

Carol

**CASUALTY  
ACTUARIAL SOCIETY**

ORGANIZED 1914

**RECOMMENDATIONS FOR STUDY**

(1975 Syllabus)

---

RULES REGARDING EXAMINATIONS FOR ADMISSION  
SYLLABUS OF EXAMINATIONS  
RECOMMENDATIONS FOR STUDY

---

OFFICE OF THE SOCIETY

200 East 42nd Street • New York, New York 10017

*Twentieth Edition, 1975*

Important Notice to Candidates for  
Parts 4, 6, 8 and 10 of the May, 1976 Examinations

While the Recommendations for Study will not include any major modifications to the syllabus of examinations, certain texts have become difficult to obtain, necessitating changes. In addition, a few new readings have been added. This bulletin outlines the changes in the syllabus for Parts 6, 8 and 10 of the exams. Naturally, readings not specifically referred to in this bulletin are still required for these three parts.

For Part 4, on the other hand, a complete, new syllabus is attached. The Zubay, Goshay and Science Research Associates readings have been deleted from 4(b). Chapter references for the Jordan, Wagner and Raiffa texts have been significantly altered. Only the references to the Ferguson and the Cozzolino and Freifelder papers are unchanged. These changes resulted from an analysis of the results of last May's exam, feedback from students, and a desire to condense the number of readings required for this exam.

The 1976 Recommendations for Study will incorporate these changes and will be printed in the very near future. It will be mailed to all members and students as soon as it is available from the printer.

att.

## (a) LIFE CONTINGENCIES

Jordan, C.W. Life Contingencies. 1967. Chapters 1 (omitting Section 5), 2 (omitting Section 6), 3, 4 (omitting Sections 2 and 3), 5 (omitting Sections 6, 7, 8 and 11), 6 (omitting Sections 4 and 5), 7 (Sections 1, 2 through formula 7.1 and 3 through formula 7.7 only), 8 (Section 3 only), 9 (Sections 1, 2 and 3 only).

Ferguson, R.E. "Actuarial Note on Workmen's Compensation Loss Reserves." P.C.A.S. LVIII, 1971

## (b) OPERATIONS RESEARCH, DECISION THEORY, DATA PROCESSING

Davis, G.B. Introduction to Electronic Computers. 1971  
Chapters 1, 2, 3, 4, 5, 8, 10, 19.

Raiffa, H. Decision Analysis - Introductory Lectures on Choices Under Uncertainty. Chapters 1 through 6.

Insurance companies have found that operations research techniques may be applied in solving insurance problems. Occasionally, an actuary may be assigned a specific work problem which would be most expeditiously solved by operations research methods. Frequently, there will be more than one way of solving a complex actuarial problem and a familiarity with operations research techniques can help the actuary select the one best suited to the problem.

It is not expected that this examination will make the candidate an operations research expert. Rather, it is designed to introduce the student to Operations research, much in the way a one-semester, first course in the subject would. This is accomplished by selecting several important operations research techniques and requiring that the candidate learn them in detail, including an ability to solve numerical problems. Other operations research techniques are simply surveyed and the candidate is required only to have a general familiarity, knowing when the technique should be applied.

The following sections of the Wagner text are those for which the candidate is expected to be able to recognize applications of the technique, set up problems and work numerical problems. The test will include both short-answer objective questions and longer problems on this subject matter.

Wagner, H.M. Principles of Operations Research.  
Chapters 2, 3 (pp. 77-85), 4 (pp. 95-110), 5 (pp. 129-143),  
8 (pp. 253-260), 20 (pp. 837-869) in the first edition (1969)

or

Chapters 2, 3 (pp. 73-81), 4 (pp. 91-106), 5 (pp. 127-145),  
8 (pp. 263-270), 20 (pp. 851-884) in the second edition (1975).

In the remaining sections, listed below, the candidate will not be required to reproduce mathematical formulas, to set up problems or to work numerical examples. However, he will be expected to recognize the type of problem to which these techniques might apply. For this section, the test will consist solely of short-answer questions.

Wagner, H.M. Principles of Operations Research.

Chapters 1, 11 (pp. 359-372), 16 (pp. 639-671), 21 (pp. 887-898), and 22 in the first edition (1969)

or

Chapters 1, 11 (pp. 383-396), 16 (pp. 651-677), 21 (pp. 903-915), and 22 in the second edition (1975).

The following paper is given as an example of an application of an operations research approach to an insurance problem. The candidate will not be asked to reproduce formulas or work examples. He will be expected to know which OR techniques were employed and how they were used for the particular insurance situation described in the paper. Only short-answer question(s) will be asked on this paper.

Cozzolino and Freifelder, "Underwriting Individual Drivers: A Sequential Approach." P.C.A.S. LX, 1973.

PART 6

(a) PRINCIPLES OF RATEMAKING

1. Replace the reference to "Classification Ratemaking," Chapter 11, Casualty Contingencies with:

Casualty Contingencies (exposure draft), Chapter 10 "Organization and Analysis of Risk Data," Chapter 11 "Classification Ratemaking" and Chapter 12 "Individual Risk Ratemaking" (available from the CAS office).

2. Replace the reference to Marshall's Workmen's Compensation Insurance Ratemaking with:

Kallop, R. "Workers' Compensation Insurance Ratemaking" (available from the CAS office).

(b) INSURANCE STATISTICS

There are no changes in the syllabus for this part.

PART 8

(a) INSURANCE LAW: SUPERVISION AND REGULATION

Delete the reference to New York Insurance Department's Examination of Insurance Companies

(b) STATUTORY INSURANCES

Replace the reference to Myers' Social Insurance and Allied Government Programs with:

Myers, R.J. Social Security 1975, Chapters 1-11, 13 and 15.

PART 10

(a) OPERATIONS OF INSURANCE COMPANIES

Add the following three references:

"Property-Liability Tests (A3) Task Force" Proceedings, National Association of Insurance Commissioners 1975 Vol. 1, pages 250-340

Stone, James M. "A Theory of Capacity and the Insurance of Catastrophe Risks" Journal of Risk and Insurance Part I in Vol. XL No. 2 (June, 1973) page 231 and Part II in Vol. XL No. 3 (September, 1973) page 339.

Joskow, Paul L. "Cartels, Competition and Regulation in the Property-Liability Insurance Industry" Bell Journal of Economics (available from the CAS office).

(b) REINSURANCE AND EXCESS RATING

Replace the reference to Chapter 14 of Casualty Contingencies with:

Casualty Contingencies (exposure draft) Chapter 13 "Deductibles, Excess Covers and Coinsurance Clauses" and Chapter 14 "Non-Proportional Reinsurance, Retentions and Surplus" (available from the CAS office).

Add the following four references:

Cahill, J.M. "Deductible and Excess Coverages, Liability and Property Damage Lines Other Than Automobile." P.C.A.S. XXIII, 1936. p. 18 or P.C.A.S. LVIII, 1971. p. 115.

Cahill, J.M. "Excess Coverage (per accident basis) for Self-Insurers: Workmen's Compensation - New York." P.C.A.S. XXVII, 1940. p. 77.

Salzmann, R. "Rating by Layer of Insurance" P.C.A.S. L 1963. p. 15.

Ferguson, R.E. "Allocating Premium to Layer by the Use of the Increased Limits Tables" P.C.A.S. LIX 1972. p. 43.

(c) FORECASTING

This new section was added in response to the increasing involvement of actuaries in the forecasting and planning functions of insurance companies. The four readings required for the 1976 syllabus are of a general nature and students are advised to prepare for questions which will test his ability to apply these principles to insurance problems. The readings (other than the McGuinness article) are available at cost from the CAS office.

Chambers, J.C., Mullick, S.K. and Smith, D.D. "How to Choose the Right Forecasting Technique" Harvard Business Review July-August 1971. p. 45.

Parker, G.G.C. and Segura, E.L. "How to Get a Better Forecast" Harvard Business Review March-April 1971. p. 99.

McLagan, D.L. "A Non-econometrician's Guide to Econometrics" Business Economics Vol. VIII, No. 3, May 1973. p. 38.

McGuinness, J.S. "Elements of Time-Series Analysis in Liability and Property Insurance Ratemaking" P.C.A.S. LV 1968. p. 202.

(d) TOPICS OF CURRENT INTEREST

The list of topics of current interest is replaced by the following list:

Changes in the Automobile Tort Liability System.

Federal Investigations and Legislation (e.g., liability hazards created by the Employee Retirement Income Security Act of 1974).

Insurance Accounting Problems (e.g., see Financial Accounting Standards Board papers on catastrophe reserves, price level accounting and foreign exchange accounting).

Legal Insurance.

Marketing Developments and Trends (e.g., mass merchandising, total security programs, etc.).

NAIC Examination of Insurance Companies (including the McKinsey Report).

