Calculate the profit (loss) for each of the 10,000 simulations, with and without the Vietombia agreement in place. Show your work.

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

(ii) Calculate each of the relevant statistics identified in rows 29-40 of the Excel spreadsheet, with and without the Vietombia agreement in place. Show your work.

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

4. Continued

(c) (*4 points*)

(i) Evaluate the Vietombia agreement based solely on the model output and statistics calculated.

ANSWER:

(ii) Recommend whether or not Frenz should enter into the Vietombia agreement. Justify your answer.

ANSWER:

(d) (*2 points*)

(i) Identify two limitations of the current model design.

ANSWER:

(ii) Recommend how the model can be enhanced to address the limitations identified in part (i). Justify your answer.

ANSWER:

1. Fall 2022 SDM Exam (LOs 3a, 3b, 3c)

Sources:
Data, Models, and Decisions - Ch 8, Non-Linear Optimization
CP311-101-25: The Hard Side of Change Management

(15 points)
Case Study, Fall 2022
https://www.soa.org/4ac732/globalassets/assets/files/edu/2022/spring/exams/fall-2022-exam-cfesdm-case-study.pdf

Recall from "The Hard Side of Change Management":

$$\text{DICE Score} = D + (2 * I) + (2 * C1) + C2 + E$$

(a) (*2 points*)

(i) Define each component of the DICE score formula.

ANSWER:

(ii) Describe how a DICE framework is used.

ANSWER:

Information on Blue Jay Tire can be found in section 3 of the case study.

BJT wants to improve production at its worst-performing US plant. The plant employs 100 full-time employees and operates with 1 shift per day, and the plant has a local management team. BJT senior management sends a single individual from the head office to assess the situation and implement changes at the plant. The individual met with each manager to learn about operations at the plant and has decided that the team must implement four changes:

- Add a second shift to the plant.
- Split the current 100-person full-time workforce evenly between the two shifts.
- Hire 100 part-time workers, split evenly between the two shifts.
- Operate two shifts for the next six months so that production is doubled until a more permanent solution is found.

1. **Continued**

(b) (*3 points*) Describe what is being measured by each DICE score variable in the context of the above change.

ANSWER:

(c) (*1 point*) Explain how the DICE score formula would differ if the above shift changes were enacted entirely by the US plant's local management.

ANSWER:

You determine that the "E" in the DICE score does not have a linear relationship with its underlying factors. You recommend a non-linear equation for "E":

$$E = exp\left\{\frac{-\sum_{i=1}^{N}\left(S_i + Q_i + \prod_{\forall j \neq i} T_{ij}\right)}{N}\right\}$$

Where:

- N is the number of employees.
- S_i is a measure of salary for employee i.
- Q_i is a measure of job proficiency for employee i.
- T_{ij} is a measure of collaboration and teamwork between employees i and j.

(d) (*3 points*) Interpret the relationship between the DICE variable E and each of the components of the proposed formula.

ANSWER:

1. Continued

Employee 1 has resigned. BJT will be able to retain Employee 1 with a higher salary, but this will reduce the teamwork score between Employee 1 and other employees. BJT senior management has stated that it is not acceptable for the E score to be negatively impacted by more than 10%. You have been asked to assist with negotiating Employee 1's retention.

(e) (*3 points*)

(i) Describe the objective of negotiating Employee 1's retention in terms of a linear program. Justify your answer.

ANSWER:

(ii) Describe three relevant constraints that would apply when negotiating Employee 1's retention.

ANSWER:

(f) (*3 points*) Describe how C1 and C2 may exhibit non-linearity. Justify your answer.

ANSWER:

2. Fall 2022 SDM Exam (LOs 1a, 1b, 2a, 2b, 2d, 4b)

Sources:
Valuation, Measuring and Managing the Value of Companies – Ch. 3: Fundamental Principles of Value Creation
Valuation, Measuring and Managing the Value of Companies – Ch. 18: Using Multiples
Damordaran on Valuation, Chapter 13 – Value of Control
Handbook of Budgeting – Ch. 2 Balanced Scorecard-based Budgeting & Performance Management
Handbook of Budgeting – Ch. 15 Budgeting of Shareholder Value

CP311-105-25: Capital Bias
Strategic Management - Ch. 5
Strategic Management - Ch. 7

(*29.5 points*)
Case Study, Fall 2022
https://www.soa.org/4ac732/globalassets/assets/files/edu/2022/spring/exams/fall-2022-exam-cfesdm-case-study.pdf

Information on Darwin Life (Darwin) can be found in section 6 of the case study.
Information on Snappy Life (Snappy) can be found in section 7 of the case study.

