Subject SA4

CMP Upgrade 2021/22

CMP Upgrade

This CMP Upgrade lists the changes to the Syllabus objectives, 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 2021 CMP to make it suitable for study for the 2022 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 2022 *Student Brochure* for more details.

We only accept the current version of assignments for marking, *ie* those published for the sessions leading to the 2022 exams. If you wish to submit your script for marking but have only an old version, then you can order the current assignments free of charge if you have purchased the same assignments in the same subject in a previous year, and have purchased marking for the 2022 session.

This CMP Upgrade contains:

- all significant changes to the Syllabus objectives and Core Reading
- additional changes to the ActEd Course Notes and Assignments that will make them suitable for study for the 2022 exams.

0 Changes to the Syllabus

This section contains all the ***non-trivial*** changes to the syllabus objectives.

There were no non-trivial changes to the syllabus objectives for the 2022 Subject SA4 exam.

1 Changes to the Core Reading and ActEd text

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

Chapter 1

Section 3.3

The following reference has been added:

- **Risk Alert on Climate Change, IAoA website: https://www.actuaries.org.uk/system/files/field/document/Risk%20Alert%20-%20Climate%20Change%20FINAL.pdf**

Chapter 2

Section 4

The following Core Reading has been added before the question in this section:

Individuals may also take an interest in how pension providers and trustees invest the funds, for example whether or not the assets are being invested in an ethical manner, (for example excluding fossil fuels) either through individual correspondence or via a centralised campaign.

Section 5.4

The following Core Reading has been added after the first paragraph:

Professional trustees are independent of the scheme that appoints them, and may act as trustee for several unrelated schemes. They would be expected to offer expertise in trusteeship matters, and to hold relevant professional accreditations.

Chapter 3

Section 4.2: Lifetime Allowance

The detail on the Lifetime Allowance has been updated in the second paragraph under this heading to read as follows:

The LTA is £1,073,100 with effect from 6 April 2020. Legislation was introduced in the Finance Act 2021 to remove the annual lifetime allowance link to the Consumer Price Index and maintain it at the 2020/21 rate for the next 5 fiscal years (until 5 April 2026).

Chapter 5

Section 5

This section has been updated and a replacement page is attached.

Chapter 8

Section 2.7: DC pension schemes

The final sentence of the second paragraph of Core Reading under the 'DC pension schemes' heading has been amended to read as follows:

The effects of future investment returns and inflation, and the likely absence of guarantees, together with the systemic risks posed by climate change, point to the need to review the position regularly, particularly if the client's circumstances change materially.

Chapter 10

Section 0

Two paragraphs of Core reading have been added after the first sentence as follows:

At the time of writing (Spring 2021) the enduring effect of the Covid-19 pandemic on both the global economy and financial markets, and hence the impact on pension schemes, will not be known for some time. This version of the Core Reading does not attempt to address these areas.

UK example

The United Kingdom left the European Union on 1 January 2021 without an EU-wide arrangement for the operation and regulation of financial services. Discussions will continue during 2021 and this version of the Core Reading does not attempt to address these areas.

Section 1

At the bottom of page 3 the key benefits of IRM have been updated as follows:

TPR states that the key benefits of IRM are:

- improved decision-making due to better understanding of risks
- open discussion between trustees and employers on the risks to each other's objectives and strategies
- increased focus on the most important risks
- better preparation if problems occur
- improved use of time and resources.

Section 5

A new Section 5 has been added with the current Section 5 renamed Section 6. A replacement page is attached.

Chapter 13

Section 2.2

An additional disadvantage has been added to the Core Reading for domestic equities as follows:

- **Potential concentration in individual sectors or stocks**

Section 2.10: Commodities

A new paragraph of Core Reading has been added after the first paragraph under the 'Commodities' heading as follows:

Investment in soft (food) commodities may be seen as controversial due to additional volatility it causes to food prices in a time of increasing food uncertainty from climate change.

Section 2.14

The fourth paragraph of Core Reading has been deleted.

Section 2.15

A new Section 2.15 has been added with the current Section 2.15 and 2.16 renamed Section 2.16 and 2.17 respectively. Section 2.15 is now as follows:

2.15 Environmental and social and governance (ESG) driven investments

Investment decisions based on ESG factors, such as green bonds and green loans.