National Health Insurance, including Health Maintenance Organizations.

Problems of the High Risk Insured (e.g., FAIR plans, Facilities, Joint Underwriting Associations, assigned risk plans, windstorm pools, flood, crime).

Archive 1975



PROCEEDINGS AND OTHER PUBLICATIONS  
OF THE SOCIETY

The Prices of back numbers of the Proceedings and other publications of the Society and a list of those back numbers still in print are set out in the Year Book of the Society.

Those wishing to purchase these publications should write to:

Secretary  
Casualty Actuarial Society  
200 East 42nd Street  
New York, New York 10017

old Book ← new 1975  
Part 5 Readings applies to Part 6 — \$3.00  
Part 6 Readings applies to Part 8 — \$3.00  
~~Part 7~~ Part 7 + 9  
Part 8 ~~Part 9~~  
Part 8 Part 9-B \$5.00  
Chapter 11 - Part 6  
Chapter 14 - Part 10

Post Exams  
old Syllabus 1974  
Part 5

new Syllabus  
← Part 6

Chapters 14 & 13 for Part 10  
Chapter 11-10-12 for Part 6

Archive 1975

RULES REGARDING EXAMINATIONS FOR ADMISSION

(Effective with May 1975 Examinations)

1. Dates of Examinations

<u>Part</u>	<u>1975</u>	<u>1976 and thereafter</u>
1	May, November	May, November
2	May, November	May, November
3	May, November	May, November
4	May	May
5	November	November
6	May	May
7	May, November	November
8	May	May
9	May, November	November
10	May	May

The Secretary will announce the exact dates on which the examinations will be given. It is customary to hold the examinations in such cities as will be convenient.

2. Filing of Application

A candidate who wishes to take one or more of Parts 1, 2 and 3 must make application on the Society's application form, which may be obtained from the Secretary.

A candidate who has previously submitted his application on the Society's application form, and who wishes to take one or more examinations other than Parts 1, 2 and 3, need not again make use of the Society's application form, but may simply write to the Secretary, stating the part or parts for which he is applying.

Each application must be accompanied by the appropriate examination fee, in check, draft, or money order payable to the Casualty Actuarial Society.

Applications must be received by the Secretary by April 1 for the Spring examinations and by October 1 for the Fall examinations.

3. Joint Administration

Part 1, the General Mathematics examination, Part 2, the Probability and Statistics examination and Part 3, the Numerical Analysis and Theory of Interest examination, are jointly administered by the Casualty Actuarial Society and the Society of Actuaries. Successful candidates will be given credit for these examinations by both Societies regardless of the Society through which the candidate registers.

#### 4. Associateship and Fellowship Examinations

In 1975 and 1976 satisfactory completion of (or credit for) examinations 1 through 6 is required in order to fulfill the examination requirements for Associateship. After 1976, examinations 1 through 7 will be required.

Satisfactory completion of (or credit for) all ten examinations is required in order to fulfill the examination requirements for Fellowship.

#### 5. Fees

The examination fee schedule at time of publication is as follows:

Parts 1, 2	\$10.00 for each Part
Part 3	\$12.50
Parts 4-10	\$20.00 for each Part

Examination fees are payable each time the candidate presents himself. Check, draft, or money order payable to the order of the Casualty Actuarial Society must be received by the Secretary before April 1 for the Spring examinations, or before October 1 for the Fall examinations.

#### 6. Prize Awards

The Casualty Actuarial Society and the Society of Actuaries will jointly award one \$200 and four \$100 prizes to the five successful undergraduates ranking highest in the General Mathematics examination. These prize awards are granted for both the Spring and Fall examinations.

#### 7. Credit for Examination Parts Under Former Syllabus

A candidate who has passed, or been credited with, one or more of the examinations under the 1974 Syllabus will receive credit for the corresponding examinations of the 1975 Syllabus in accordance with the following table:

<u>Parts Passed or Credited Under 1974 Syllabus</u>	<u>Parts Credited Under 1975 Syllabus</u>
1	1
2	2
3	3 and 4(a)
4	4(b) and 5
5	4(b) and 6
6	8
7	7
8	9(b)
9	9(a) and 10

On application to the Secretary, partial Part 4 examinations will be given in May 1975 and May 1976 to those candidates requiring them in accordance with the above credits. Similarly, partial Part 9 examinations will be given in May 1975, November 1975 and November 1976 for those candidates requiring such partial examinations. Beginning with the 1977 examinations, no candidate will be permitted to write only a portion of either the Part 4 or the Part 9 examination and all partial credits will expire.

#### 8. Waiver of Examinations for Associateship

Waiver of certain Associateship examinations will be allowed for a candidate who has passed or been credited with corresponding examinations of the Society of Actuaries, in accordance with the following:

<u>Casualty Actuarial Society</u>	<u>Society of Actuaries</u>
Part 1	Part 1, General Mathematics, passed prior to 1963 (before joint administration)
Part 2	Part 2, Probability and Statistics, passed prior to 1966 (before joint administration)
Part 3	Part 3, Numerical Analysis (or Finite Differences) and Theory of Interest (or Compound Interest)
Part 4(a)	Part 4, Life Contingencies

Candidates who take the Advanced Mathematics Test of the Graduate Record Examinations may apply for credit for Part 1. Credit will be granted if the candidate's score on the Graduate Record Advanced Mathematics Test is equivalent, as determined by the Casualty Actuarial Society, to a passing score on Part 1.

An application to the Casualty Actuarial Society for credit may be submitted either in advance of taking the Graduate Record Advanced Mathematics Test or after taking it. Acceptance of applications submitted more than three years after the test has been taken will be at the discretion of the Education and Examination Committee. The required application form can be obtained from the Secretary of the Casualty Actuarial Society. A small fee will be required in most instances in connection with securing a transcript of the candidate's scores on the test; the fees are explained on the application form.

The Board of Directors may waive, subject to such other requirements as it may prescribe, any examination of the Casualty Actuarial

Society if the applicant has passed any examination required by another recognized professional organization that the Board of Directors deems equivalent to such examination of the Casualty Actuarial Society.

#### LIBRARY

All candidates registered for the examinations of the Casualty Actuarial Society and all members of the Casualty Actuarial Society have access to all the library facilities. The CAS Library is located at 200 East 42nd Street, New York, N.Y. 10017.

Registered candidates may have access to the library by receiving from the Society's Secretary the necessary credentials. Books and manuals may be withdrawn from the library for a period of one month without charge. In general, not more than two references may be in the hands of a borrower at one time.

Address requests for books to:

Secretary  
CAS Library Service  
200 East 42nd Street  
New York, N.Y. 10017

#### AMERICAN ACADEMY OF ACTUARIES

Satisfactory completion of specified examinations of the Casualty Actuarial Society will satisfy the educational requirements of the American Academy of Actuaries. For further information contact the Academy at 208 South LaSalle Street, Chicago, Illinois 60604.

SYLLABUS OF EXAMINATIONS  
(Effective with 1975 Examinations)

<u>Part</u>	<u>Subject</u>
1	General Mathematics*
2	Probability and Statistics*
3	Numerical Analysis and Theory of Interest*
4	(a) Life Contingencies (b) Operations Research, Decision Theory, Data Processing
5	Principles of Economics, Theory of Risk and Insurance Forms, Coverages, Underwriting, Product Design, Marketing
6	Principles of Ratemaking and Insurance Statistics
7	Insurance Accounting and Expense Analysis Premium, Loss, and Expense Reserves
8	Insurance Law; Supervision and Regulation Statutory Insurances
9	(a) Advanced Ratemaking (b) Individual Risk Rating
10	Operations of Insurance Companies, Reinsurance, Topics of Current Interest

\* Jointly administered with the Society of Actuaries

## RECOMMENDATIONS FOR STUDY

The examinations for admission to the two grades of membership in the Society are designed to establish the qualifications of candidates. The following Recommendations For Study are provided as a guide for the candidates in their preparation for the examinations. It should be realized that although the examination questions will be based upon the textual material cited, they will not necessarily be drawn directly therefrom. The examinations will test not only the candidate's knowledge of the subject matter, but also his ability to apply that knowledge.

In their study for the mathematical sections of the Associateship Examinations, candidates are advised to work out as many examples as possible, in order to acquire facility in the application of the mathematical principles and methods to specific problems. The questions on the examinations for Parts 1, 2, and 3 are all of the multiple choice type.

In preparing for each part of the Fellowship Examinations, the candidate should become familiar with current developments by reading regularly at least two general insurance periodicals.

The references to papers in the Proceedings of the Casualty Actuarial Society (denoted by P.C.A.S.) are considered to include all discussions of these papers in these publications, though the page references cited refer to the papers only.

