

EDUCATION COMMITTEE OF THE SOCIETY OF ACTUARIES (SOA)

INTRODUCTORY STUDY NOTE

EXAM SESSION: SPRING 2023

EXAM: ALTAM – Advanced Long-Term Actuarial Mathematics

DATE: Tuesday, April 25, 2023; Time scheduled with Prometric

The examination is three hours in length.

1. This examination will have 60 points of written-answer questions. The number of written-answer questions may vary from exam session to exam session. 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). Most written-answer questions have multiple parts as illustrated in the sample written answer 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.

The exam will be taken at Prometric testing centers. The written-answer questions will be displayed on the computer and answered in a paper answer booklet to be provided and collected by Prometric. Tables will be provided in an Excel workbook. Paper versions of the exam and tables will not be provided. Candidates will be provided with a scratchpad.

Although candidates can use the Excel workbook for calculations, all answers must be written in the paper answer booklets as the Excel file will not be submitted for grading.

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.

2. Recommended material to master the Learning Objectives/Outcomes includes textbooks, sample questions, and any study notes listed in the Appendix of this note. The Appendix may contain additional important information regarding this exam. 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.
3. Knowledge and understanding of life contingency concepts are significantly enhanced through working out problems based on those concepts, including textbook problems and other sources of sample problems.
4. Tables will be provided in the exam in an Excel workbook. The workbook is also available for candidates to use during their preparation for the exam through a link on the SOA home page for this exam. The Excel workbook may be used for calculations during the exam.
5. Candidates are expected to know how to use Excel to calculate probabilities and quantiles from common distributions, including the normal distribution, the Poisson distribution, and the binomial

distribution. Candidates may also use Excel to calculate net present values or internal rates of return. However, candidates' Excel workbooks will not be submitted for grading. Candidates should record all their answers in their answer booklets and should also give sufficient information on the formulas used to allow graders to award partial credit where appropriate.

6. 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-reg/resources/edu-txt-manuals.aspx>.
7. Any changes in the syllabus for this exam will be published under "[Updates](#)" in this exam's home page on the SOA Web site.
8. The candidate should master the Learning Objectives/Outcomes. These Learning Objectives/Outcomes, 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.
9. A thorough knowledge of the material covered in the Fundamentals of Actuarial Mathematics exam is assumed.
10. A formula package 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.
11. 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.
12. 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 Excel workbook provided with the exam for their 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.*

13. A list of various seminars/workshops and study manuals appears on the SOA Web site at: <http://www.soa.org/education/exam-reg/resources/edu-sem-workshops.aspx> and <http://www.soa.org/education/exam-reg/resources/edu-txt-manuals.aspx>.

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

14. 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 sources:

Actuarial Mathematics for Life Contingent Risks, Third Edition Dickson, C.M.D., Hardy, M.R., Waters, H.R. (2020), Cambridge University Press ISBN: 978-1-108-47808-3. Exercises are considered part of the required readings.

- Chapter 7 (Sections 2.4 and 4), Chapter 8, Chapter 9, Chapter 10, Chapter 11, Chapter 13 (except section 8), Chapter 14, Chapter 15 (sections 1-3), Chapter 17, Chapter 18 (Section 6)

[ALTAM-21-23: Variable Annuity Guarantees](#)

[Notation and Terminology used on Exam ALTAM](#)

[Exam ALTAM Excel Workbook](#)

[Formula Sheet](#)

ALTAM Sample [Questions](#) and [Solutions](#)