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Exam Content Outline

Risk Management for Actuaries – Exam 9

Delivery Format

APPOINTMENT TIME: 4.5 HOURS		
Exam Duration	**Scheduled Break**	**Exam Tutorial, Confidentiality Agreement, End of Exam Survey**
4 hours	**15 min**	**15 min**

Exam Item Types

Candidates may see the following item types in the CAS examinations. Candidates should become familiar with these item types. Item type samples are available on the Pearson Vue CAS webpage.

Multiple Choice

Multiple answer choices are presented after a problem with only one correct answer.

Multiple Selection

Multiple answer choices are presented after a problem with more than one correct answer.

Point and Click

An image is presented after a problem where the candidate must identify the correct area of the image by clicking on the correct location in the image.

Fill in the Blank

One or more blank sections are presented after the problem or within a statement where the candidate must input the correct response(s).

Matching

Content columns presented after a problem where the candidate must correctly match content from one column to another.

Constructed Response

A blank response area is presented after a problem where candidates must construct and develop their own answer.

Spreadsheet

Spreadsheet-type items are displayed to the candidate in a spreadsheet format and candidates can make use of most spreadsheet functions. Please review the testing guide prior to sitting for your exam to note any differences between the Pearson Vue testing environment and common spreadsheet software (e.g., Excel, Google Sheets).

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Exam Cognitive Level

Each task is tied to a certain type of mental operation or thinking skill, which is called the cognitive level. ACAS and FCAS use four cognitive levels, and every examination item is authored to address both the task and one of the following cognitive levels paired with that task.

Remember: 0-10%

Tests the ability of the candidate to recall or remember knowledge or facts.

Understand and Apply: 40-50%

Measures the candidate's ability to understand and apply ideas and concepts to new situations.

Analyze and Evaluate: 40-50%

Requires the candidate to analyze information, combine concepts/ideas, and justify a position resulting from that combination.

Create: 0-10%

Requires the candidate to synthesize conclusions by evaluating the validity of ideas and concepts.

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Exam Section Details

DOMAINS	DOMAIN WEIGHT
A. Catastrophe and Reinsurance	25-35%
B. Risk and Return	20-30%
C. Financial Risk Management (FRM)	20-30%
D. Enterprise Risk Management (ERM)	15-25%

A. Catastrophe and Reinsurance

Candidates are expected to be able to interpret the methods used to model losses due to catastrophic events for the purpose of generating a catastrophe expected loss cost. Candidates are also expected to manage the total exposure from catastrophic events within an insurance portfolio.

Candidates will also be familiar with current and historical methods used to price reinsurance, with an emphasis on the application of these methods in pricing reinsurance contracts.

TASKS
1. Fit loss distribution-based exposure curves.
2. Determine the loss cost of various types of reinsurance contracts (e.g., excess of loss, quota share, surplus share, treaty, aggregate excess of loss, and facultative).
3. Determine the effect of common contract provisions (e.g., reinstatements, loss corridors, clash covers, profit and sliding scale commissions) on the loss cost of reinsurance contracts.
4. Evaluate catastrophe models.
5. Apply catastrophe models to ratemaking.
Readings: - Grossi & Kunreuther - Clark - Bernegger

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B. Risk and Return

Candidates can define, compare, select, and apply appropriate risk measures to compute a risk-loaded technical premium. Candidates can evaluate the economic value of insurance cash flows reflecting the time value of money. Candidates can explain and apply the insurance concepts of margin, return, and leverage.

TASKS
1. Define and apply risk taxonomies and the concept of a risk measure.
2. Calculate and compare financial risk using risk measures.
3. Evaluate the economic value of insurance cash flows reflecting the time value of money.
4. Determine risk loads for insurance pricing.
5. Assess insurance profitability (return, margin, leverage).
Readings: - Mildenhall & Major

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C. Financial Risk Management (FRM)

Candidates can describe and explain the need, purpose, design, and execution of insurer financial risk management (FRM) and perform the calculations necessary to allocate the cost of capital, estimate risk-adjusted prices, and evaluate economic performance by line or unit.