A description of the texts cited will be found in the Index To Readings at the end of these Recommendations. The reading material suggested in these Recommendations is designed to acquaint the student with the respective subjects and should not be interpreted as representing views endorsed by the Casualty Actuarial Society.

A study note has been prepared to assist the student in connection with the Part 9 examination and can be obtained from the Secretary's office at a cost of \$1.00 per copy. From time to time additional study notes will become available and the student should make inquiry of the Secretary of the Society. Also available without charge is a note entitled "Hints on Study and Exam Techniques".

Readings from out-of-print Proceedings of the Casualty Actuarial Society are available from the Society's office as follows:

Part 6	\$3.00	<i>Old Part 5</i>
Part 8	3.00	<i>Old Part 6</i>
Part 9(b)	5.00	<i>Old Part 8</i>
Parts 7, 9(a)	3.00	<i>Old Part 7+9</i>

Copies of examinations for recent years and sample examination questions may be obtained from the Secretary.



## PART 1

## GENERAL MATHEMATICS

(Jointly administered by the Casualty Actuarial Society and the Society of Actuaries.)

This three-hour multiple-choice examination is based on material usually covered in undergraduate mathematics courses through the differential and integral calculus. The following list of topics will serve to indicate the general scope of the examination:

Real and complex numbers; binomial theorem; elementary set theory including unions, intersections, and complements; functions; equations and inequalities; analytic geometry of two and three dimensions; systems of linear equations; determinants and elementary matrix algebra; standard algebraic and transcendental functions including polynomial, rational, trigonometric, logarithmic and exponential functions; limits, continuity, differentiability and integrability; derivatives, integrals and partial derivatives; the fundamental theorem of integral calculus; applications of derivatives and integrals, including multiple integrals; finite and infinite sequences and series, including the Taylor series expansion; mean value theorem.

The subject matter on which this examination is based is covered by textbooks used in standard mathematics courses. For students who have not had such courses a list of representative textbooks is to be found on page 32 of this syllabus.

## PART 2

## PROBABILITY AND STATISTICS

(Jointly administered by the Casualty Actuarial Society and the Society of Actuaries.)

This three-hour multiple-choice examination is based on material usually covered in undergraduate courses in mathematical probability and statistics. It can be taken by college students who have had a thorough course in these subjects or by persons who have done concentrated reading in these fields. The general scope of the examination is indicated by the following topics, which are among those proposed for a one-year college course in probability and statistics by the Committee on the Undergraduate Program in Mathematics (CUPM) of the Mathematical Association of America:

Sample spaces; axioms and elementary theorems of probability; independence, conditional probability, and Bayes' theorem; permutations and combinations; random variables; binomial, Poisson, normal, and other probability distributions; expectation, mean, variance, and moment-generating functions of probability distributions; multivariate distributions; transformations of random variables; conditional and marginal distributions; Chebyshev's inequality, law of large numbers,

central limit theorem; point estimation, including maximum likelihood estimation and the application of criteria such as consistency, unbiasedness, and minimum variance; tests of statistical hypotheses, including power functions, Type I and Type II errors, Neyman-Pearson lemma, and likelihood ratio tests; applications of sampling distributions, such as the normal, chi-square, F, and Student's t distributions, to confidence intervals and to tests for means and variances; regression and correlation; random sampling and randomization techniques; interpretation of experimental results.

The CUPM has reported that statistics courses can be implemented in a variety of ways, including different topics and placing different emphases on topics. That widely divergent approaches are acceptable is illustrated by the many texts appropriate for a one-year college course. Among such texts, those listed on page 32 of this syllabus are representative of those which cover the above topics and which provide the mathematical background required for this examination.

Students who have mastered the text material and can work the problems in any one of these references, and who have also had adequate practice in solving problems, should be adequately prepared to handle the mathematical material in this examination.

An additional reference, for students who may wish further practice in solving problems is Theory and Problems of Statistics by M. R. Spiegel (Schaum's Outline Series, McGraw-Hill). A second additional reference, for students who may wish to acquire further insight into the underlying nature of statistics and exposure to statistical applications, is Statistics: A Guide to the Unknown by Tanur, Mosteller, et al. (Holden-Day), available in both hard cover and paperback form.

It will be assumed that the student is familiar with the ordinary deck of fifty-two playing cards and the ordinary six-faced die.

### PART 3

#### NUMERICAL ANALYSIS AND THEORY OF INTEREST

(Jointly administered by the Casualty Actuarial Society and the Society of Actuaries.)

This three-hour multiple choice examination covers the two separate subjects of Numerical Analysis and Theory of Interest. The examination is based on the material listed for Kellison's two textbooks.

#### (a) Numerical Analysis

This subject encompasses various techniques for handling numerical data. Although many of the principles dealt with lend themselves readily to computer procedures and methods, knowledge

of such procedures or methods is neither presupposed nor required for the examination.

The general scope of the Numerical Analysis section of the examination is indicated by the following topics:

Finite differences, interpolation with equal and unequal intervals, central differences, summation, numerical methods of integration and differentiation, difference equations, successive approximation or iterative techniques, numerical methods of handling matrices and determinants, and numerical approaches to linear systems of equations.

✓ Kellison, S.G. Fundamentals of Numerical Analysis. 1974. Chapters 1-4, Chapter 5 (Sections 1-5 and 8-10), Chapter 6 (Sections 1-5), Chapter 7 (Sections 1-5), Chapter 8 (Sections 1-4 and 6-8), Chapter 9 (Sections 1-3), Chapters 11 and 12, Chapter 13 (Sections 1-8).

(b) Theory of Interest

The general scope of this subject is indicated by the following topics:

Measurement of interest, accumulation and discount, present value, forces of interest and discount, equations of value, annuities, perpetuities, amortization and sinking funds, yield rates, bonds and other securities, installment loans, depreciation, depletion and capitalized cost.

The emphasis is primarily on problem-solving and secondarily on theoretical considerations. Recourse is made, as needed, to methods from the calculus and classical algebra in order to present a broad perspective of both the practical and the theoretical aspects of this subject. The student will also be expected to be able to apply elementary numerical analysis techniques in solving some problems. Basic computations are made by reference to standard tabulated interest functions, a sheet of which is supplied at the examination. A copy of this sheet will be sent, after the examination fee has been paid, to all students applying for the examination.

✓ Kellison, S.G. The Theory of Interest. 1970. (Omit Section 7 of Chapter 4, Sections 9 and 10 of Chapter 6, and Sections 3, 4 and 5 of Chapter 7.)

For many students, Part 3 is the first actuarial examination for which they will be preparing without the benefit of a formal course in the subject material. These students will find it helpful to maintain contact with other Part 3 students and

to take advantage of opportunities to discuss with others questions that are considered difficult. Students should not hesitate to consult members of the profession in their own organizations or elsewhere who are knowledgeable on these subjects.

The examinations are drafted by the Part 3 Committee with the intention of testing the student's knowledge of the subject matter included in the texts and every effort is made to ensure that the questions fall within the scope of the texts. Trick questions are deliberately avoided, and the wording of each question is considered carefully to eliminate possible ambiguities. Each Part 3 examination is thoroughly reviewed in relation to all these factors by Officers of the Education and Examination Committees of both the Society of Actuaries and the Casualty Actuarial Society.

The Part 3 examinations are not published. However, a set of illustrative questions will be sent, after the examination fee has been paid, to students applying for the examination for the first time. Future examinations may vary somewhat from this set of questions as to the proportion of questions of various styles and subjects; new forms of questions may appear from time to time and the total number of questions may be increased or decreased. After having covered the study material thoroughly, students may wish to test themselves individually by trying to answer the illustrative questions within the indicated allotted time. Such a test will not only provide practice in answering multiple-choice questions but may also indicate areas requiring further work and study.

Scoring of the Part 3 examination will be done in such a way that there is no advantage or disadvantage to be anticipated from guessing answers in a purely random fashion as compared with omitting the answers entirely. The final decision as to where the pass mark shall be set is arrived at by consultation among the Officers of the Education and Examination Committees of the Society of Actuaries and the Casualty Actuarial Society, and the Chairman of Part 3. In fixing the pass mark, consideration is given both to the performance level of students' answers and to the comparative difficulty of the examination, in relation to those of previous years. Any peculiarities in connection with the answers to any questions on the examinations that show up, despite all the care taken in setting the examinations, are given appropriate recognition.

## PART 4\*

## (a) LIFE CONTINGENCIES

Jordan, C.W. Life Contingencies. 1967. Chapters 1 (omitting Section 5), 2, 3, 4 (omitting Section 2), 5 (omitting Sections 6, 7, and 8), 6, 7 (Sections 1, 2, and 3 only), 8 (Section 3 only), 9, 10 (omitting Section 3), 11 (Sections 1 through 5 only), 13 (Sections 1 and 2 only).