Gabriela Martinez, Darwin's CEO, is considering acquiring Snappy as way to improve Darwin's financial performance. You have been asked to complete an analysis of the potential purchase.

(a) (*2.5 points*) Snappy should be valued at a 50% premium to the life insurance industry average price-to-book ratio.

(i) Determine Snappy's fair market value. Show your work.

ANSWER:

(ii) Explain three reasons why a single company may have a higher price-to-book multiple than its industry average.

ANSWER:

2. Continued

A colleague provides the following feedback:

> "I think Snappy's online sales channel is under-valued. I met with a consultant who has experience in online retail and they think this channel could triple our existing sales!"

(b) (*3 points*)

(i) Identify three capital decision biases demonstrated by your colleague. Justify your answer.

ANSWER:

(ii) Recommend a mitigation technique for each bias identified in part (i). Justify your answer.

ANSWER:

2. Continued

(c) (*3.5 points*) Snappy's optimal value is $5.8 million.

(i) Define control premium.

ANSWER:

(ii) Calculate the implied control premium using your answer from (a)(i). Show your work.

ANSWER:

(iii) Interpret your answer in (c)(ii).

ANSWER:

(iv) Explain a potential problem in Snappy's Balance Sheet that could be fixed by changing management.

ANSWER:

2. Continued

(d) (*3.5 points*) Snappy's optimal value is $5.8 million.

(i) Define control premium.

ANSWER:

(ii) Calculate the implied control premium using your answer from (a)(i). Show your work.

ANSWER:

(iii) Interpret your answer in (c)(ii).

ANSWER:

(iv) Explain a potential problem in Snappy's Balance Sheet that could be fixed by changing management.

ANSWER:

2. Continued

(e) (*4.5 points*) Gabriela is satisfied with your calculations, but she knows the Board will want assurances that the acquisition creates value for the combined organization over time. Gabriela will review your work and present it to the board members.

(i) Explain how Economic Value Added can be used to address the board's concerns.

ANSWER:

(ii) Recommend 5 components for the balanced scorecard for the acquisition of Snappy. Justify your answer.

ANSWER:

2. Continued

(f) (*7.5 points*) Darwin's Board is also mindful of the initiatives currently underway.

(i) (*0.5 points*) Describe the purpose of a strategy map.

ANSWER:

(ii) (*3 points*) Compare and contrast Darwin's strategy map with Snappy's for each of the three Internal Perspective components.

ANSWER:

(iii) (*1 point*) Assess whether Darwin is a first mover, second mover, or late mover. Justify your answer.

ANSWER:

(iv) (*3 points*) Critique the alignment of Darwin's resources based on your assessment in part (iii).

ANSWER:

2. Continued

(g) (*4 points*) Evaluate the potential acquisition of Snappy by Darwin with respect to four of the seven problems in achieving acquisition success. Justify your answers.

ANSWER:

(h) (*1 point*) Recommend whether or not Darwin should acquire Snappy. Justify your answer.

ANSWER:

1. Spring 2022 SDM Exam (LOs 1b, 2a, 2b, 2c, 2e)

Sources:
Handbook of Budgeting – Ch. 30 ZBB
CP311-100-25: What Everyone gets wrong about Change Management

(*20 points*)
Case Study Spring 2022
https://www.soa.org/49af5b/globalassets/assets/files/edu/2022/fall/exams/spring-2022-exam-cfesdm-case-study.pdf

Information on Big Ben can be found in section 5 of the case study.

Big Ben senior management is considering next year's funding goals for the four strategic initiatives: digital banking, cryptocurrency, the insurance opportunity with Darwin, and solar energy financing. Management faces both conflicting demands and limited resources. They decide to focus on making incremental changes from the previous year's expenditure level to set next year's budget.

(a) (*2 points*) List the shortfalls under this budgeting approach.

ANSWER:

There are five Quest categories related to change management that compose a corporate transformation.

(b) (*6 points*) Identify all applicable Quest categories for each of the four strategic initiatives. Justify your answers.

ANSWER:

Big Ben management feels that digital banking and cryptocurrency are the two best options. They wish to use the Zero-Based Budgeting approach (ZBB) to help answer the question "If we can only implement either Digital *or* Crypto, which should we choose?"

