EDUCATION COMMITTEE OF THE SOCIETY OF ACTUARIES (SOA)

INTRODUCTORY STUDY NOTE

EXAM SESSION: **SPRING 2024**

EXAM: **ASTAM – Advanced Short-Term Actuarial Mathematics**

DATE: **Wednesday, April 24, 2024; Time scheduled with Prometric**

The examination is three hours in length.

1. The ASTAM Exam is a three-hour exam consisting of six questions, worth a total of 60 points.

2. The exam will be taken at Prometric testing centers. The questions will be displayed on the computer. Candidates will also be provided with an Excel Workbook.

3. Five of the questions are to be answered in pen in exam answer booklets provided by Prometric. For these questions candidates may use the Excel Workbook for calculations, but only the answers provided in the exam answer booklet will be graded.

    One of the questions will be answered in the Excel Workbook. For this question, only the information provided in the Excel Workbook will be graded. Candidates may use the scratch paper booklet for rough notes, but nothing written on the scratch paper will be graded.

4. The point values assigned to each question are set to be proportional to the examination committee's estimate of the time required (approximately 3 minutes per point). Each question will have multiple parts, as illustrated in the sample questions and solutions. Each of the parts is worth an indicated portion of the total points for that question. Partial credit may be awarded for an answer to a question part; therefore, candidates should write answers to each part even if they are not complete.

5. Paper versions of the exam, tables, and formula sheet will not be provided.

6. The ranges of weights shown on the syllabus are intended to apply to the large majority of exams administered. On occasion, the weights of topics on an individual exam may fall outside the published range.

7. Recommended material to master the Learning Objectives/Outcomes includes textbooks, sample questions, and the study notes listed in the Appendix of this note. The Learning Objectives/Outcomes are found via links in this exam's home page on the SOA web site. The link to the sample questions is in the Appendix to this note. Past exam questions and solutions are also available through the SOA web site.

8. A thorough knowledge of the material covered in the Fundamentals of Actuarial Mathematics exam is assumed.

9. Tables will not be provided for this exam. Instead, candidates will be expected to use Excel to calculate probabilities and quantiles from common distributions, including the Normal distribution, the Poisson distribution, the chi-squared distribution, the *F* distribution, the gamma distribution, the binomial distribution, and the negative binomial distribution. Candidates may also use Excel for general calculations. However, candidates' Excel workbooks will not be considered when grading the pen and paper answers. Candidates should record all their answers in their answer booklets and should also give sufficient information on the formulas and methods used to allow graders to award partial credit where appropriate.

10. For the Excel question, only the information provided by candidates in the Excel Workbook will be graded. Candidates may use the scratch paper booklet for rough notes, but nothing written on the scratch paper will be graded.

11. Several book distributors carry some or all of the textbooks for the Society of Actuaries exams. A list appears on the SOA Web site at: http://www.soa.org/education/exam-req/resources/edu-txt-manuals.aspx.

12. Any changes in the syllabus for this exam will be published under "Updates" in this exam's home page on the SOA Web site.

13. The candidate should master the Learning Objectives/Outcomes. These Learning Objectives/Outcomes comprise the syllabus and also guide the examination committee when writing questions. The Learning Objectives/Outcomes also set out the cognitive level needed to pass this exam. Note that candidates are expected to "interpret," "explain," "compare," "apply," "construct," etc. While studying the recommended text sections, candidates should refer back to the Learning Outcomes to remain focused on the goals of the exam.

14. A formula sheet will also be available for this exam. Candidates are responsible for all formulas on the syllabus, including those not specifically listed on this formula sheet. A link to the formula sheet is provided in the Appendix.

15. The examination questions for this exam will be based on the notation and terminology described in the Notation and Terminology Study Note for this exam. If a conflict exists (in definitions, terminology, etc.) between this note and the readings for other exams, the questions should be answered on the basis of this note.

16. Candidates may ONLY use these battery or solar-powered Texas Instruments calculator models: BA-35, BA II Plus*, BAII Plus Professional*, TI-30Xa, TI-30X II* (IIS solar or IIB battery), and TI-30X MultiView* (XS solar or XB battery). Candidates may use more than one of the approved calculators during the examination. Candidates may also use the supplied Excel workbook for calculations.

Calculator instructions may not be brought into the exam room. During the exam, the calculator must be removed from its carrying case so the supervisor can confirm that it is an approved model. Candidates using a calculator other than the approved models will have their exams disqualified. Candidates can purchase calculators directly from: Texas Instruments, Attn: Order Entry, PO Box 650311, Mail Station 3962, Dallas, TX 75265, phone 800/842-2737 or http://epsstore.ti.com.

*The memory of the **BA II Plus, BAII Plus Professional, TI-30X II**, and **TI-30X MultiView**

calculators will need to be cleared by the examination supervisor upon the candidate's entrance to the examination room.

17. A list of various seminars/workshops and study manuals appears on the SOA Web site.

    These seminars/workshops and study manuals do not reflect any official interpretation, opinion, or endorsement of the Society of Actuaries or its Education Committee.

18. The Society of Actuaries provides study notes to persons preparing for this examination. They are intended to acquaint candidates with some of the theoretical and practical considerations involved in the various subjects. While varying opinions are presented where appropriate, limits on the length of the material and other considerations sometimes prevent the inclusion of all possible opinions. These study notes do not, however, represent any official opinion, interpretation or endorsement of the Society of Actuaries. The Society is grateful to the authors for their contributions in preparing study notes.

    The American Academy of Actuaries, the Canadian Institute of Actuaries, the Conference of Consulting Actuaries, and the Society of Actuaries jointly sponsor various examinations administered by the Society of Actuaries.

APPENDIX

The syllabus material is the following four sources:

Loss Models: From Data to Decisions, (Fifth Edition), 2019, by Klugman, S.A., Panjer, H.H. and Willmot, G.E., Wiley, ISBN: 978-1-119-52378-9

- Chapter 3: Sections 3.3, 3.4.2 – 3.4.6
- Chapter 5: Sections 5.1, 5.2
- Chapter 7: Sections 7.1, 7.2
- Chapter 8
- Chapter 9: Sections 9.3.1, 9.3.2, 9.4 (Theorem 9.7 and Example 9.9 only), 9.5, 9.6 (except 9.6.1), 9.7,
- Chapter 11: Sections 11.5-11.7
- Chapter 12: Section 12.4
- Chapter 13
- Chapter 15 (except 15.4.2)
- Chapter 17
- Chapter 18

Introduction to Ratemaking and Loss Reserving for Property and Casualty Insurance (Fifth Edition), 2022 by Brown and Lennox, ACTEX, ISBN: 978-1-64756-787-3 [Candidates may also use Fourth Edition, 2015, (same chapters) ACTEX, ISBN: 978-1625424747]

- Chapter 1: Sections 1.2, 1.4
- Chapter 4: Section 4.8
- Chapter 5: Sections 5.3, 5.4

ASTAM-21-23: *Outstanding Claims Reserves*, 2022, Hardy, M.R. (Excluding Appendix A)

ASTAM-22-23: Chapter 5 of *Quantitative Enterprise Risk Management, 2022,* by Hardy, M.R. and Saunders, D., Cambridge University Press, ISBN: 978-1009098465

Notation and Terminology used on Exam ASTAM

ASTAM Formula Sheet

Sample questions and solutions

Sample excel questions and solutions

Corrections and Comments for *Loss Models,* Fifth Edition

Note: The text and study notes will not be available with the examination. An electronic copy of the formula sheet will be available with the exam**.**