✓ Ferguson, R.E. "Actuarial Note on Workmen's Compensation Loss Reserves." P.C.A.S. LVIII, 1971.

## (b) OPERATIONS RESEARCH, DECISION THEORY, DATA PROCESSING

✓ Wagner, H.M. Principles of Operations Research. 1969. Chapters 1, 2, 3 (pp. 77-85), 4 (pp. 95-110), 5 (pp. 129-133), 6 (pp. 165-187), 8, 10, 11 (pp. 359-372), 13 (pp. 445-459), 14 (pp. 513-528), 16 (pp. 639-671), 20 (pp. 837-869), 21 (pp. 887-898), and 22.

~~Zubay, Eli "Symposium on Operations Research in the Insurance Industry," Journal of Risk and Insurance, Volume XXXII, No. 3, September 1965, pp. 325-336.~~

✓ Raiffa, H. Decision Analysis - Introductory Lectures on Choices Under Uncertainty. *Contact Jeff Large Education Comm.*

✓ Cozzolino and Freifelder, "Underwriting Individual Drivers: A Sequential Approach." P.C.A.S. LX, 1973.

✓ Davis, G.B. Introduction to Electronic Computers. 1971. Chapters 1, 2, 8, 10, 19.

~~Science Research Associates, Inc. Computing Systems Fundamentals: Overview SRA No. 15-60.~~

✓ ~~Goshey, R.C. Information Technology in the Insurance Industry. 1964. Chapters 2-3, 6-7.~~

PART 5 *no longer reading required*

## (a) PRINCIPLES OF ECONOMICS, THEORY OF RISK AND INSURANCE

In studying the following references it is recommended that they be read in the order listed:

Samuelson, P.A. Economics: An Introductory Analysis. 1970. Chapters 1-5, 10-15, 18-20, 21 (Appendix only), 22-26, 30, 31, 33,

✓ Samuelson, P.A. Economics. 1973. Chapters 1-4, 6, 10-15, 18-20, 21 (Appendix only), 22-26, 30, 31, 33.

\*Also see "Recommendations for Study", page 6.

- ✓ Kulp, C.A. and Hall, J.W. Casualty Insurance. 1968. Chapters 1 and 18.
- ✓ Bickelhaupt, D.L. and Magee, J.H. General Insurance. 1970. Chapters 1-3.
- ~~✓ Willett, A.H. Economic Theory of Risk and Insurance. 1951.~~
- ✓ Houston, D.B. "Risk, Insurance, and Sampling." The Journal of Risk and Insurance. Vol. XXXI, No. 4. p. 511.

(b) FORMS, COVERAGES, UNDERWRITING, PRODUCT DESIGN, MARKETING

(1) Policy Forms and Insurance Coverages

The candidate should be familiar with the policy provisions and the bases of exposure used in the respective lines of insurance, with emphasis on basic coverages and features common to all lines as well as those peculiar to specific lines or types.

The manual sections listed should be studied as illustrative of the part played by manuals in the forms and coverages area. Where separate manuals are published by states, use a typical state.

Policy provisions change from time to time so that it is essential to supplement the cited texts by study of the contracts currently in use. The candidate will be held responsible for knowledge of the following policy forms (not the associated endorsements): Family Auto, Homeowners, Workmen's Compensation. Copies of current insurance contracts may be obtained from a carrier or references may be made to the book or kit of sample policies cited herein.

Certain of the references encompass material beyond the scope of this sub-section, such as the determination of manual or class rates and individual risk rating plans. The examination for this sub-section will not reflect such material.

- ✓ Kulp, C.A. and Hall, J.W. Casualty Insurance. 1968. Chapters 2-10 and 14.
- ✓ Bickelhaupt, D.L. and Magee, J.H. General Insurance. 1970. Chapters 4, 10-13, 20, 21, 27, 28 and Appendices C and D.
- ✓ Eilers, R.D. and Crowe, R.M., Eds. Group Insurance Handbook. 1965. Chapters 3, 5, 6, 25 and 39.
- ✓ Head, G.L. Insurance to Value. 1971. Chapters 3 and 4.

(S.S. HUEBNER FOUNDATION FOR INS)

\* American Mutual Insurance Alliance.  
Study Kit of Policies, Forms and Endorsements -- Casualty, Fire, Marine and Life. Current edition.

or

Insurance Information Institute.  
Advanced Book of Sample Insurance Policies for Property and Liability Coverages. Current edition.

Note: A review of The Fire, Casualty and Surety Bulletins, The National Underwriter Company, or Broadened Protection for Personal and Business Risks, current edition, The National Underwriter Company may be helpful to the student in preparing for this section although examination questions will not be derived from these sources. The latter consist of pages from the F.C. & S. Bulletins.

Insurance Services Office.  
Private Passenger Automobile Manual. General Rules pp. 1-29.  
Homeowners Policy Manual of Rules and Rates. General Rules pp. 1-11.  
Owners, Landlords and Tenants Liability Manual. General Rules pp. 1-10, 45-66.

National Council on Compensation Insurance.  
Basic Manual of Rules, Classifications and Rates for Workmen's Compensation and Employers' Liability Insurance. General Rules pp. R1-R26.

## (2) Underwriting

The candidate should be familiar with the insurance underwriting function and its basic purpose, principles and activities. In addition to the listed references, those portions of the chapters in sub-section (1) which pertain to underwriting should be studied.

✓ Kulp, C.A. and Hall, J.W. Casualty Insurance. 1968. Chapter 11.

✓ Bickelhaupt, D.L. and Magee, J.H. General Insurance. 1970. Chapter 7.

✓ Head, G.L. Insurance to Value. 1971. Chapters 5 and 9.

~~\* Readings in Underwriting. Current edition. The American Institute for Property and Liability Underwriters.~~

~~\* Holton, Robert B. Commercial Fire Underwriting. 1969. The National Underwriter Company.~~

~~\* Subject must not~~

(3) Product Design and Marketing

The student should have an understanding of marketing concepts and considerations, including marketing research and product design and development. He should be prepared to discuss the application of this to the insurance process and product - policies, sales and pricing. The reference is not an insurance text and, in studying it, the student may omit the questions, problems, case histories and appendix. He should attempt to develop analogies in the insurance business.

Stanton, William J. Fundamentals of Marketing. 1971.

## PART 6\*

## (a) PRINCIPLES OF RATEMAKING

It is recommended that the student study references in the order listed.

- ✓ Michelbacher, G.F. and Roos, N.R. Multiple-Line Insurers: Their Nature and Operation. 1970. Chapters 2, 3.
- ✓ Kulp, C.A. and Hall, J.W. Casualty Insurance. 1968. Chapters 11 (pp. 373-375, 386-411 only), 19-22.
- "Classification Ratemaking", an exposure draft of Chapter 11 from planned Casualty Contingencies textbook (available from the C.A.S. office).
- ✓ Long and Gregg, Property and Liability Insurance Handbook. 1965. Chapters 13, 20 (pp. 285-297 only), 28, 56.
- ✓ Dorweiler, P. "Notes on Exposures and Premium Bases." P.C.A.S. XVI, 1929. p. 319. or P.C.A.S. LVIII, 1971. p. 59.
- ✓ Longley-Cook, L.H. An Introduction to Credibility Theory. 1962.
- ✓ Marshall, R.M. Workmen's Compensation Insurance Ratemaking. Revised, 1961. *Kallop W.C. ins by*
- ✓ Fratello, B. "The Workmen's Compensation Injury Table and Standard Wage Distribution Table - Their Development and Use in Workmen's Compensation Ratemaking." P.C.A.S. XLII, 1955. p.110.  
*also booklet*

\*Also see "Recommendations for Study", page 6.



- ✓ Stern, P.K. "Ratemaking Procedures for Automobile Liability Insurance." P.C.A.S. LIII, 1965. p. 139.
- ✓ Tarbell, L.L. "Automobile Physical Damage Ratemaking." P.C.A.S. XLVI, 1959. p. 123.
- ✓ Lange, J.T. "General Liability Insurance Ratemaking." P.C.A.S. LIII, 1966. p. 26.
- ✓ Newman, S.H. "Burglary Insurance Ratemaking." P.C.A.S. LIII, 1966. p. 312.
- ✓ Brannigan, J.F. "Current Ratemaking Procedures in Boiler and Machinery Insurance." P.C.A.S. LIII, 1966. p. 248.
- ✓ Hurley, R.L. "Commercial Fire Insurance Ratemaking Procedures." P.C.A.S. IX, 1973.
- ✓ Insurance Services Office. Recommended Procedure for Statewide Rate Level Analysis - Extended Coverage Insurance, Commercial Property. December 1972.
- ✓ Walters, M.A. "Homeowners Insurance Ratemaking." P.C.A.S. LXI, 1974. (Until Volume LXI of the Proceedings is published, copies of this paper will be available from the C.A.S. office.)
- ✓ Cook, C.F. "Trend and Loss Development Factors." P.C.A.S. LVII, 1970. p. 1.
- ✓ Head, G.L. Insurance to Value. 1971. Chapters 1, 2, 6-8, and Appendices 1-4.
- ✓ Lange, J.T. "The Interpretation of Liability Increased Limits Statistics." P.C.A.S. LVI, 1969. p. 163.
- ✓ "Individual Risk Rating Plans", a study note available from the C.A.S. office.