ESG issues are discussed in more detail later in the course.

Broadly speaking, green bonds and green loans are designed to raise money for projects with clear environmental benefits.

More information about green bonds can be found at: **https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/green-bond-principles-gbp/**

Chapter 14

Section 0

A new paragraph of Core Reading has been added after the first paragraph of Core Reading as follows:

The United Kingdom left the European Union on 1 January 2021 without an EU-wide arrangement for the operation and regulation of financial services. Discussions will continue during 2021 and this version of the Core Reading does not attempt to address these areas.

Section 7.2

The bullet points in the fourth paragraph have been amended as follows:

- the word '**controversial**' has been removed from the fourth bullet point
- a first bullet point has been added, as follows:
- **have a more diverse range of individuals on the Board, giving rise to improved corporate performance,** for example, some studies suggest that Boards with a mixture of female and male members have better corporate performance than organisations with solely male Board members

Section 7.3

The first paragraph has been amended as follows:

There is scientific consensus that warming of the climate is unequivocal and linked to increasing atmospheric concentrations of greenhouse gases, of which a key driver is the burning of fossil fuels, and other human activities.

Chapter 15

Section 1.2

Some text has been added to this section covering non-insurance consolidators. This follows the text on 'Considerations on a 'self-sufficient' discontinuance valuation' and is as follows:

Considerations for transfer to a non-insurance consolidator

It may be that the scheme itself would be wound up immediately with assets and liabilities transferred to a non-insurance consolidator.

The liabilities are valued either as the actual cost of transferring the scheme to a non-insurance consolidator or are based on the actuary's view of principles likely to be adopted by consolidators based on their knowledge of the market.

Chapter 16

Section 3.1

A new paragraph has been inserted after the first set of bullets, as follows:

The Core Reading for Subject SP4 no longer uses the replicating portfolio umbrella for the mark to market and bond yields plus risk premium approaches. However the replicating portfolio umbrella remains in place for Subject SA4 and is likely to be reviewed in the future.

Similarly, the third paragraph under the heading 'Replicating portfolio' on page 17 has been amended as follows:

This approach is the basis of the following two methods in Subject SA4**:**

- mark to market, or market consistent
- bond yields plus risk premium.

and the basis of the mark to market method in Subject SP4.

The second paragraph under the heading 'Bond Yields plus Risk Premium' on page 19 has been deleted.

Section 4

A final paragraph of Core Reading has been added to this section:

Finally, ALMs can also include the impact of different climate change trajectories.

Chapter 18

Section 6

A final paragraph of Core Reading has been added to this section:

It will also be necessary to consider systemic factors such as the effect of climate change, that could mean future experience is different from that of the past. Impacted areas could include investment returns, mortality, morbidity and inflation. To assess the possible impacts of such changes, emerging data of recent changes could be considered, or advice sought from other experts including economists and scientists.

2 Changes to the X Assignments

Overall

There have been minor changes throughout the assignments, including changes to mark allocations.

More significant changes are listed below.

If you would like the new assignments *without* marking, then retakers can purchase an updated CMP or standalone X Assignments at a significantly reduced price. Further information on retaker discounts can be found at:

www.acted.co.uk/paper_reduced_prices.html

If you wish to submit your scripts for marking but have only an old version, then you can order the current assignments free of charge if you have purchased the same assignments in the same subject in a previous year, and have purchased marking for the 2022 session. We only accept the current version of assignments for marking, *ie* those published for the sessions leading to the 2022 exams.

Assignment X1

Question 1.3

As it is used in earlier parts of this question, the information on the benefits provided by the CDF has been moved up to appear as the second paragraph after part (i).

Assignment X3

Question 3.1

Part (iv) of this question now reads:

(iv) Describe how the results of an asset liability modelling exercise can be used to help reduce risk in the investment and funding strategies. [7]

Parts (v), (vi) and (vii) of this question have been moved up to appear directly below part (iv) as the information provided after part (iv) is not generally relevant for these parts.

Solution 3.1

In part (v) TPR's definition is no longer given credit.