There are Five Key Elements of Zero-Based Budgeting.

(c) (*4 points*) Apply each element of ZBB within the context of the two alternatives.

ANSWER:

1. Continued

(d) (*1 point*) Explain what is wrong with management's use of ZBB.

ANSWER:

1. Continued

(e) (*4 points*) Management wants to maximize Big Ben's 5-year income from their investment. If the initiative is unsuccessful, it will merely break even over five years. Ignore effects of time value of money.

Item	Initiative	Initial investment ($M)	Annual Income ($M)	# of internal departments impacted	Overall Probability of success
1	Digital banking	9	2	8	60%
2	Crypto	13	2.5	5	30%

(i) (*1.5 points*) Develop a metric that best compares the initiatives. Justify your answer.

ANSWER:

(ii) (*1 point*) Calculate the metric for each initiative.

ANSWER:

(iii) (*0.25 points*) Rank the initiatives by order of preference.

ANSWER:

(iv) (*1.25 points*) Interpret the results of the ranking.

ANSWER:

1. **Continued**

Big Ben management has determined that, due to the growth of FinTech firms, expanding its digital banking presence is the only strategic initiative that will receive funding.

Regarding the Market Analysis for Neobanks, Mr. Patel argues "under ZBB approach, although the identification and evaluation of the minimum level of effort is the most challenging element, we can assume 75 percent of the current funding level is ideal for the Big Ben expansion strategy."

(f) (*1 point*) Explain two important reasons for defining a minimum level of funding for the digital banking initiative.

ANSWER:

(g) (*2 points*) Critique Mr. Patel's statement.

ANSWER:

2. Spring 2022 SDM Exam (LOs 1b, 2a, 2b, 2c, 2e)

Sources:
Handbook Budgeting Chapter 15 and 29
CP311-102-25: Cultural Change that Sticks

(*10.5 points*)
Case Study Spring 2022
https://www.soa.org/49af5b/globalassets/assets/files/edu/2022/fall/exams/spring-2022-exam-cfesdm-case-study.pdf

(a) (*0.5 points*) Define Corporate Performance Management.

ANSWER:

Information on Seaplane Expeditions and Aviation Company (SEA) can be found in section 8 of the case study.

SEA has retained the services of a consultant with experience in the transportation sector in China. The consultant has proposed an expansion plan as follows:

SEA will utilize Corporate Performance Management (CPM) to monitor the performance of the expansion plan only. The following goals and measurements plan has been proposed.

Strategy: Expand Service into China

Tactics and Goals	Measures	Dimension	Frequency
Maintain safety record	Safety incidents	By route	Monthly
Service 100,000 passengers	Passenger		

Internal Threats	Leading Indicators to Monitor
Supply of pilots	Number of Tickets sold
Supply of maintenance staff	

(b) (*3 points*) Critique SEA's proposed expansion plan with respect to CPM.

ANSWER:

2. Continued

The consultant has reviewed attempts by other companies to expand into foreign countries. In every case, the company's local culture adapts to the new country. The consultant is concerned that this adaptation has not been considered in SEA's proposed plan above.

(c) (*5 points*) Critique SEA's proposed expansion plan based on the Five Principles to Help Cultural Changes Stick.

ANSWER:

(d) (*2 points*) Recommend two changes to SEA's proposed expansion plan based on your assessment in (c). Justify your answer.

ANSWER:

3. Spring 2022 SDM Exam (LOs 1a, 3a, 3b, 3c)

Sources:
Data Models and Decisions - Ch. 5
Strategic Management – Chapter 1

(*23 points*)
Case Study Spring 2022
https://www.soa.org/49af5b/globalassets/assets/files/edu/2022/fall/exams/spring-2022-exam-cfesdm-case-study.pdf

Information on Big Ben Bank can be found in Section 5 of the Case Study.

Big Ben is considering providing financing under the solar energy subsidy program described in section 5.4 of the case study. Stakeholders of the program may be in 1 of 3 categories:

I. Capital market stakeholders
II. Product market stakeholders
III. Organizational stakeholders

(a) (*3 points*) List the stakeholders that are in each category (I through III). Justify your answers.

ANSWER:

3. Continued

Big Ben has developed a model to evaluate the investment.