(b) INSURANCE STATISTICS

This section includes reading which covers the planning and use of internal statistical material, the compilation and presentation of insurance statistics for administrative and ratemaking purposes, and the sources and uses of external statistics, particularly as they may be required in insurance administration and ratemaking. References are listed in the suggested order for study.

- ✓ Michelbacher, G.F. and Roos, N.R. Multiple-Line Insurers: Their Nature and Operation. 1970. Chapter 11.

Kimball, S.L. and Denenberg, H.S. Eds. Insurance, Government and Social Policy. 1969. Chapter 13.

National Council on Compensation Insurance. Workmen's Compensation Unit Statistical Plan Manual.

Insurance Services Office. Automobile Statistical Plan.

Insurance Services Office. Statistical Plan for Homeowners Policies, Comprehensive Dwelling Policy, Dwelling Policies and Commercial Risks.

Health Insurance Association of America. Statistical Plan for Individual Accident and Health and Individual and Family Hospital, Surgical, Medical Policies. 1958.

The candidate should be familiar with the sources of published insurance statistics in order to know where to obtain such information when the need arises. The following annual publications constitute a representative list of such sources:

Best, A.M., Co.

Best's Insurance Reports - Property/Liability.

Best's Reproductions of Convention Statements - Property/Liability.

Best's Aggregates and Averages - Property/Liability.

Best's Executive Data Service.

The National Underwriter. 233-3958

Argus F.C. & S. Chart.

Argus Chart of Health Insurance.

New York Insurance Department. Loss and Expense Ratios (compiled from Insurance Expense Exhibits).

Weekly Underwriter.

The Insurance Almanac.

#### PART 7\*

##### (a) INSURANCE ACCOUNTING AND EXPENSE ANALYSIS

National Association of Insurance Commissioners. Proceedings. Blanks Committee Reports for the years subsequent to 1969 as these reports apply to the Fire and Casualty Blank.

##### (1) Insurance Accounting

Association form of Annual Statement Blank for Fire and Casualty Companies. (For specific illustrations, see Best's Reproductions of Convention Statements - Property/Liability.) The candidate should be familiar with this blank and its compilation.

\*Also see "Recommendations for Study", page 6.

\*Student must get

- ✓ Michelbacher, G.F. and Roos, N.R. Multiple-Line Insurers, Their Nature and Operation. 1970. pp. 172-180.
- ✓ ~~Insurance Accounting and Statistical Association. Insurance Accounting--Fire and Casualty. 1965. Chapters 1-4, 7, 8, 13, 16.~~
- ✓ New York (State) Insurance Department. Examination of Insurance Companies. Volume 2, Part 4.
- ✓ Committee on Annual Statement. "Report on the Annual Statement." P.C.A.S. LII, 1965. p. 244.
- ✓ American Institute of Certified Public Accountants. Audits of Fire and Casualty Insurance Companies. Chapter 9.
- Balcarek, R.J. "Effect of Loss Reserve Margins in Calendar Year Results." P.C.A.S. LIII, 1966. p. 1.
- Salzmann, R. "Schedule P on a Calendar/Accident Year Basis." P.C.A.S. LIV, 1967. p. 120.
- Otteson, P.M. "Some Observations Concerning Fire and Casualty Insurance Company Financial Statements." P.C.A.S. LII, 1965. p. 215.
- ✓ Pruitt, D.M. "Uniform Accounting -- A Study of Regulation." P.C.A.S. XXXVI, 1949. p. 22.
- ✓ Insurance Accounting and Statistical Association. Proceedings.
- | <u>Year</u> | <u>Page</u> | <u>Article</u>   |
|-------------|-------------|--|
| ✓ I 1965    | 269         | Interpretation and Analysis of Insurance Financial Statements. |
| ✓ II 1968   | 584         | Current Proposals for Changes in Schedule P.                   |
| ✓ III 1969  | 630         | Thoughts about Annual Statement Reporting.                     |
| ✓ IV 1970   | 687         | Managerial vs. Statutory Accounting.                           |

(2) Expense Analysis

Insurance Expense Exhibit. The candidate should be familiar with this blank and its compilation.

- ✓ ~~Insurance Accounting and Statistical Association. Insurance Accounting -- Fire and Casualty. 1965. Chapters 5, 14.~~
- ✓ New York (State) Insurance Department. Examination of Insurance Companies. Volume 4, Part 2.

Insurance Accounting and Statistical Association. Proceedings.

<u>Year</u>	<u>Page</u>	<u>Article</u>
<u>VI</u> 1963	273	Review of Uniform Accounting Instructions and Methods Used by Country Mutual in Allocating Expenses.
<u>Morison, G.D.</u>	"1965 Study of Expenses by Size of Risk."	<u>P.C.A.S. LIII</u> , 1966. p. 61.

## (b) PREMIUM, LOSS AND EXPENSE RESERVES

Association form of Annual Statement Blank for Fire and Casualty Companies. Pages 3, 7, 9, 27 and 32-36. (For specific illustrations as to relationship of Schedules, see Best's Reproductions of Convention Statements - Property/Liability.)

Michelbacher, G.F. and Roos, N.R. Multiple-Line Insurers, Their Nature and Operation. 1970. pp. 181-202.

Insurance Accounting and Statistical Association. Insurance Accounting -- Fire and Casualty. 1965. Chapters 9, 10 and 12.

Skurnick, D. "A Survey of Loss Reserving Methods." P.C.A.S. LX, 1973.

New York (State) Insurance Department. Examination of Insurance Companies. Volume 3. Chapters 2 (pp. 95-126 only), 4-10.

Tarbell, T.F. "Incurred but not Reported Claim Reserves." P.C.A.S. XX, 1933. p. 275 or P.C.A.S. LVIII, 1971. p. 83.

Bornhuetter, R.L. and Ferguson, R.E. "The Actuary and IBNR." P.C.A.S. LVIV, 1972. p. 181.

Balcarek, R.J. "Reserves for Reopened Claims on Workmen's Compensation." P.C.A.S. XLVIII, 1961. p. 1.

Fitzgibbon, W.J., Jr. "Reserving for Retrospective Returns." P.C.A.S. LII, 1965. p. 203.

Resony, A.V. "Allocated Loss Expense Reserves." P.C.A.S. LIX, 1972. p. 141.

Insurance Accounting and Statistical Association. Proceedings.

<u>Year</u>	<u>Page</u>	<u>Article</u>
<u>XI</u> 1955	332	Unearned Premium Reserve Accounting.
<u>XII</u> 1960	196	Unearned Premium Reserve Methods.
<u>XV</u> 1967	171	Discussion of Active Life Reserves As Respects Loss of Time Policies.

(a) INSURANCE LAW: SUPERVISION AND REGULATION(1) Background Law and Insurance

- ✓ Barnes, A. J. Self Review in Business Law. 1970.
- ✓ Anderson, R.A. The Insurer's Tort Law. 1971.
- ✓ Kulp, C.A. and Hall, J.W. Casualty Insurance. 1968. Chapter 23.
- ✓ New York (State) Insurance Department. Examination of Insurance Companies. Volume 2, Chapters 2, 3 and 5; Volume 6, Chapters 1 and 2.
- ✓ New York (State) Laws, Statutes, etc. New York Insurance Law. Articles I-V (except IIIa), VII, VIII, X, XIa, XII, XV (except XVa), and XVI.

(Note: The candidate is responsible only for the sections of the law as stated. If he is studying from publications such as the Consolidated Laws Service, which cite case histories as well as the law itself, the candidate is not responsible for the case histories although he may find them helpful to an understanding of the law. Candidates will not be tested on those sections of the New York Laws dealing exclusively with life insurance and/or annuities.)

(2) Supervision and Regulation

- ✓ Hartman, G.R. Rate-making for Homeowners Insurance. 1967. Chapters 4 and 7. *S. S. HUEBNER FOUNDATION*
- ✓ Mertz, A.C. The First Twenty Years.
- ✓ Carlson, T.O. "Rate Regulation and the Casualty Actuary." P.C.A.S. XXXVIII, 1951. p. 9 (excluding appendices).
- ✓ New York (State) Insurance Department. "The Public Interest Now in Property and Liability Insurance Regulation." (A Report to Governor Nelson A. Rockefeller, January 7, 1969.)
- ✓ Hartman, G.R. and Lange, J.T. "Rate Regulation and the Casualty Actuary-Revisited." P.C.A.S. IV, p. 1.
- ✓ Kimball, S.L. and Denenberg, H.S. Eds. Insurance, Government and Social Policy. 1969. Chapter 1-4, 8-10, 18.

