Subject A213

CMP Upgrade 2023/24

CMP Upgrade

This CMP Upgrade lists the changes to the Syllabus, Core Reading and the ActEd material since last year that might realistically affect your chance of success in the exam. It is produced so that you can manually amend your 2023 CMP to make it suitable for study for the 2024 exams. It includes replacement pages and additional pages where appropriate.

Alternatively, you can buy a full set of up-to-date Course Notes / CMP at a significantly reduced price if you have previously bought the full-price Course Notes / CMP in this subject. Please see our 2024 *Student Brochure* for more details.

This CMP Upgrade contains:

- all significant changes to the Syllabus and Core Reading
- additional changes to the ActEd Course Notes and Assignments that will make them suitable for study for the 2024 exams.

0 Changes to the Syllabus and Study Guide

There have been no non-trivial changes to the wordings of the syllabus objectives.

There has been one clarification with respect to examination length which is shown below:

Assessment

Combination of a one hour 45 minute computer based modelling assignment and a two hour and fifteen minutes written examination.

There has been an important note added to pages 2 and 3 of the Study Guide. This is shown below:

Relationship with Institute and Faculty of Actuaries (IFoA) Subject CM1 Course Structure and Consistency with Other ActEd Products

Subject A213 is based on chapters 14 to 27 of the IFoA Subject CM1 as used for the IFoA's 2023 examinations. Subject A211 is based on the first 13 chapters of the IFoA Subject CM1 as used for the IFoA's 2023 examinations. The IFoA updated the syllabus for Subject CM1 for the 2024 examinations onwards, including the removal of two syllabus objectives. This led to the removal of the first 2 chapters of the Subject CM1 Course Notes from 2024 onwards. However, those syllabus objectives continue to be part of the ASSA 2024 syllabus for Subject A211. Therefore the Course Notes for both Subject A211 and Subject A213 are based on the 2023, rather than 2024, Subject CM1 course notes, including the 2023 chapter numbering.

Students should also be aware of this if using any other Subject CM1 ActEd materials, such as Revision Notes, Flashcards or ASET. If students use the 2024 versions of such products, they will find that any references to chapters of the Course Notes in those products will refer to the new (2024) Subject CM1 chapter structure, after the removal of chapters 1 and 2.

1 Changes to the Core Reading

This section contains all the ***non-trivial*** changes to the Core Reading.

Chapter 24

Section 3.3

The opening paragraph to Section 3.3 leads into the wrong equation. It should read:

We can use the Kolmogorov forward differential equations to derive transition probabilities, as in the case of multiple state models. We note from Section 2.1 that, in the multiple state model, this produces the following general result:

$$ {}_t p_x^{\bar{ii}} = \exp\left(-\int_0^t \sum_{j \neq i} \mu_{x+s}^{ij} ds \right) $$

Section 4

The form of the deferred dependent probability on page 26 is incorrect. It has been corrected to read:

We can also use the table to calculate *deferred* dependent probabilities of the form:

$$ {}_{n|}(aq)_x^k = \frac{(ad)_{x+n}^k}{(al)_x} $$

A line of Core Reading on page 27 contains the wrong notation. The corrected notation is below.

The notation used is $l_x^j, d_x^j, q_x^j, p_x^j, \mu_x^j$ *etc* for mode of decrement j.

2 Changes to the ActEd material

This section contains all the ***non-trivial*** changes to the ActEd text.

Chapter 17

Page 16

The first non-bold equation on page 17 contains an erroneous n subscript on the left-hand side. The equation has been corrected to read:

$$\ddot{a}_x^{(m)} = \frac{1}{m} + a_x^{(m)}$$

Chapter 20

Page 17

The solution to the question at the bottom of page 16 was incorrect. It has been corrected to the following:

The accumulated fund will be:

$$1{,}000{,}000 \times 1.04^{20} = 2{,}191{,}123$$

The expected number of survivors will be:

$$10{,}000 \times \frac{l_{60}}{l_{40}} = 10{,}000 \times \frac{9{,}287.2164}{9{,}856.2863} = 9{,}422.63$$

So the expected payout per survivor is:

$$\frac{2{,}191{,}123}{9{,}422.63} = £232.54$$

Chapter 26

Page 24

The table at the top of the page was incorrect as the expected claim expense had not been allowed for in the expected profit per policy in force at the start of the year.

The table now reads:

Year	Premium	Expense	Interest	Expected claim expense	Expected death cost	Expected maturity cost	Expected profit per policy in force at start of year
1	2,000	–200	90.00	–5.00	-104.00		1,781.00
2	2,000	–30	98.50	–5.10	-216.40		1,847.00
3	2,000	–30	98.50	–5.20	-337.63		1,725.67
4	2,000	–30	98.50	–5.30	-468.13		1,595.07
5	2,000	–30	98.50	–100	-608.36	-11,723.35	-10,363.21

In the solution section there was also an error in the interest earned in year 5, which has been corrected to:

$$(2,000-30)\times 0.05 = 98.50$$

Hence the verification of the expected profit per policy in force at start of year 5 should be:

$$2,000-30+98.50-100-608.36-11,723.35=-10,363.21$$

3 Changes to the X Assignments

Assignment X5

X5.6

The alternative solution presented for part (ii) contained a couple of errors. The term and following explanation has been corrected to read:

$$50{,}000\int_1^{10} e^{-\delta t}\, {}_{t-1}p_{50}^{ai}\, {}_1p_{50+t-1}^{\bar{i}\bar{i}}\, v_{50+t}\, dt$$

This time the PDF is ${}_{t-1}p_{50}^{ai}\, {}_1p_{50+t-1}^{\bar{i}\bar{i}}$*, that is at time t the life was sick one year ago, has remained sick for the last year and then has died from the sick state. This can be evaluated between the limits of 1 and 10.*

4 Changes to the Y Assignments

There are no changes to the Y assignments.