Question 3.2

Part (iv) of this question and the information which proceeded it has changed as follows:

The trustees have stated their intention is to buy out the liabilities once the scheme has sufficient funds to do so. The recent actuarial valuation of the scheme showed it to be 80% funded on a buy-out basis.

The recently appointed investment consultant has proposed that the buy-out position will be monitored regularly and when the coverage improves by 5%, there will be a switch of 20% of the assets from equities to government bonds. In this way, it is expected that a 100% government bonds policy will be in place once the scheme is 100% funded on a buy-out basis.

(iv) Discuss the issues the trustees should consider when assessing the appropriateness of this proposed transition programme. [15]

Solution 3.2

The solution to part (iv) has been rewritten and replacement pages are attached.

Assignment X4

Question 4.1

The marks available for the first four parts have been changed to 4, 1, 10 and 5 respectively leading to total marks for this question of 30.

The solution to part (iii) from the heading 'Replicating portfolio' onwards has been replaced with the following:

Mark to market

The market value of the liabilities is taken to be the market value of the portfolio of assets which most closely replicates the duration and risk characteristics of the liabilities. [½]

Fixed-interest bonds are likely to have been used to match pensions with fixed increases … [½]

… of appropriate terms and with appropriate coupons … [½]

… although precise matching is unlikely to be possible. [½]

Government bonds are likely to have been used … [½]

… although high-quality corporate bonds could be used if the risk of default is negligible. [½]

… their lower marketability and liquidity and higher volatility results in a higher expected return … [½]

… which may have been reflected in the discount rate. [½]

As non-pensioner liabilities will eventually become pension liabilities, bond yields are also reflected in the discount rate(s) in order to value these members' benefits. [½]

Bond yield plus risk premium

Under this approach, the discount rate(s) are based on the mark to market approach but adjusted (usually increased) to reflect the additional returns expected on other asset classes … [½]

… *eg* equities, property and corporate bonds (if such bonds are not taken into account in the mark to market approach). [½]

The allowance for the increase in the discount rate will usually reflect what liabilities are backed with these other assets … [½]

… *eg* the pre-retirement discount rate could be increased to reflect equities held to back non-pensioner liabilities with the post-retirement discount rate unadjusted if government bonds are held to back pensions in payment. [½]

Liabilities are valued using a discount rate which is found by increasing bond yields by the addition of either a constant or a variable risk premium. [½]

A variable risk premium would be derived by a combination of market information and actuarial judgement … [½]

… taking into account market conditions with a possible aim of smoothing short-term volatility in the funding level. [½]

[Maximum 10]

Question 4.2

6 marks are now available for each of parts (i), (iii), (v) and (vi) with 8 and 4 marks available for parts (vii) and (viii) respectively. Marks for other parts are unchanged, leading to total marks for this question of 50.

Part (vii) of this question has changed as follows:

(vii) Explain why different financial assumptions may have been proposed for the current valuation. [8]

The solution to part (vii) from the heading 'Mortality' onwards has been deleted.

Question 4.3

The deferred pensioner liability for the current valuation has been restated as 90*m*.

The marks available for the parts of this question have been changed to 11, 3 and 6 respectively resulting in total marks for this question of 20.

The solution has been rewritten and replacement pages are attached.

Assignment X5

Question 5.3

Part (vi) of this question has changed as follows:

(vi) Explain how the Sale and Purchase Agreement should be modified to allow a transfer of assets rather than cash and the benefits to the Balloons Pension Scheme of assets being transferred rather than cash. [5]

Assignment X6

Question 6.2

The two paragraphs following part (i) have been moved up to precede it.

The solution to part (i) under the heading 'Investment strategy' has been replaced with the following:

Investment strategy

The riskiness of the investment strategy should be considered in deciding how to remove the deficit. [½]

As the investment strategy appears to be mismatched the trustees:

- may wish to clear the deficit more quickly to reduce risk [½]
- may expect higher expected investment returns to be used to meet the deficit and therefore they may be more relaxed with a longer deficit recovery period. [½]

In the solution to part (iii), points about settlements or curtailments have been deleted.

3 Other tuition services

In addition to the CMP you might find the following services helpful with your study.