\*Also see "Recommendations for Study", page 6.

National Association of Insurance Commissioners. Proceedings. The Introduction should be read and then for the last two years, Volumes I and II should be reviewed for all discussions and committee reports relating to topics covered in section 6(a), as found in reports of the following committees:

Laws, Legislation and Regulation (B). Property and Liability (D).

(b) STATUTORY INSURANCES

(1) Statutory Automobile Insurance

- ✓ Kulp, C.A. and Hall, J.W. Casualty Insurance. 1968. Chapters 11 (pp. 372-386 and 411-478), 12 and 13.
- ✓ Department of Transportation. Motor Vehicle Crash Losses and Their Compensation in the United States. March 1971.
- \* Insurance Information Institute. Comparison Chart of First Party Auto Insurance Laws. Latest edition. (Available from I.I.I. at no charge for single copies.)
- ✓ Aponte, J. and Denenberg, H.S. "The Automobile Problem in Puerto Rico: Dimensions and Proposed Solution." The Journal of Risk and Insurance. 1968. *article*
- \* ~~American Insurance Association. Analysis of Automobile Financial Responsibility and Related Laws. (Chart). Latest edition.~~ *article*
- ✓ National Association of Independent Insurers. Chart Analysis of Automobile Insurance Plans. Latest edition. *article*
- ✓ Department of Transportation. A Study of Assigned Risk Plans. July 1970.
- ✓ (2) Social Insurance and Allied Programs
- ✓ Myers, R.J. Social Insurance and Allied Government Programs. 1965. Chapters I-X, XII, XIV and Addendum.
- ✓ (This text should be read for the basic background underlying Social Security Systems in the United States. Up-to-date provisions will be found in the pamphlet Social Security Programs in the United States. Published by the U.S. Department of Health, Education and Welfare.) *out of print*
- ✓ New York (State) Department of Labor. "Studies in Disability Insurance." (Special Bulletin No. 224).
- ✓ Schwartz, M.J. "New York Statutory Disability Benefits Law, Coverage, Rates and Rating Plans." P.C.A.S. XXXVII, 1950. p. 57.

✓ Publication # 1770-00218 Price \$1.40 to order call 400-783-

\* Student must get this on his own

## PART 9\*

(a) ADVANCED RATEMAKING(1) General

- ✓ Kimball, S.L. and Denenberg, H.S., Eds. Insurance, Government and Social Policy. 1969. Chapter 11.
- ✓ Mayerson, A.L. "A Bayesian View of Credibility." P.C.A.S. LI, 1964. p. 85.
- ✓ Mayerson, A.L., Jones, D.A., Bowers, N.L., Jr. "The Credibility of the Pure Premium." P.C.A.S. LV, 1968. p. 175.
- ✓ Hewitt, C.C. "Credibility for Severity." P.C.A.S. LVII, 1970. p. 148.
- ✓ Masterson, N.E. "Economic Factors in Liability and Property Insurance Claim Costs, 1935-1967." P.C.A.S. LV, 1968. p. 61.
- ✓ Lange, J.T. "Application of a Mathematical Concept of Risk to Property-Liability Insurance Ratemaking." The Journal of Risk and Insurance. *(Best Article)* Volume XXXVI, No. 4. 1969.
- ✓ Bailey, R.A. "Insurance Rates with Minimum Bias." P.C.A.S. L, 1963. p. 4.

(2) Property and Multiple Line

- ✓ Lange, J.T. "Implications of Sampling Theory for Package Policy Ratemaking." P.C.A.S. LIII, 1966. p. 285.
- ✓ Longley-Cook, L.H. "Underwriting Profit in Fire Bureau Rates." P.C.A.S. LIII, 1966. p. 305.
- Whitman, A.F. and Williams, C.A. "Environmental Hazards and Rating", Journal of Risk and Insurance. Vol. XXXVII, No. 3. September 1970. pp. 419-436.

(3) Liability and Workmen's Compensation

- Rosenbloom, J.S. and Lee, J.F. "Economic Consequences of Automobile Accident Injuries: An Analysis." CPCU Annals. June 1971. pp. 129-142.
- ✓ Stinton, J.E. "Automobile Personal Injury Claims - A review." CPCU Annals. June 1971. pp. 115-128.
- ✓ Dropkin, L.B. "Some Considerations on Automobile Rating Systems Utilizing Individual Driving Records." P.C.A.S. XLVI, 1959. p. 165.

\*Also see "Recommendations for Study", page 6.

- ✓ Bailey, R.A. and Simon, L.J. "An Actuarial Note on the Credibility of Experience of a Single Private Passenger Car." P.C.A.S. XLVI, 1959. p. 159.
- ✓ Cahill, J.M. "Excess Coverage (per accident basis) for Self-Insurers: Workmen's Compensation - New York." P.C.A.S. XXVII, 1940. p. 77.

(4) Accident and Health

- ✓ Bartleson, E.L. Health Insurance Provided Through Individual Policies. 1968. Chapters 4-7 and Appendices 1 and 4.
- ✓ MacIntyre, D.M. Voluntary Health Insurance and Rate Making. 1962. Chapters 2-6.
- ✓ Eilers, R.D. and Crowe, R.M., Eds. Group Insurance Handbook. 1965. Part IV, Chapters 13-24.

(5) Other Lines

- ✓ Backman, J. Surety Rate Making. 1948. Chapters 6-8, 12, 13.
- ✓ Roth, R.J. "The Rating of Crop-Hail Insurance." P.C.A.S. XLVII, 1960. p. 108.

(b) INDIVIDUAL RISK RATING

Note: Candidates unfamiliar with the general principles underlying individual risk rating plans should review Michelbacher and Roos, Chapter 3, and Kulp and Hall, Chapter 22, before studying the required readings for this part. It is realized that parts of some technical articles cited in the recommended reading for this part are not current. However, the candidate should study all articles for their explanation of theory.

(1) General

Snader, R.H. "Fundamentals of Individual Risk Rating and Related Topics." (This study note may be obtained from the Casualty Actuarial Society at a cost of \$1.00 per copy.)

(2) Experience Rating

- ✓ Dorweiler, P. "A survey of Risk Credibility in Experience Rating." P.C.A.S. XXI, 1934. p. 1 or P.C.A.S. LVIII, 1971. p. 90.



- ✓ Perryman, F.S. "Experience Rating Plan Credibilities." P.C.A.S. XXIV, 1937. p. 60 or P.C.A.S. LVIII, 1971. p. 143.
- ✓ Johnson, R.A. "The Multi-Split Experience Rating Plan in New York." P.C.A.S. XXVIII, 1941. p. 15.
- ✓ Smith, S.E. "Interstate and Overall Rating Plans." P.C.A.S. XXXIV, 1947. p. 6.
- ✓ Bailey, A.L. "Workmen's Compensation D-Ratio Revision." P.C.A.S. XXXV, 1948. p. 26.
- ✓ Unthoff, D.R. "The Compensation Experience Rating Plan -- A Current Review." P.C.A.S. XLVI, 1959. p. 285.
- ✓ Marshall, R.M. Workmen's Compensation Insurance Ratemaking. Revised. 1961. Appendix, section 7 only.

The candidate should study the following rating plans and the forms used in the application thereof:

National Council on Compensation Insurance:  
Experience Rating Plan

Insurance Services Office, Experience and Schedule Rating Plans applicable to:  
General Liability

Surety Association of America:  
Experience Rating Plan - Financial Institutions.  
Experience Rating Plan - Mercantile Establishments.

### (3) Retrospective Rating

- Dorweiler, P. "On Graduating Excess Pure Premium Ratios." P.C.A.S. XXVIII, 1941. p. 132.
- Carlson, T.O. "An Actuarial Analysis of Retrospective Rating." P.C.A.S. XXVIII, 1941. p. 283.
- Valerius, N.M. "Risk Distributions Underlying Insurance Charges in the Retrospective Rating Plan." P.C.A.S. XXIX, 1942. p. 96.
- Smith, S.E. "Interstate and Overall Rating Plans." P.C.A.S. XXXIV, 1947. p. 6.
- Unthoff, D.R. "Excess Loss Ratios via Loss Distributions." P.C.A.S. XXXVII, 1950. p. 82.
- Leslie, W., Jr. "The National Defense Projects Rating Plan." P.C.A.S. XXXVIII, 1951. p. 174.

Foster, R.B. "The Boiler and Machinery Adjustment Rating Plan." P.C.A.S. XLI, 1954. p. 135.