Assume each annual loan repayment per $1,000 of financing is calculated as follows for each of the 20 years during which the financing is in place:

$$Payment = EEP \times RP \times U$$

Where (for any given year):

- EEP is units of the Excess Energy Production produced by the solar panels.
- RP is the Retail Price per unit of energy.
- U is an indicator variable denoting whether the Utilities companies participated in the program.
- EEP, RP, and U are independent of each other, and independent across time.

The model assumes the following probability distributions for the above variables, based on observed national averages from 5 years ago. This data is also provided in the Excel file for this question.

EEP (units)	Prob
25	5%
50	20%
75	50%
100	20%
125	5%

RP ($/unit)	Normal
μ	0.55
σ	0.20

U (Yes/No)	Prob
Yes (U=3)	80%
No (U=1)	20%

(b) (*1 point*) Calculate the expected annual loan repayment. Show your work.

ANSWER:

(c) (*2 points*) Calculate the standard deviation of the annual loan repayment. Show your work.

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

(d) (*2 points*) Explain why a simulation model is a useful tool to evaluate this investment.

ANSWER:

3. Continued

You are provided simulated values in the same format as above, corresponding to each year in one scenario modelled by Big Ben. This data is also provided in the Excel file for this question.

Year	EEP	RP	U	Payment
Distribution	**U(0,1)**	**N(0,1)**	**U(0,1)**	**N/A**
1	0.80	(0.02)	0.12	
2	0.59	(1.20)	0.05	
3	0.44	(0.57)	0.34	
4	0.52	(0.41)	0.69	
5	0.24	0.86	0.58	
6	0.04	0.14	0.52	
7	0.24	1.82	0.08	
8	0.16	0.09	0.30	
9	0.74	(1.00)	0.33	
10	0.63	0.26	0.22	
11	0.68	0.74	0.90	
12	0.26	0.24	0.01	
13	0.26	(1.50)	0.65	
14	0.64	1.11	0.30	
15	0.55	0.29	0.32	
16	0.41	0.62	0.84	
17	0.99	1.09	0.83	
18	0.82	0.54	0.18	
19	0.66	(0.61)	0.03	
20	0.72	1.44	0.44	

(e) (*5 points*)

(i) Calculate the simulated payment amount for each year in the above scenario.

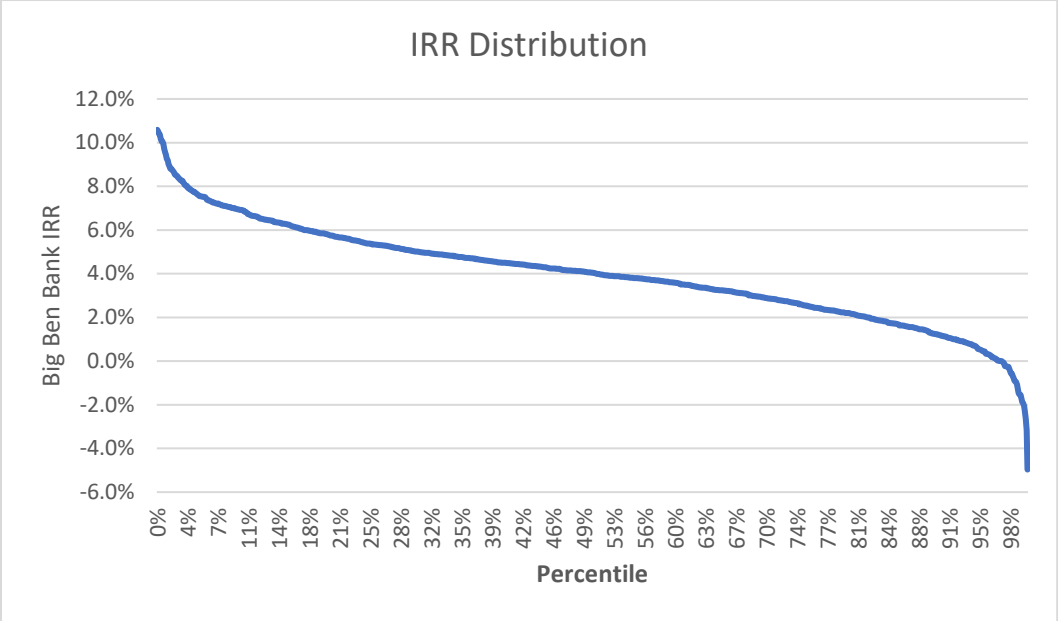
The response for this part is to be provided in the Excel spreadsheet.