3.1 Study material

We also offer the following study material in Subject SA4:

- Flashcards
- ASET (ActEd Solutions with Exam Technique) and Mini-ASET
- Mock Exam and AMP (Additional Mock Pack).

For further details on ActEd's study materials, please refer to the 2022 *Student Brochure*, which is available from the ActEd website at **www.ActEd.co.uk**.

3.2 Tutorials

We offer the following (face-to-face and/or online) tutorials in Subject SA4:

- a set of Regular Tutorials (lasting a total of three days)
- a Block (or Split Block) Tutorial (lasting three full days).

For further details on ActEd's tutorials, please refer to our latest *Tuition Bulletin*, which is available from the ActEd website at **www.ActEd.co.uk**.

3.3 Marking

You can have your attempts at any of our assignments or mock exams marked by ActEd. When marking your scripts, we aim to provide specific advice to improve your chances of success in the exam and to return your scripts as quickly as possible.

For further details on ActEd's marking services, please refer to the 2022 *Student Brochure*, which is available from the ActEd website at **www.ActEd.co.uk**.

3.4 Feedback on the study material

ActEd is always pleased to receive feedback from students about any aspect of our study programmes. Please let us know if you have any specific comments (*eg* about certain sections of the notes or particular questions) or general suggestions about how we can improve the study material. We will incorporate as many of your suggestions as we can when we update the course material each year.

If you have any comments on this course, please send them by email to SA4@bpp.com.

5 Non-mandatory resource material from the IFoA

As noted earlier, the IFoA also produces other non-mandatory resource material which is intended to provide helpful guidance for its members.

These include:

- *Whistleblowing and speaking up*

  Whistleblowing – a guide for actuaries (with effect from May 2019 this guide is now entitled 'Speaking Up: A Guide for Members') **and *Whistleblowing – a guide for employers of actuaries***.

  These leaflets are intended to help all actuaries (and their employers) understand their whistleblowing and speaking up **obligations, both professionally and legally, and to alleviate concerns that they may have about such responsibilities.**

- *Conflicts of interest*

  Conflicts of interest – a guide for actuaries (with effect from May 2019 this is now a guide for members) **and *Conflicts of interest – a guide for employers of actuaries*** (the latter has now been withdrawn).

  These leaflets build on the provisions of the Actuaries' Code in relation to conflicts of interest and set out views on good practice regarding such conflicts and how they might be managed.

At the time of writing (May 2021), this resource material can be found on the IFoA's website within the upholding standards area, at:

https://www.actuaries.org.uk/upholding-standards/standards-and-guidance/non-mandatory-guidance

- *Climate-related risks*

  Risk Alert on Climate-Related Risks (IFOA, 2017)

  This risk alert, issued on 12 May 2017, states that: "Actuaries should ensure they understand, and are clear in communicating, the extent to which they have taken account of climate-related risks in any relevant decisions, calculations or advice."

At the time of writing (May 2021), this resource material can be found on the IFoA's website within the upholding standards area, at:

https://www.actuaries.org.uk/upholding-standards/risk-alerts

6 Actuarial Quality Framework in the UK

The Financial Reporting Council has developed an Actuarial Quality Framework which is designed to support effective communication between actuaries, their principal clients and employers such as senior management and members of governing and review bodies, other professionals such as lawyers and accountants, end-users and their representatives, policymakers and regulators.

The Framework is intended to be complementary to other regulations affecting actuaries and those who rely on their work.

It aims to promote the following drivers of actuarial quality:

- **Methods – reliability and usefulness of actuarial methods.**
- **Communication – communication of actuarial information and advice.**
- **Actuaries – technical skills of actuaries and ethics and professionalism of actuaries.**
- **Environment – working environment for actuaries and other factors outside the control of actuaries.**

Detailed knowledge of the Actuarial Quality Framework is not required for the examinations, but the full document can be found by using the search facility on: http://www.frc.org.uk.

5 Climate risk

An emerging risk likely to impact pension provision is climate change risk. This can be defined as the risks arising from adverse changes in the physical environment and secondary impacts in the economy at a regional or a global scale.

IRM should include the identification, assessment, mitigation and monitoring of climate risk.