Simon, L.J. "The 1965 Table M." P.C.A.S. LII, 1965. p. 1.

Hewitt, C.C. "Loss Ratio Distribution - A Model." P.C.A.S. LIV, 1967. p. 70.

The candidate should study the following retrospective rating plans and the forms used in the application thereof:

- \* National Council on Compensation Insurance:
  - ~~Retrospective Rating Plans - Plans A, B, C and J.~~
  - ~~Retrospective Rating Plan D.~~
  - ~~Retrospective Rating Plan D - Rating Supplement for Workmen's Compensation.~~
- ✓ Insurance Services Office:
  - Retrospective Rating Plan D - Rating Supplement for Liability, Burglary and Glass Lines.
- ✓ Retrospective Rating Plan D - Rating Supplement for Automobile Physical Damage.

(4) Miscellaneous Rating

Cahill, J.M. "Deductible and Excess Coverages, Liability and Property Damage Lines Other Than Automobile." P.C.A.S. XXIII, 1936. p. 18 or P.C.A.S. LVIII, 1971. p. 115.

The candidate should study the following rating plans and the forms used in the application thereof:

- ✓ Insurance Services Office:
  - Composite Rating Plan (Automobile, General Liability, Burglary, Glass.
- ✓ Insurance Services Office:
  - Deductible Rating Plan (\$5000 Max.) - Fire and Allied Lines. July 1963.
  - Deductible Rating Plan (\$10,000 Min.) - Fire and Allied Lines. July 1964.

\* Student must get

## PART 10\*

## (a) OPERATIONS OF INSURANCE COMPANIES

The candidate is expected to have acquired considerable technical knowledge and practical experience during preparation for previous examination parts. Ability to apply this knowledge and experience may be tested through questions dealing with problems for which there may be no generally recognized solutions.

The following references are indicated for particular attention:

- Herron, S.D., Jr. "Insurance Company Investments." P.C.A.S. LIII, 1965. p. 238.
- ✓ National Association of Insurance Commissioners. Measurement of Profitability and Treatment of Investment Income in Property and Liability Insurance. June 1970.
- Balcarek, R.J. "The Capital Investment Market and the Insurance Industry." P.C.A.S. LV, 1968. p. 186.
- ✓ Kimball, S.L. and Denenberg, H.S., Eds. Insurance, Government and Social Policy. 1969. Chapter 6.
- \* Denney, R.L., Rua, A.P., and Schoen, R.J. Federal Income Taxation of Insurance Companies. 1966. Chapters 3, 4, 10, 11 and 12.
- Beckman, R.W. "Federal Income Taxes". P.C.A.S. LVIII, 1971. *Jeff Long, Royal-Globe Ed. Chairman*
- Ferrari, J.R. "The Relationship of Underwriting, Investments, Leverage, and Exposure to Total Return on Owners' Equity." P.C.A.S. LV, 1968. p. 295.
- ✓ Hedges, B.A. "Insurance Rates and Investment Earnings Considered Together." The Journal of Risk and Insurance. Volume XXXVI, No. 4 (September, 1969). p. 455.
- Ferrari, J.R. "A Theoretical Portfolio Selection Approach for Insuring Property and Liability Lines." P.C.A.S. LIV, 1967. p. 33.
- Bailey, R.A. "Underwriting Profit from Investments." P.C.A.S. LIV, 1967. p. 1.
- ✓ Lewis, J.R. "Observations on Mass Merchandising of Property and Liability Insurance." CPCU Annals. June, 1971. pp. 165-180.

\* Student must get

\*Also see "Recommendations for Study", page 6.

\*Indefinitely out of stock

## (b) REINSURANCE

- ✓ Kulp, C.A. and Hall, J.W. Casualty Insurance. 1968. Chapter 17.
- ✓ Munich Reinsurance Co. Reinsurance and Reassurance. Volumes I-IV.

"Non-Proportional Reinsurance, Retentions and Surplus", an exposure draft of Chapter 14 from planned Casualty Contingencies textbook (available from the C.A.S. office).

## (c) TOPICS OF CURRENT INTEREST

The following is a list of topics of current interest in the industry with which the candidate should be familiar. Each September the Education Committee will review the topics and establish the list from which examination questions for the following year will be drawn. Consult the Secretary for the current list of topics.

In preparing for this subject, the candidate must do his own study and research by reading articles in the general press and in trade journals, by discussing the topics with people in the industry, and by reading whatever industry papers he can obtain.

The candidate should pay particular attention to all pertinent papers in Proceedings of the Casualty Actuarial Society for the most recent four years with special attention to the reviews. The candidate should also review the volumes for the most recent four years of the Proceedings of the National Association of Insurance Commissioners for material on these topics.

LIST OF TOPICS OF CURRENT INTEREST

- Captive Insurance Companies.
- Changes in the Automobile Tort Liability System.
- Federal Investigations and Legislation.
- Insurance Accounting Problems (e.g., generally accepted accounting principles, catastrophe reserves, etc.)
- Legal Insurance.
- Marketing Developments and Trends (e.g., mass merchandising, total security programs, etc.)
- NAIC Early Warning and Profitability Reports.
- NAIC Examination of Insurance Companies (including the McKinsey Report).

*Price level accounting & Foreign exchange acct.  
may be purchased from "Financial Acct Standards Board,  
Publications Div  
High Ridge Pk, Stamford, CT 06905.  
ct.*

National Health Insurance, including Health Maintenance Organizations.

Problems of the High Risk Insured (e.g., FAIR plans, Facilities, Joint Underwriting Association, assigned risk plans, wind-storm pools, flood, crime).

Rate Regulatory Problems (e.g., competitive rating laws).

*Business Economics* N III, May 1973  
(pamphlet)

## INDEX TO READINGS

Readings are available through the library of the Casualty Actuarial Society. However, the following information is furnished for those who wish to purchase the references.

- AICPA. Audits of Fire and Casualty Insurance Companies.  
American Institute of Certified Public Accountants, 666 Fifth Avenue, New York, New York 10019.
- American Institute for Property and Liability Underwriters, Readings in Underwriting. American Institute for Property and Liability Underwriters, Providence and Sugartown Roads, Malvern, Pennsylvania 19355.
- American Insurance Association. Analysis of Automobile Financial Responsibility and Related Laws. (Chart) American Insurance Association, 85 John Street, New York, New York 10038.
- Anderson, R.A. The Insurer's Tort Law. (1971). The Insurance Press, Ocean City, New Jersey 08226.
- Backman, J. Surety Rate-Making. (1948). Surety Association of America, 110 William Street, New York, New York 10038.
- Barnes, A.J. Self Review in Business Law. (1970). Richard D. Irwin, Inc., 1818 Ridge Road, Homewood, Illinois 60430.
- Bartleson, E.L. Health Insurance Provided Through Individual Policies. (1968). The Society of Actuaries, 208 South LaSalle Street, Chicago, Illinois 60604.
- Bickelhaupt, D.L. and Magee, J.H. General Insurance. (8th Edition) (1970). Richard D. Irwin, Inc., 1818 Ridge Road, Homewood, Illinois 60430.
- Davis, G.B. Introduction to Electronic Computers. (2nd Edition) (1971). McGraw-Hill Book Company, Manchester Road, Manchester, Missouri 63011.
- Denney, R.L., Rua, A.P., and Schoen, R.J. Federal Income Taxation of Insurance Companies. (1966). The Ronald Press Company, 79 Madison Avenue, New York, New York 10016.
- Department of Transportation. A Study of Assigned Risk Plans. (1970). GPO Cat. No. - TD 1.17:As7. Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.
- Department of Transportation. Motor Vehicle Crash Losses and Their Compensation in the United States. GPO-1971-0-420-342. Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