(ii) Calculate the Internal Rate of Return (IRR) to Big Ben with respect to the investment under this scenario.

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

3. Continued

Your analyst repeats the above procedure over 1000 trials to construct the following IRR distribution:



(f) (*2 points*) Recommend two risk measures Big Ben should consider when evaluating this investment. Justify your recommendation.

ANSWER:

(g) (*2 points*) Explain how the simulation output can be used to help Big Ben decide whether or not invest.

ANSWER:

3. Continued

(h) (*3 points*) Assume no relevant factors have been omitted from the model.

(i) Identify two shortcomings of the simulation model used by Big Ben.

ANSWER:

(ii) Recommend two enhancements to the model that address your findings in part (i). Justify your recommendation.

ANSWER:

(i) (*3 points*) Assume the model ***does not*** capture all relevant factors:

(i) Identify two additional factors Big Ben should consider in its analysis. Justify your answer.

ANSWER:

(ii) Describe how each additional factor identified in part (i) could affect Big Bank's investment decision. Justify your answer.

ANSWER:

2. Fall 2021 SDM Exam (LOs 1b, 3a, 3c)

Sources:
Data, Models, and Decisions– Ch. 7
Strategic Management – Ch. 9

(13 points)
Case Study Fall 2021:

https://www.soa.org/4ae43d/globalassets/assets/files/edu/2021/fall/exams/fall-2021-exam-cfesdm-case-study.pdf

BJA management determines that in the event of a pandemic intercontinental flights would be stopped and they would focus only on domestic and continental routes. There would be only 50 flights possible per day. Instead of minimizing the standard deviation of viral outbreaks on these flights, BJA management would like to maximize the expected profit margin per flight. BJA management determines they can tolerate a possibility of viral outbreaks on these flights to have a standard deviation of at most 0.9.

(a) (*4 points*) State the objective function and constraint functions.

ANSWER:

(b) (*4 points*) For the optimization problem defined in part (c):

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

ANSWER:

(ii) Critique BJA management's assumptions under the current model.

ANSWER:

(iii) Explain the implications of Reputational Risk and how it relates to the current model.

ANSWER:

(c) (*2 points*) Recommend two ways to improve the model. Justify your answer.

ANSWER:

2. Continued

(d) (*3 points*) It is expected that passenger traffic across the industry will be reduced by 99% during a pandemic. BJA is considering using Code Sharing as a response.

(i) Identify the type of strategic alliance that best describes code sharing. Justify your answer.

ANSWER:

(ii) Recommend a specific action to help manage competitive risks in the type of alliance identified in (i). Justify your answer.

ANSWER:

(iii) Explain whether using code sharing is a valid strategic response to a 99% drop in passenger traffic.

ANSWER:

3. Fall 2021 SDM Exam (LOs 4b)

Sources:
CP311-105-25: Capital Bias

(*5 points*)
Case Study Fall 2021:
https://www.soa.org/4ae43d/globalassets/assets/files/edu/2021/fall/exams/fall-2021-exam-cfesdm-case-study.pdf
Information on Frenz can be found in section 4 of the case study.

As an analyst working for the chief risk officer (CRO) of Frenz Corporation, you are asked to examine the potential impact of a global pandemic on Frenz's business.

Frenz will make a capital investment budget of $1 million with a specific goal to minimize the number of infections at Frenz stores in the event of a pandemic. Three initiatives have been identified that could be implemented, each independent of the other.

Option	Cost ($)	Number of Customers Impacted	Infection Rate Reduction (Impacted Customers Only)	Management Desirability Rating
1	500,000	100,000	15%	A
2	700,000	90,000	25%	C
3	350,000	50,000	10%	B

(a)(5 points)

(i) Recommend a metric that avoids narrow framing and bias. Justify your answer.

ANSWER:

(ii) Calculate the recommended metric for each initiative. Show your work.

ANSWER:

(iii) Recommend which initiative(s) should be approved based on your answer to parts (i) and (ii). Justify your answer.

ANSWER:

4. Fall 2021 SDM Exam (LOs 1b, 2d, 2f, 4b)

Sources:
Strategic Management – Ch. 7
Damordaran on Valuation Chapter 13 Value of Control
CP311-104-25: Leaders as Decision Architects

(*22 points*)

Case Study Fall 2021:
https://www.soa.org/4ae43d/globalassets/assets/files/edu/2021/fall/exams/fall-2021-exam-cfesdm-case-study.pdf

Information on Darwin Life Insurance Company (Darwin) can be found in Section 7 of the Case Study.