Climate change risks can broadly be classified into three categories:

- **Physical risk – risks arising from the first-order effects of environmental changes such as greenhouse emissions, pollution and land use. The effects may be chronic, such as global warming and sea level rise, or they may be acute events, such as instances of extreme weather.**

  For example, there could be:

  – damage to property due to flooding

  – changes to the use of land due to the impact on rainfall patterns

  – population movement due to climate change leading to a reduction in the local workforce.

- **Transition risk – risks arising from the economic, political and market changes as part of the move to a low-carbon economy.**

  For example, a company's activities may be restricted by law such that it can no longer extract value from its assets.

- **Liability risk – risks arising from injured parties seeking compensation for the impacts of climate change.**

  For example, the types and volume of claims under life and health insurance policies may change which may result in losses and / or changes to the pricing and conditions of these policies.

Question

Outline some general factors which will determine the extent of these risks on pension schemes.

Solution

Factors could include:

- the likely extent and impact of climate change, which may depend on factors such as geography, culture and legislation
- current legislation and guidance, and how this may change to mitigate climate risks
- the objectives of the key stakeholders and their strategies to mitigate climate risk
- the pensions environment, such as the type and status of benefits arrangements.

The likely impact of these risks on pension schemes may impact the following aspects:

- **Sponsor covenant – the impact on the sponsoring employer of the effects of climate change which will also be dependent on the industry in which the sponsor operates.**
- **Investment – inflation, investment return and interest rates.**
- **Funding – demographic impact such as morbidity and mortality rates.**

Question

Outline how climate risks may affect mortality rates in the UK.

Solution

Mortality rates could be positively (+) or negatively (-) affected as follows:

+ rising temperatures may lead to a reduction in cold-related deaths which could more than offset any increase in heat-related deaths

+ efforts to reduce air pollution and greenhouse gas emissions may improve health by improving air quality, reducing meat consumption and increasing walking and cycling

- more extreme weather events, such as flooding

- more insect-borne disease

- energy prices could rise (say from the result of carbon taxes) making it more expensive to heat homes and import fruit and vegetables

- economic growth could reduce, resulting in lower healthcare spending.

(iv) ***Appropriateness of the transition programme***

General issues

The trustees are usually responsible for specifying overall guidelines for investment strategy but may wish to consult / agree the approach with the company. [½]

In determining the investment strategy the trustees should ensure the scheme assets are properly and prudently invested and take proper advice. [½]

The trustees must work within the scheme's trust deed and rules (*eg* any restrictions on the type of assets held), comply with legislation and consider any guidance issued. [½]

In order to consider the appropriateness of the transition programme, the trustees need to consider whether:

- the investment target (100% government bonds) is appropriate [½]
- the process to reach this target is appropriate. [½]

The trustees may wish to ensure that the assets are / will be sufficiently diversified within each asset class (*eg* an equity portfolio might include overseas equities). [½]

Investment target

The transition programme aims to move to a matched position on the buy-out basis … [½]

… by investing in long term government bonds with an appropriate balance between conventional and index-linked bonds to reflect pension increases under the scheme … [½]

… so the target is consistent with the trustees' objective to buy out the liabilities. [½]

Process to reach the investment target

The process should reflect the method by which the buy-out position is expected to be improved … [½]

… in particular the balance between improving the buy-out position through additional company contributions and through investment returns in excess of those reflected in the buy-out basis. [½]

The process involves a move to a 100% government bond policy in four stages (each stage involving a switch of 20% of equities to government bonds each time the buy-out coverage improves by 5%; there are four such improvements from a buy-out funding level of 80% to 100%) … [½]

… assuming the scheme currently holds 20% of assets in government bonds. [½]

The trustees should consider whether it would be better to have a different number of stages than four as: [½]

- more stages may result in faster movement towards the target [½]
- fewer stages may result in lower expenses. [½]

The process to reach the investment target can be set by switching assets:

1. at given time points [½]
2. when it is beneficial to do so given investment markets, such as when the price of equity is considered high and the price of government bonds low [½]
3. each time a test relevant to the investment target is met, as for the proposed transition programme. [½]

The assets to be switched can be set as a percentage of the assets or a fixed or changing amount. [½]

The advantages of the third / proposed approach include:

- it ensures the process is tailored to the overall aim, *ie* having sufficient assets to buy-out [½]
- equity investment is maintained until the overall aim is met which may result in the aim being met more quickly due to the higher expected returns [½]
- if the buy-out test (that would trigger an asset switch) is met, the assets and the liabilities become more closely matched. [½]

Problems with this approach arise if:

- the buy-out test is not set appropriately [½]
- the test is seldom met; the investment target may never be met or it may take longer than desired for it to be met … [½]

  … *eg* due to poor equity returns. [½]

Term to reach target

The trustees may wish to target a fixed term (or maximum term) to reach the agreed investment strategy. [½]

The shorter the term, the less equity investment risk taken by the scheme … [½]

… although higher company contributions may be required which may be unacceptable to the company. [½]

Cashflow

The most efficient way to reach a given strategy is often by using new money to invest in the assets where the trustees wish to increase their holding. [½]

In this way there are no transaction costs from switching between assets. [½]

Since the scheme is closed to new entrants, contributions will have reduced. The scheme may therefore have a negative net cashflow position (and the position will worsen over time) and therefore this may not be possible. [½]

Additional contributions may now be required to eliminate the deficit and this will increase cashflow … [½]

… which can be used to invest in government bonds. [½]

Aligning the funding strategy to the investment target

The trustees should consider directly aligning the contribution strategy to the investment target such that employer contributions will increase if the buy-out position worsens. [½]

The features of this approach are:

- benefit security is improved as the risk of a reducing buy-out funding level is reduced [½]
- employer contributions may be volatile and required at unexpected amounts and times which may not be acceptable to or affordable by the employer. [½]

Other actions to help to reach the buy-out target

The trustees should consider other actions which may improve the likelihood of reaching the buy-out target, such as:

- buying in the pensioner liability if terms are advantageous [½]
- incentive exercises, such as enhanced transfer value options for deferred pensioners. [½]

Monitoring the programme

The transition programme needs to be monitored and updated if the situation changes materially. [½]

Effective controls need to be put in place, including the assessment of the risks. [½]

Flexibility / controls

It may be advisable to build some additional flexibility or controls into the transition programme, for example … [½]

… an adaptation of the second approach such that equity assets can be sold when values are high in order to lock in good returns … [½]

… and equity assets cannot be sold when values are depressed. [½]

The quality of the investment managers may determine how much discretion the trustees are willing to grant them. [½]

[Maximum 15]

Solution X4.3

Comment

This question tests your ability to apply material on managing and analysing experience.

(i) ***Approximate analysis of experience***

Markers: give credit for other valid methods.

Assumptions

- Contributions / benefits are paid on average, halfway through the period. [½]
- Investment returns occur uniformly over the period [½]

Markers: give credit for other reasonable assumptions

The total surplus at the previous valuation was 520*m* – 200*m* – 80*m* – 200*m* = 40*m*. [½]

The total surplus at the current valuation is 570*m* – 300*m* – 90*m* – 190*m* = (10)*m*. [½]

Surplus brought forward

At the start of the period the surplus was 40*m*, which would have grown to 46.3*m* at the end of the period at the assumed rate of interest of 5% *pa*. [½]

Investment returns

Expected value of the assets at the current valuation date:

$$520\times 1.05^{3}+(60-65)\times 1.05^{1½}=596.6m$$ [½]

This compares with an asset value of 570*m*. Hence, there is a deficit item = (26.6)*m*. [½]

Pension in payment increases

Approximate deficit item due to the larger than expected average pension increases:

$$190m\times\left(\left(\frac{1.025}{1.055}\right)^{3}-1\right)=(15.8)m$$ [1]

But the above only considers the change in pension liabilities at the current valuation date. We should also consider the liabilities already discharged from the scheme, and the approximate loss we made on those liabilities due to higher than expected pension increases. [½]

This is: $20m\times 3\times\left(1.025^{1.5}-1.055^{1.5}\right)\times 1.05^{1.5}=(3.0)m$ [½]

So total item due to higher than expected pension increases is (15.8)*m* + (3.0)*m* = (18.8)*m* [½]

Salary increases

The active liability is 300*m*.