- Eilers, R.D. and Crowe, R.M., Eds. Group Insurance Handbook. (1965). Richard D. Irwin, Inc., 1818 Ridge Road, Homewood, Illinois 60430.
- Goshay, R.C. Information Technology in the Insurance Industry. (1964). Richard D. Irwin, Inc., 1818 Ridge Road, Homewood, Illinois 60430.
- Hartman, G.R. Ratemaking for Homeowners Insurance. (1967). Richard D. Irwin, Inc., 1818 Ridge Road, Homewood, Illinois 60430.
- Head, G.L. Insurance to Value. (1971). Richard D. Irwin, Inc., 1818 Ridge Road, Homewood, Illinois 60430.
- Insurance Accounting and Statistical Association. Insurance Accounting - Fire and Casualty. (2nd Edition) (1965). The Spectator Company, Chestnut and 56th Streets, Philadelphia, Pennsylvania 19139.
- ✓ Jordan, C. W. Life Contingencies. (2nd Edition) (1967). Society of Actuaries, 208 South LaSalle Street, Chicago, Illinois 60604.
- Kellison, S.G. The Theory of Interest. (1970). Richard D. Irwin, Inc., 1818 Ridge Road, Homewood, Illinois 60430.
- Kellison, S.G. Fundamentals of Numerical Analysis. (1974). Richard D. Irwin, Inc., 1818 Ridge Road, Homewood, Illinois 60430.
- Kimball, S.L. and Denenberg, H.S., Eds. Insurance, Government and Social Policy. (1969). Richard D. Irwin, Inc., 1818 Ridge Road, Homewood, Illinois 60430.
- Kulp, C.A. and Hall, J.W. Casualty Insurance. (4th Edition) (1968). The Ronald Press Co., 79 Madison Avenue, New York, New York 10016.
- Long and Gregg, Eds. Property and Liability Insurance Handbook. (1965). Richard D. Irwin, Inc., 1818 Ridge Road, Homewood, Illinois 60430.
- Longley-Cook, L.H. An Introduction to Credibility Theory. (1962). Casualty Actuarial Society.
- MacIntyre, D.M. Voluntary Health Insurance and Rate-Making. (1962). Cornell University Press, 124 Roberts Place, Ithaca, New York 14858.
- Marshall, R.M. Workmen's Compensation Insurance Ratemaking. (Revised, 1961). Casualty Actuarial Society.

- Mertz, A.C. The First Twenty Years. National Association of Independent Insurers. (Available in many property-liability insurance companies and from Casualty Actuarial Society Library. Do not write to National Association of Independent Insurers.)
- Michelbacher, G.F. and Roos, N.R. Multiple Line Insurers: Their Nature and Operation. (1970). McGraw-Hill Book Company, Manchester Road, Manchester, Missouri 63011.
- Munich Reinsurance Company. Reinsurance and Reassurance. (Available in many property-liability insurance companies and from Casualty Actuarial Society Library. Do not write to Munich Reinsurance Company.)
- Myers, R.J. Social Insurance and Allied Government Programs. (1965). Richard D. Irwin, Inc., 1818 Ridge Road, Homewood, Illinois 60430.
- New York (State) Department of Labor. Division of Research and Statistics. Studies in Disability Insurance. (1949). (Special Bulletin No. 224). The New York State Department of Labor, 80 Centre Street, New York, New York 10013. (Out-of-print. Available from C.A.S. Library.)
- New York (State) Insurance Department. Examination of Insurance Companies. (1953-1955, 7 Volumes). Prepared under the supervision of Deputy Superintendent Adelbert G. Straub, Jr., New York State Insurance Department, 324 State Street, Albany, New York 12210.
- New York (State) Insurance Department. Loss and Expense Ratios. New York State Insurance Department, 324 State Street, Albany, New York 12210.
- New York (State) Insurance Department. The Public Interest Now in Property and Liability Insurance Regulation. (A report to Governor Nelson A. Rockefeller, January 7, 1969). New York State Insurance Department, 324 State Street, Albany, New York 12210.
- New York (State) Laws, Statutes, etc. New York Insurance Law. (This can be obtained from several sources, such as - The Williams Press, Inc., 99 Broadway, Menands, New York 12202; or Edward Thompson Company, 399 Gold Street, Brooklyn, New York 11201.)
- Raiffa, H. Decision Analysis - Introductory Lectures on Choices Under Uncertainty. Addison-Wesley Publishing Company, Inc., Reading, Massachusetts 01867.
- Samuelson, P.A. Economics: An Introductory Analysis. (8th Edition) (1970). McGraw-Hill Book Company, Manchester Road, Manchester, Missouri 63011.



- Samuelson, P.A. Economics. (1973). McGraw-Hill Book Company, Manchester Road, Manchester, Missouri 63011.
- Science Research Associates, Inc. Computing Systems Fundamentals: Overview. SRA No. 15-60. Science Research Associates, Inc., 259 E. Erie Street, Chicago, Illinois 60611. (SRA is a subsidiary of IBM; IBM reference # GR 29-0280-0.)
- Spiegel, M.R. Theory and Problems of Statistics. McGraw-Hill Book Company, Manchester Road, Manchester, Missouri 63011.
- Stanton, William J. Fundamentals of Marketing. (1971). McGraw-Hill Book Company, Manchester Road, Manchester, Missouri 63011.
- Tanur, Mosteller, Kruskal, Link, Pieters, and Rising. Statistics: A Guide to the Unknown. (1972). Holden-Day, 500 Sansome Street, San Francisco, California 94111.
- Wagner, H.M. Principles of Operations Research. (1969). Prentice Hall, Inc., Englewood Cliffs, New Jersey 07632.
- Willett, A.H. Economic Theory of Risk and Insurance. (1951) Richard D. Irwin, Inc., 1818 Ridge Road, Homewood, Illinois 60430.

## PART 1 GENERAL MATHEMATICS

REPRESENTATIVE TEXTBOOKS

The General Mathematics Examination is based on material usually covered in undergraduate mathematics courses through the differential and integral calculus. There are many textbooks used in American and Canadian colleges which adequately cover the material upon which the candidate may be examined. The four items listed below may be considered representative of this class of textbooks. Any one of these may be helpful for students who have not had courses covering these topics.

Thomas, G.B. Jr.  
Calculus and Analytic Geometry (4th Edition)  
 Addison-Wesley Publishing Company, Inc.  
 Reading, Massachusetts 01867

Johnson, R.E., and Kiokemeister, F.L.  
Calculus with Analytic Geometry (4th Edition)  
 Allyn and Bacon, Inc.  
 Rockleigh, New Jersey 07647

Protter, M.H. and Moreey, C.B. Jr.  
College Calculus with Analytic Geometry  
 Addison-Wesley Publishing Company, Inc.  
 Reading, Massachusetts 01867

Purcell, E.J.  
Calculus with Analytic Geometry  
 Appleton-Century-Crofts, Inc.  
 440 Park Avenue South  
 New York, New York 10016

## PART 2 PROBABILITY AND STATISTICS

REPRESENTATIVE TEXTBOOKS

Hoel, P.G.  
Introduction to Mathematical Statistics (4th Edition)  
 John Wiley & Sons, Inc.  
 605 Third Avenue  
 New York, New York 10016

Hogg, R.V. and Craig, A.T.  
Introduction to Mathematical Statistics (3rd Edition)  
 MacMillan Company  
 866 Third Avenue  
 New York, New York 10022

Hoel, P.G., Port, S.C., and Stone, C.J.  
Introduction to Probability Theory and Introduction to Statistical Theory  
 Houghton Mifflin Company  
 Boston, Massachusetts

ADDRESSES OF OTHER ORGANIZATIONS  
WHOSE MATERIAL IS SUGGESTED READING

A. M. Best Co.  
Park Avenue  
Morristown, New Jersey 07964

American Mutual Insurance Alliance  
20 North Wacker Drive  
Chicago, Illinois 60606

CPCU Annals  
Penn State Building  
Media, Pennsylvania 19063

Health Insurance Association of America  
1701 K Street, NW  
Washington, D.C. 20006

or  
750 Third Avenue  
New York, New York 10017  
or  
332 South Michigan Avenue  
Chicago, Illinois 60604

Insurance Accounting and Statistical Association  
406 West 34th Street  
Kansas City, Missouri 64111

Insurance Information Institute  
110 William Street  
New York, New York 10038

Insurance Services Office  
160 Water Street  
New York, New York 10038

The Journal of Risk and Insurance  
112 E. Washington Street  
Bloomington, Illinois 61701

National Association of Independent Insurers  
2600 River Road  
Des Plaines, Illinois 60018

National Association of Insurance Commissioners  
660 E. Mason Street  
Milwaukee, Wisconsin 53202

National Council on Compensation Insurance  
200 East 42nd Street  
New York, New York 10017

EXAMINATION QUESTIONS

NEW PART

EXAMS TO BE SENT

1	SAMPLE QUESTIONS - SOA
2	SAMPLE QUESTIONS - SOA
3	SAMPLE QUESTIONS - SOA
4	SAMPLE QUESTIONS
5	PART 4 (LATEST TWO EXAMS)
6	PART 5 (LATEST TWO EXAMS)
7	PART 7 (LATEST TWO EXAMS)
8	PART 6 (LATEST TWO EXAMS)
9	PARTS 8 & 9 (LATEST TWO EXAMS)
10	PART 9 (LATEST TWO EXAMS)

ADDRESSES OF OTHER ORGANIZATIONS  
WHOSE MATERIAL IS SUGGESTED READING

The National Underwriter Company  
420 E. Fourth Street  
Cincinnati, Ohio 45202

Surety Association of America  
125 Maiden Lane  
New York, New York 10038

The Weekly Underwriter  
116 John Street  
New York, New York 10038

Archive 1975