QRS Life (QRS) has approached RPPC with a proposal to acquire Darwin. QRS is a mature, well-capitalized firm seeking an opportunity to invest excess cash flows. QRS only operates in select European markets. It is seeking a distribution network to sell products in North America.

Alexis Marino, Darwin's CFO, has been asked to prepare financial information on Darwin.

(a) (*6 points*)

(i) (*0.5 points*) Explain the benefits of a Cross-Border Acquisition for an acquiring firm.

ANSWER:

(ii) (*0.5 points*) Explain why Cross-Border Acquisitions are subject to more risk than those within a firm's home country.

ANSWER:

(iii) (*3 points*) Describe three pitfalls QRS may encounter with the acquisition of Darwin. Justify your answer.

ANSWER:

4. Continued

(iv) (*2 points*) Describe two ways QRS can mitigate the pitfalls mentioned in (ii). Justify your answer.

ANSWER:

4. Continued

(b) (*10 points*) QRS proposes to acquire Darwin for $1.6 billion.

(i) (*1 point*) Explain the implication of a 0% control premium.

ANSWER:

(ii) (*3 points*) Describe two changes QRS could make at Darwin that would increase Firm Value. Justify your answer.

ANSWER:

Independent analysts determine Darwin's optimal value is $1.4 billion.

(iii) (*1 point*) Calculate the control premium using a value of 1.226 billion. Show your work.

ANSWER:

(iv) (*2 points*) Interpret the difference between the purchase price QRS is willing to pay and the optimal value. Justify your answer.

ANSWER:

(v) (*3 points*) Explain how Darwin's activities and performance over the last 10 years have affected firm value. Justify your answer.

ANSWER:

4. Continued

Brandon Kaladin, CEO, sent you an email regarding the acquisition, but some of the statements are concerning.

(c) (*4 points*) Explain the cognitive bias in each statement and its potential risks in decision making.

(i) "One clear benefit of QRS acquiring us is we will be able to leverage the technology and business techniques that may not be popular here yet. It will put us way ahead of our competitors!"

ANSWER:

(ii) "Just last week, I read an article in the Wall Street Journal about how product innovation is just terrific in most European jurisdictions. We should be open to following QRS's example to avoid being left behind here."

ANSWER:

(iii) "It's great QRS made the first offer and showed their hand on how much they're willing to pay. We can just negotiate the price up from there."

ANSWER:

(iv) "We've been consistently hitting our strategic targets since being acquired by RPPC in 2014. I'm certain we'll be able to take on the growth opportunities from being acquired by QRS!"

ANSWER:

(d) (*2 points*) Explain how an email from an assigned devil's advocate could help combat the bias in the email sent by Brandon.

ANSWER:

1. Spring 2021 SDM Exam (LOs 4b)

Sources:
CP311-104-25: Leaders as Decision Architects

(*6 points*)
Case Study Spring 2021
https://www.soa.org/49c13e/globalassets/assets/files/edu/2021/spring/exams/spring-2021-exam-cfesdm-case-study.pdf

Information on Blue Jay Air can be found in Section 2 of the case study.

John Feather wants to create a plan for BJA that would be followed in the event of a global pandemic.

John insists that in the event of a pandemic BJA would keep the current policy to offer a credit voucher valid for the next six months for cancellations. His objective is to minimize cash outflows from the company. The BJA board views this as a very conservative approach, and they would like another option to consider.

(a) (*2 points*) Describe two biases exhibited by John Feather. Justify your answer.

ANSWER:

1. **Continued**

BJA is considering a different approach for customers cancelling travel in the event of a pandemic:

- Customers must first complete a survey about travelling after the pandemic. There are pictures of desirable travel locations embedded in the survey.
- Customers then choose between a cash refund or a voucher.
    - The cash refund is for 100% of the ticket price. Customers choosing this option will need to fill out a two-page form and mail it to BJA. It will take six to eight weeks to process.
    - The voucher is for 115% of the ticket price, but expires two years from the date of issue. No additional paper work is required and the voucher is immediately available to book future travel.
- An email communication will be sent out to customers to confirm the completed transaction, regardless of which option is chosen.

(b) (*4 points*)

(i) Explain the difference between System 1 and System 2 thinking.

ANSWER:

(ii) Explain how System 1 thinking is used in the proposed approach. Justify your answer.