TASKS
1. Describe and explain the financial risk and capital structure of insurers, the cost of insurance capital, and the impact of insurance market imperfections.
2. Allocate the cost of risk capital to business units or lines of business.
3. Set prices for insurance policies on a risk-adjusted basis.
4. Assess risk-adjusted performance of business units or lines of business.
5. Estimate and manage interest rate and credit risk (e.g., default, prepayment, reinsurance).
6. Describe and apply the basics of structured finance.
7. Describe and apply securitization and its applications to the management of catastrophe risk (e.g., CAT bonds, insurance-linked securities).
Readings: - Coval, Jurek, and Stafford - Cummins Capital - Cummins CAT Bond - Mildenhall & Major - Panning

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D. Enterprise Risk Management (ERM)

Candidates can define and explain Enterprise Risk Management (ERM), including model selection and calculations necessary to implement a realistic program. Candidates can describe the relationship between ERM and the overall risk that a business faces, and the impact of different ERM tools on business risk and strategy.

TASKS
1. Determine operational risks.
2. Analyze insurance and financial risk quantitatively.
3. Determine the effect of risk measures and risk modeling on strategic management.
4. Select models to manage diverse risks.
5. Develop risk mitigation strategies.
6. Assess effectiveness of risk mitigation strategies.
Readings: - Brehm et al

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Complete Text References for Exam 9

Text references are alphabetized by the citation column.

Citation	Abbreviation	Domains/ Tasks	Source
Bernegger, S., "Swiss Re Exposure Curves and the MBBEFD Distribution Class," *ASTIN Bulletin*, Vol. 27, No. 1, May 1997, pp. 99-111.	Bernegger	A1	**OP**
Brehm, P.; Gluck, S.; Kreps, R.; Major, J.; Mango, D.; Shaw, R.; Venter, G.; White, S.; and Witcraft, S., Guy Carpenter, "Enterprise Risk Analysis for Property & Liability Insurance Companies," - Chapters 1, 2 (excluding Section 2.6), 3 (excluding Section 3.4), 4, and 5 (Section 5.4 only).	Brehm et al.	D1-D6	**SK**
Clark, D. R., "Basics of Reinsurance Pricing," CAS Study Note, Revised 2014.	Clark	A2-A3	**OP**
Coval, J.; Jurek, J.; and Stafford, E., "The Economics of Structured Finance," *The Journal of Economic Perspectives*, American Economic Association, Winter 2009, Vol. 23, No. 1	Coval, Jurek, and Stafford	C5-C6	**SK**
Cummins, J. D., "Allocation of Capital in the Insurance Industry," *Risk Management and Insurance Review*, American Risk and Insurance Association, Inc., Spring 2000, Vol. 3, No. 1, pp. 7-27. Including erratum.	Cummins Capital	C1-C4	**SK (Erratum is OP)**
Cummins, J. D., "CAT Bond and Other Risk-Linked Securities: State of the Market and Recent Developments," Risk Management and Insurance Review, American Risk and Insurance Association, Inc., 2008, Vol. 11, No. 1, pp. 23-47.	Cummins CAT Bond	C7	**SK**
Grossi, P., and Kunreuther, H., Editors, *Catastrophe Modeling: A New Approach to Managing Risk*, 2005, Springer. - Chapters 2-6 (excluding references at the end of each chapter) and including errata for Section 2.4, updated March 2021.	Grossi & Kunreuther	A4-A5	**B**
Mildenhall, S. and Major, J., *Pricing Insurance Risk: Theory and Practice*. John Wiley & Sons, 2022. Including errata. - **Domain B**: Chapters **3** (excluding 3.5), **4** (excluding 4.2.6, 4.3.9, 4.4), **5** (including sections 5.1, 5.2.1-5.2.15, 5.2.20, 5.3.4), **6**, **8** (sections 8.5, 8.7), **9** (excluding 9.3, 9.4), **10**, **11** (excluding 11.2.3, 11.3.4-11.3.7, 11.6) - **Domain C**: Chapters **2** (sections 2.1-2.2), **8** (sections 8.1-8.4, 8.6, 8.9, excluding 8.4.2), **12** (excluding 12.4), **13**, **14** (excluding 14.4-14.5), **15** (excluding 15.4.3-15.4.4) - Proofs and Appendices (5.A, 5.B, 8.A, 8.B, 10.A) will not be tested.	Mildenhall & Major	B1-B5, C1-C4	**B**

Citation	Abbreviation	Domains/ Tasks	Source
Panning, W. H., "Managing Interest Rate Risk: ALM, Franchise Value, and Strategy," Willis Re Working Paper, July 2006.	Panning	C3, C5	**OP**

Source Key

B	Book – may be purchased from the publisher or bookstore.
BO	Book (Optional) – may be purchased from the publisher or bookstore.
OP	All text references marked as Online Publications will be available by clicking the hyperlink within the syllabus.
SK	Material included in the 2025 Study Kit.
SKU	Material included in both the 2025 CAS Study Kit and the 2025 Update to the 2024 Study Kit.

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