Approximate liability allowing for expected salary increases is:

$$300m \times \left(\frac{1.03}{1.04}\right)^3 = 291.4m$$ [½]

So, the salary profit on the liabilities is approximately:

$291.4m - 300m = (8.6)m$ *ie* a loss of $8.6m$ [½]

But there is a similar offsetting gain due to an element of contributions received being higher than expected, due to higher than expected salary increases. Based on actual contributions, the offset is approximately:

$$60 \times \left(1 - \left(\frac{1.03}{1.04}\right)^{1.5}\right) \times 1.05^{1.5} = 0.9m$$ [½]

So that the total salary item is $(8.6)m + 0.9m = (7.7)m$ [½]

We are assuming that the higher than expected salary increases occurred evenly across the active membership and hence the active liabilities. [½]

Contributions

Using the PUSCR of 25.5% the expected contributions on expected salaries would be:

$$3 \times 25.5\% \times 80 \times 1.03^{1.5} \times 1.05^{1.5} = 68.8m$$ [1]

We have already analysed the salary and investment items, so we must use the expected values for salaries and investment returns in order to avoid double counting this experience. [½]

This compares with the actual contribution income on expected salaries of:

$$60 \times \left(\frac{1.03}{1.04}\right)^{1.5} \times 1.05^{1.5} = 63.6m$$ [½]

The approximate item of deficit due to the smaller than expected contributions:

$68.8m - 63.6m = (5.2)m$ [½]

Pension in deferment increases

Increases in deferment were as expected, therefore the item of surplus = 0. [½]

Hence we have:

Surplus brought forward	46.3m
Investment returns	(26.6)m
Salary increases	(7.7)m
Contributions	(5.2)m
Pension in payment increases	(18.8)m
Pension in deferment increases	0m
Total	(12.0)m

[1 for summary]

These items total to an expected deficit of 12m, compared with an actual deficit of 10m. [½]

We do not have enough information to analyse the sources of the remaining 2m difference although it appears that we are close enough not to further refine the calculations. [½]
[Maximum 11]

(ii) ***Comment on the results of the analysis of experience***

It appears that:

- investment returns have been poor … [½]

  … the actual return was around 3.5% *pa*, around 1.5% *pa* less than the 5% *pa* expected … [½]

  … as $520 \times (1.035)^3 + (60-65) \times (1.035)^{1½} \approx 570m$ [½]
- salary increases have been an item of loss [½]
- pension in payment increases have been a major item of loss … [½]

  … as they were 3% *pa* greater than expected and the pensioners represented over 40% of the liability [½]
- contributions have been an item of loss. [½]

[Maximum 3]

(iii) ***Factors to consider before using the results***

The results of an analysis should never be used blindly and without considering the following: [½]

- how accurate the results are – whether there was sufficiently detailed information (*eg* to provide reliable results and to break down data into sufficiently homogeneous groups) [½]
- whether the period under investigation was typical [½]
- whether the reasons for emergence of surplus / deficit are likely to continue into the future (*ie* whether the experience is representative of the future) … [½]

  … or whether the surplus / deficit arose as a result of a one-off, *eg* an abnormal event, such as a redundancy exercise, or very unusual experience … [½]

  … the volatility of the assumption – for example, equity returns can be particularly volatile and so it is unlikely to be appropriate to change the assumed return on equities based on the inter-valuation period alone [½]
- whether any changes in experience are part of a trend, if so, then there may be a reason to change the assumptions to a greater extent than suggested by the analysis alone [½]
- whether the events in the period under investigation were affected by the economic cycle, and how our assumptions should reflect this [½]
- whether the results are significant enough to justify a change in the assumptions [½]
- the financial significance of the assumption under consideration [½]
- the employer's and trustees' views on changing the assumption [½]
- the employer's views on the control of certain factors, *eg* salary increases [½]
- whether there are likely to be changes in the scheme structure or operation that would mean some of the assumptions should not be based on the scheme's past analysis [½]
- whether there are any changes in legislation that would mean some of the assumptions should not be based on the scheme's past analysis [½]
- whether any surplus arose simply because the assumptions include margins [½]
- the size of the scheme – a small scheme is likely to have much more volatile experience and the results of the analysis will be less meaningful than for a large scheme. [½]

[Maximum 6]
[Total 20]