ANSWER:

(iii) Explain how System 2 thinking is used in the proposed approach. Justify your answer.

ANSWER:

(iv) Explain an improvement to the proposed approach that could bypass both systems.

ANSWER:

2. Spring 2021 SDM Exam (LOs 3a, 3b, 3c)

Sources:
Data, Models, and Decisions – Ch. 8

(12 *points*)
Case Study Spring 2021
https://www.soa.org/49c13e/globalassets/assets/files/edu/2021/spring/exams/spring-2021-exam-cfesdm-case-study.pdf

(a) (*1.5 points*) Explain the difference between management science models and active management in the investment management industry with respect to each of the following:

(i) Selection of assets

ANSWER:

(ii) Consideration of risks

ANSWER:

Information on Darwin Life can be found in Section 7 of the Case Study.

(b) (*3 points*) Describe two techniques of management science Darwin Life can use to assist with its business operations, specifically as it pertains to managing investments. Justify your answer.

ANSWER:

2. Continued

Darwin is considering making a change to its investment strategy. Funds would be invested in Bonds, Mortgages, and Alternatives.

Asset	Expected Rate of Return	Variance	Risk Rating	Avg Duration
Bonds	2.0%	0.25%	2	12
Mortgages	7.0%	9.0%	4	5
Alternatives	16.0%	25.0%	8	2

	Correlation Matrix		
Asset	Bonds	Mortgages	Alternatives
Bonds	1	0.5	-0.5
Mortgages	0.5	1	-0.25
Alternatives	-0.5	-0.25	1

- Risk-free rate of return is 0.0%.
- Darwin's duration mismatch tolerance is 1.5 years. The duration of the underlying liabilities is 7.
- The risk rating of the portfolio must be no more than 3.5.
- Darwin must expect to earn a rate of return of at least 5%.

(c) You have been asked to maximize the Sharpe ratio of the asset portfolio using only nonlinear optimization.

$$\text{Sharpe Ratio:} = \frac{E[R_a - R_b]}{\sigma_a}$$

where…

- R_a is the rate of return of the portfolio.
- R_b is the risk-free rate of return.
- σ_a is the standard deviation of the portfolio rate of return in excess of the risk-free rate of return.

(i) (*2 points*) State the objective function.

ANSWER:

2. **Continued**

(ii) (*2.5 points*) State all of the unique constraints necessary to implement the above investment strategy.

ANSWER:

(iii) (*2 points*) Compare and contrast linear optimization and nonlinear optimization as approaches for maximizing the Sharpe ratio.

ANSWER:

(iv) (*1 point*) Propose an approach that uses the results of both linear optimization and nonlinear optimization to maximize the Sharpe ratio. Justify your answer.

ANSWER:

3. Spring 2021 SDM Exam (LOs 4a, 4b)

Sources:
CP311-106-25: Chapter 19 (Sections 19.1 – 19.4) of *Quantitative Enterprise Risk Management*
CP311-104-25: Leaders as Decision Architects

(*2 points*)
Case Study Spring 2021
https://www.soa.org/49c13e/globalassets/assets/files/edu/2021/spring/exams/spring-2021-exam-cfesdm-case-study.pdf

Frenz is considering introducing the loyalty rewards program described in Section 4.4 of the Case Study as part of its Digital Strategy.

(a)(*2 points*)

(i) Describe two cognitive biases that may limit the success of the rewards program. Justify your answer.

ANSWER:

(ii) Recommend actions Frenz can take to combat each bias described in (i). Justify your answer.

ANSWER:

4. Spring 2021 SDM Exam (LOs 1b, 3a, 3b, 3c)

Sources:
Strategic Management - Ch. 9, Cooperative Strategy
Data, Models, and Decisions - Ch 5 –Simulation Modeling

(*10 points*) Information on Frenz can be found in Section 4 of the Case Study.

Some of the parts of this question require calculations and require you to show your work. If you are completing this work in a Microsoft Excel workbook, please include it as part of your submission.

Frenz would like to enter into a vertical complementary alliance with a popular coffee bean producer as its primary bean supplier. The alliance would require the supplier to have a dedicated facility for Frenz's beans.

The supplier's preliminary analysis indicates the following:

- The supplier's marginal monthly production costs for a dedicated facility is $25,000.
- The supplier will produce 1,000 units of coffee beans per month.
- Frenz's demand for beans is 750 units per month. They have negotiated a discounted fixed price of $30/unit with the supplier. The supplier will sell surplus coffee bean production to other commodity markets.
- The monthly demand for coffee beans by other commodity markets is uncertain and follows the discrete probability distribution in the table below:

Demand for Surplus Coffee Beans (units per month)	**Probability**
0	0.5
250	0.3
500	0.2

- The supplier is able to vacuum pack any unsold beans so they can be sold in a future period. There is no additional inventory cost for storing unsold beans.
- The market price for coffee beans for any given month follows a Normal distribution with mean of $35/unit and standard deviation of $10/unit.

4. Continued

The supplier wants to simulate earnings projections over the next 10 months. You are given one set of random uniform numbers and one set of Standard Normal random variables (Z):

Month	Random Number Set 1 (Market Demand for Coffee Beans)	Z, Standard Normal random variable (Market Price of Coffee Beans)
1	0.65	-1.00
2	0.25	0.75
3	0.15	0.00
4	0.85	-1.50
5	0.75	1.00
6	0.95	2.00
7	0.55	-1.75
8	0.45	0.25
9	0.05	-0.75
10	0.35	-0.50

(a) (*6 points*)

(i) Design a model to project the supplier's earnings from the dedicated facility.

ANSWER:

(ii) Calculate projected earnings over the next 10 months using the random numbers provided. Show your work.

ANSWER:

(b) (*2 points*) Recommend two metrics the bean producer could use to evaluate earnings risk from the dedicated facility. Justify your answer.

ANSWER:

(c) (*2 points*) Describe two considerations as to whether or not Frenz should proceed with the alliance. Justify your answer.

ANSWER:

6. Fall 2020 SDM Exam (LOs 3a, 3c, 4a, 4b)

Sources:
Data, Models, and Decisions – Ch. 7, 9
CP311-104-25: Leaders as Decision Architects

(*17 points)*
Case Study Fall 2020
https://www.soa.org/4ad2a4/globalassets/assets/files/edu/2020/fall/exams/edu-2020-fall-cfesdm-exam-case-study.pdf

(a) (*1 point*)

(i) Define discrete optimization.

ANSWER:

(ii) Explain how linear optimization can be used to approximate solutions to discrete optimization problems.

ANSWER:

6. Continued

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

Analysis on BJA flight attendance shows that, on average for any given flight, 5% of customers do not show up. BJA does not issue refunds to customers who do not show up for flights.

BJA is considering implementing an intentional overbooking strategy in an effort to maximize revenue. Customers are considered overbooked when they are asked to give up their seat. As part of this strategy, overbooked customers will be given a $1200 voucher.

Under this strategy, senior management would like to ensure that the total expected value of vouchers issued is no more than 2% of total revenue.

Additionally, because BJA is mindful of its reputation, senior management would like to expect no more than 1% of customers are overbooked on any given flight.

BJA flight tickets cost $900 per person and plane capacity is 300 customers per flight.

You are asked to build a linear optimization model to analyze this strategy.

(b) (*2 points*)

(i) State the objective function.

ANSWER:

(ii) State the constraint functions.

ANSWER:

6. Continued

(c) (*4 points*) For the optimization problem defined in part (b):

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

ANSWER:

(ii) Critique the inclusion of both constraint functions in the model.

ANSWER:

Recent legislation was passed that requires airlines to offer overbooked customers a voucher valued at a minimum of $600 plus twice the value of the original ticket price.

(d) (*0.5 points*) State the new constraint functions.

ANSWER:

(e) (*1.5 points*)

(i) Calculate the optimal solution for the optimization model defined in part (d). Show your work.

ANSWER:

(ii) Explain how the relationship between the constraint functions has changed compared to how they were defined in part (b).

ANSWER:

6. Continued

Further legislation requires airlines to offer overbooked customers the option to receive the value of the voucher in the form of a full cash refund.

(f) (*2 points*) Assuming all overbooked customers elect to take the cash refund option:

(i) Explain how this new legislation changes the model.

ANSWER:

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

ANSWER:

(g) (*4 points*) Critique the optimization model's representation of:

(i) The overbooking strategy. Justify your answer.

ANSWER:

(ii) BJA's business strategy. Justify your answer.

ANSWER:

(h) (*2 points*) Design a solution to incentivize overbooked customers to choose the voucher over the full cash refund equivalent to the voucher value. Justify using decision architecture.

ANSWER: