INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

September 2016

Subject ST4 – Pensions and other Benefits Specialist Technical

Introduction

The Examiners' Report is written by the Principal Examiner with the aim of helping candidates, both those who are sitting the examination for the first time and using past papers as a revision aid and also those who have previously failed the subject.

The Examiners are charged by Council with examining the published syllabus. The Examiners have access to the Core Reading, which is designed to interpret the syllabus, and will generally base questions around it but are not required to examine the content of Core Reading specifically or exclusively.

For numerical questions the Examiners' preferred approach to the solution is reproduced in this report; other valid approaches are given appropriate credit. For essay-style questions, particularly the open-ended questions in the later subjects, the report may contain more points than the Examiners will expect from a solution that scores full marks.

The report is written based on the legislative and regulatory context pertaining to the date that the examination was set. Candidates should take into account the possibility that circumstances may have changed if using these reports for revision.

Luke Hatter
Chair of the Board of Examiners
December 2016

A. General comments on the *aims of this subject and how it is marked*

1. The aim of the Pensions and Other Benefits Specialist Technical subject is to instil in successful candidates the ability to apply, in simple situations, the mathematical and economic techniques and the principles of actuarial planning and control needed for the operation on sound financial lines of providers of pensions or other employee benefits.

2. This subject examines the ability of candidates to apply core actuarial techniques and concepts, together with specific knowledge of pensions and other benefit arrangements to simple, but practical situations.

3. The Examiners therefore look for candidates to apply their knowledge of the core reading to the specific situation that the Examiners asked, having read the question carefully. Too many candidates write around the subject matter of the question in more general fashion, or focus on one aspect of the issue at great length, in either case gaining few of the marks available.

4. Good candidates demonstrate that they have used the planning time well - an attempt to get a logical flow is a big advantage in making points clearly and without repetition. This also enables candidates to use the latter parts of questions to generate ideas for answers to the early parts (or use their solutions to earlier parts of questions to create a structure for latter parts). Time management is important so that candidates give answers to all questions that are roughly proportionate to the number of marks available.

5. Candidates who give well-reasoned points, not in the marking schedule, are awarded marks for doing so.

B. General comments on *student performance in this diet of the examination*

1. The overall standard of scripts was similar to the previous session, with candidates over recent years maintaining a very consistent level of performance.

2. It is very important that candidates consider all aspects of the question, and read the preamble fully. There is never superfluous information in the question, and by using all of the information available, candidates can ensure they give a full answer. Giving just a little more to clearly show depth can turn a close fail into a pass. The questions are set so that it should take approximately twice as long to answer a 10 mark question as a 5 mark one. Answers should therefore be similarly proportionate.

3. In addition, candidates should carefully consider the command verbs used to guide the depth given in their answers (a list of what is expected for each verb is available on the IFoA website).

4. Taking care in these points of technique will help students score better.

5. More detailed feedback is provided on each question below.

C. Pass Mark

The Pass Mark for this exam was 64.

Solutions

Q1 (i)

- Employer contribution rates will be known in advance [½]
- and could be lower [½]
- and less volatile [½]
- Possibly reduced administration and adviser costs [½]
- Investment risk borne by the member [½]
- Mortality risk borne by the member [½]
- Inflation risk post retirement borne by member [½]
- Possibly reduced governance risk [½]
- and reduced legislative risk [½]
- Reduced funding risk [½]
- Easier to explain to members [½]
- and easier to achieve the desired flexibility for members [½]
- Continuity for existing DB Scheme members may aid employee relations [½]

[Maximum 4]

(ii) **Contributions**

- Consider the desired level of benefits to be provided [½]
- and any cost or legislative constraints [½]
- Eligibility criteria and targeted population e.g. different scales for different categories of members [½]
- Will it be made available to existing DB members? [½]
- Employee needs / expectations [½]
- Level of employer contributions [½]
- Level of employee contributions – base and additional [½]
- Any employer matching employee contributions [½]

Investments

- Range of investment funds to be offered [½]
- Whether to offer a Default Fund [½]
- Life styling near retirement [½]
- Will any investment guarantees or underpins be made available? [½]

Benefits Provided

- Integration with flexible benefits package [½]
- Complexity of design – enabling members can understand their options[½]
- Use of Hybrid options e.g. DC defined ambition arrangements [½]
- Options to provide additional protection benefits e.g. in ill health or death [½]

- Can funds be accessed before retirement? [½]
- Options available at retirement [½]
  - e.g. variable income via in-house drawdown options [½]
  - transfer to other pension providers [½]
  - Taking cash lump sums [½]
  - Purchasing an annuity at retirement [½]
  - Flexibility over retirement age and phased retirement [½]
  - Combinations of cash lump sum, drawdown and annuity purchase [½]

[Maximum 1 mark for 2 examples]

[Maximum 6]

(iii)

- How to take benefits on retirement, e.g. cash, annuity, drawdown [½]
- Current annuity terms and whether they represent value for money [½]
- Size of investment funds available pre and post retirement [½]
- Level of income needed in retirement [½]
- and how this will vary over time [½]
  - e.g. a stable amount may be needed (guaranteeing a basic secure income) [½]
  - possibly increasing with inflation [½]
  - need for lump sum on retirement [½]
  - income starting low and increasing during phased retirement [½]
  - or higher spending early in retirement, lower later [½]
  - possibly reducing when state / other DB pensions are payable [½]
  - higher income may be needed later on to cover long-term care needs [½]
  - Will an annuity be purchased later in life? [½]

[Maximum 2 marks for 4 examples]

- Who will manage the investments pre/post retirement [½]
- Tax implications on benefits taken [½]
- and tax relief on any future contributions after receipt of part of the benefits [½]
- Availability of specialist advice [½]
- and its cost [½]
- Consideration of personal characteristics [½]
- E.g. health status, marital status, lifestyle [½]
- Consideration of overall financial circumstances [½]
- E.g. wealth, other income in retirement, mortgage / debts [½]

[Maximum 5]

(iv) **Advantages**

- A higher initial rate of income may be available [1]
- Member has flexibility over the income that can be taken [½]
- So it can be tailored to future spending patterns [½]
- Dependants' benefits on early death may be higher [½]

- It is not a final decision – the option of buying an annuity at a later date still remains [½]
- If annuity rates improve it may be possible to secure a better annuity at a future date [½]
- The member is free to invest in asset classes of their choice [½]
- Which potentially have higher returns that the assets backing annuities [½]
- The member is not exposed to the insolvency risk of the insurer [½]
- And doesn't incur insurer expenses, capital costs and profit loadings [½]

Risks

- The member continues to be exposed to investment risk [1]
- Hence if investment returns are poor the lifetime income may be less than that from the annuity [½]
- There may be no hedge against inflations unless index linked bonds are purchased [½]
- The annuity market may worsen and so if the member eventually buys an annuity this may be on poorer terms **[Do not award if candidate listed the opposite risk as an advantage]** [½]
- There may be legislative requirements preventing some flexibility over the amounts that can be taken [½]
- The member is exposed to longevity risk [1]
- If the member lives longer than expected the lifetime income may be lower than the annuity option [½]
- The member's fund needs to earn a return in excess of bond returns to maintain an income equivalent to that of the annuity (known as mortality drag) [½]
- This differential increases as the member gets older [½]
- Tax rates may impact more on benefits as a result of drawdown e.g. dependants' benefits on early death [½]
- Drawdown arrangements can be complex to understand and administer
- Hence specialist advice is needed [½]
- The cost of this advice, administration costs and fund management costs will erode the member's fund [½]

[Maximum 8]

[Total 23]

Part (i)	Generally answered well, although some candidates went into too much detail on specific points, rather than covering the breadth required to score well.
Part (ii)	Again, generally answered well. Some candidates did not go into the specifics to incorporate the desired flexibility.
Part (iii)	Well answered by many but some candidates interpreted the question almost exclusively about how to tailor their funds to their chosen format of benefit at retirement.

Part (iv)	Answers were varied with many candidates not going into sufficient detail. Some candidates did not cover investment and longevity risks.

Q2 (i) **Advantages**

- Global equities may have higher expected returns than other assets, particularly bonds, which will lead to reduced employer contributions. [½]
- Similarly the return on corporate bonds is expected to be higher than the return on gilts. [½]
- Good diversification, if diversified assets are held within each category. [½]
- It may provide a broad match to the liabilities, assuming 60% of the liabilities are real in nature (e.g. active members with salary-related benefits) and 40% are fixed in nature. [½]
- Corporate bonds have a relatively high running yield which may help the scheme with its increasing need for cash over time. [½]
- It may allow less prudent funding than otherwise as the higher returns on equities can be factored into the discount rate assumption. [½]
- This slower pace of funding can allow the employer to use more funds in its business. [½]

Risks

- Equities are volatile and will not match liability movements caused by changing interest rates [1]
- This may lead to a volatile funding level [½]
- Equity prices may fall [½]
- Income from equities is not guaranteed [½]
- Overseas equities may present a currency risk [½]
- and be exposed to political risk [½]
- Some equities may suffer from lack of liquidity [½]
- or have high dealing costs [½]
- or inflation expectations [½]
- The corporate bonds may not be a good match for the scheme liabilities by duration [½]
- and will not match inflation linked or salary linked benefits [½]
- Corporate bonds carry a credit risk [½]
- and may suffer from a lack of liquidity [½]
- There may be a lack of diversification which could be improved by holding other assets [½]

[Maximum 7]

(ii)

- This should result in better security of benefits [½]
- as a result of a lower risk investment strategy [½]
- The actual risk reduction will depend on the credit risk of the government bonds [½]
- Government bonds are generally low risk [½]
- but will depend on the credit risk / political risk and central bank policy of the individual country [½]
- The risk of scheme assets losing value due to stock market falls is removed [½]
- Currency risk of holding overseas equities is reduced [½]
- Government bonds could be a better match for some or all of the scheme's liabilities [½]
- Particularly if index linked government bonds are held to broadly match any inflation-linked benefits [½]
- However the government bonds need to be of a similar duration to the liabilities [½]
- Better matching will reduce the chance of deficits arising in future and lead to less funding volatility. [½]
- Government bonds are generally marketable and liquid. [½]
- Running yield may vary – government bond yield likely to be lower than corporate bond yield but may be higher or lower than equity yield [½]
- Government bonds have a lower expected return than equities and corporate bonds [½]
- hence the discount rate used to value the liabilities will be lower [½]
- as it will need to be amended to reflect the expected rate of return from the new investment strategy [½]
- The starting point is the yield available on the government bonds [½]
- Adjusted to take account of reinvestment risk … [½]
- … investment management expenses [½]
- …. and any additional margin for prudence and credit risk [½]
- …..although less margin for credit risk in assumptions means that impact on discount rate may be less than expected [½]
- The reported value of the liabilities will be higher [½]
- Resulting a in lower funding level [½]
- and possibly increased deficit and ongoing accrual contribution payments (loss of upside risk) [½]
- Which, if unaffordable, may result in benefits being cut back e.g. future accrual, discretionary benefits [½]
- The risk due to lack of diversification is increased [½]
- There may be advice costs incurred in switching investment strategy
- and associated transaction costs [½]

[Maximum 8]

(iii)

- Subject to requirements of scheme documentation / legislation / professional guidance… [½]
- …e.g. unisex factors [½]
- The transfer payment should be no less than the expected cost of providing the benefits within the original scheme [½]
- This, as a minimum, represents the actuarial value of the deferred pension the member is entitled to [½]
- This ensures the member is no worse off because the same level of benefits can be provided within the receiving scheme (in theory) [½]
- No future salary growth is assumed as the active members are assumed to leave pensionable service [½]
- It is usual to calculate the transfer value with regard to prevailing market conditions [½]
- Using "best estimate" assumptions [½]
- with no margin for prudence [½]
- This should also reflect the revised investment strategy [½]
- The transfer value may allow for discretionary pension increases [½]
- and allow for the cost of calculating the transfer value [½]
- The transfer value may be reduced if the scheme's funding level is below 100% (fairness to remaining scheme members) [½]
- Member options / potential for selection risk need to be considered if they don't require consent from the employer / trustees [½]
- Consistent with approach for transfers-in [½]
- Consider practical issues such as cost vs. complexity, frequency of review [½]

[Maximum 5]

(iv) **For member**

- More choice for the member [½]
- To fit their own personal circumstance [½]
- E.g. spouse pension, [½]
- pension increases, guarantee period [½]
- Flexible annuities may be available which offer a drawdown facility… [½]
- …with the ability to defer the purchase of a guaranteed income to a later date [½]
- Access to impaired life annuity [½]
- Benefits could be more secure [½]
- Potential for higher income depending on the size of the transfer value… [½]
- …market conditions… [½]
- …and personal circumstances (e.g. unmarried member selecting against scheme) [½]

For employer

- The post retirement mortality risk is removed from the scheme [½]
- and the investment risk [½]

- and reducing expenses [½]
- Potential actuarial gain if TV basis is less generous than the funding basis [½]
- A cheaper alternative than purchasing an immediate annuity to extinguish the liability [½]

[Maximum 5]

[Total 25]

Part (i)	Had mixed responses. Poorer quality answers dealt in terms of the general characteristics of global equities and corporate bonds without linking them to the particular circumstances of the pension scheme. Few considered the 60:40 split of these investments in relation to the current potential percentages of real and fixed liabilities.
Part (ii)	Was better answered with most candidates producing the logical sequence connecting lower returns to higher employer contributions. The better candidates noted that the reduction in discount rate could be mellowed to some extent by a reduction in the margin for prudence. Many candidates commented on the timing of the switch, relative to market prices, although the question was concentrating primarily on investment strategy.
Part (iii)	Was reasonably answered, although the weaker candidates soon ran out of ideas. The question was clearly targeted at an individual transfer, so those who suggested the basis should be negotiated between the outgoing and incoming schemes were missing the point. Some suggested that the transfer value might be enhanced to encourage members to transfer (e.g. to reduce risk or future administration for the scheme), but this would be rare and not constitute a principle. Some were too dogmatic in what the transfer value may or may not allow for.
Part (iv)	Well answered. Most candidates made the salient points.

Q3 (i)

- Sponsor covenant can be defined as the combination of the ability [½]
- and the willingness / legal obligation [½]
- of the sponsor to pay sufficient contributions [½]
- to ensure that the scheme's benefits can be paid as they fall due [½]

[Maximum 2]

(ii)

- Credit risk assessment can be used as an analogy for sponsor covenant [½]
- Business outlook – an assessment of the business outlook in general and specific to the sponsor's sector [½]
- Use of financial metrics – financial statistics and accounting ratios [½]
- e.g. interest cover etc. [½]
- Implied market default risk [½]
- e.g. from market view of the company's equities [½]
- and / or bonds [½]
- Credit rating from a specialist agency [½]
- Risk-based measures such as levy to a central discontinuance fund [½]
- Merton type credit risk models [½]
- Quantitatively derived credit risk [½]
- Independent business review from an external credit advisory specialist[½]
- Assessment of how the company is run such as quality of management and business plans [½]

[Maximum 5]

(iii) **Investigations**

- The first step is to obtain further information to confirm the employer covenant is weaker and the ability to pay future deficit contributions is actually reduced [½]
- An external employer covenant review by experts is likely to be the most appropriate course of action [½]
- Need to consider the impact of the change in the employer covenant on the employer's cashflow [½]
- And its ability to pay the current deficit payments [½]
- Discuss the situation with the employer to understand the reasoning behind the poor trading results [½]
- Including consideration of whether the impact is in respect of the employer only or affects the whole industry or economy [½]
- and if the performance is temporary or likely to be permanent [½]
- Consider any impact on the credit rating of the employer or any issued stock [½]

Actions

- Actuarial and legal advice will be sought on these various courses of action [½]
- Consider impact on funding the scheme … [½]
- … if contribution plan is unaffordable allow the employer to reduce the pace of funding as desired [½]
- … alternatively if the covenant is very weak move to a more prudent approach to get contributions into the scheme whilst the employer remains solvent [½]
- If the covenant strength is reduced consider changing the scheme's investment strategy to bonds [½]
- investing in assets that pay out in the event of sponsor default, such as derivatives including credit default swaps [½]

- considering alternatives to cash payments if the sponsor is unable to afford them, such as a charge on the sponsor's fixed assets or parent company guarantee [½]
- including ratchets in contributions so that if the sponsor's financial position improves then the scheme shares in this improvement [½]
- set up contingent contributions so the sponsor has to make up the deficit more quickly if the scheme's financial position deteriorates. [½]
- Discuss with the employer changes to future benefits, such as [½]
- Increasing the member contribution rate [½]
- Reducing the value of future benefits or closing to accrual [½]
- De-risk or reduce the scheme's accrued benefits … [½]
- … for example through the use of insurance or incentive exercises. [½]
- Continue to monitor and review the covenant [½]

[Maximum 5]

[Total 12]

Parts (i) and (ii)	were covered by the Core Reading and so were answered well by those who knew it.
Part (iii)	Generally answered well but some candidates did not consider the practical implications of the given situation.

Q4 (i)

- Gradual removal of liabilities by the continuation of the scheme without any further accrual of benefits [½]
- Transfer of liabilities to another pension scheme with the same sponsor [½]
- Transfer of the funds to the beneficiary to extinguish the liability [½]
- Transfer of the funds to an insurance company or other pension provider to invest and provide a benefit [½]
- Transfer of the liabilities to an insurance company to guarantee the benefits [½]
- Transfer of the liabilities to a central discontinuance fund [½]

[Maximum 3]

(ii) **Gradual removal of liabilities by the continuation of the scheme without any further accrual of benefits**

- The scheme still needs to manage the key risks (including upsides) around funding, investment and covenant. [½]
- Temporary continuation may reduce the costs that would be associated with disinvesting and transferring assets, [½]
- but there will be no guarantee that the discontinuance benefits are met, as the cost of the benefits will still be affected by future investment and mortality experience [½]

Transfer of liabilities to another pension scheme with the same sponsor

- will only be an option if the scheme is being discontinued but the employer, or an owning company, has other schemes. [½]
- The situation is then similar to that of temporary continuation, except that any surplus or deficit arising will relate to a larger group of individuals. [½]
- The option may therefore not be made available due to the risk that the funds will be used for the benefit of others, or will be supported by funds that should be providing benefits for others (i.e. sharing of surplus / deficit). [½]

Transfer of the funds to the beneficiary to extinguish the liability

- An individual will receive the capital value of their benefits in lieu of a pension [½]
- The ultimate benefit will then depend on the future experience of that individual and the assumptions used to capitalise the benefits. [½]
- In many countries, it will not be possible for an individual to receive the capital value of their benefits so this option will not exist. [½]

Transfer of the funds to an insurance company or other pension provider to invest and provide a benefit

- An individual places the funds with an insurance company or other pension provider (or in the scheme of any new employer). [½]
- The ultimate benefit will then depend on the future experience of that individual and the assumptions used to capitalise the benefits. [½]
- The benefits may therefore be greater or smaller than the discontinuance benefit as the member bears investment and longevity risks. [½]

Transfer of the liabilities to an insurance company to guarantee the benefits

- Ensures that the beneficiaries are not subject to future experience risks, [½]
- This may be possible by purchasing an immediate or deferred annuity with an insurer. [½]
- There may, however, be a lack of insurers willing to accept the risks associated with guaranteeing deferred annuities. [½]
- The additional cost associated with guaranteeing a benefit may mean that the funds are not sufficient to provide the benefits that could have been targeted under one of the other forms of provision. [½]
- Benefits are exposed to insurer's covenant risk, not sponsor's [½]

Transfer of the liabilities to a central discontinuance fund

- This fund may be able to provide the guarantees without the risk premium, by placing a levy on schemes that have not discontinued. [½]
- Hence it may be possible to guarantee the benefits that would be expected to arise from the available funds. [½]

- Members may suffer a reduction in their benefits as a condition of transfer [½]

[Maximum 6]

(iii) **[Maximum ½ mark per option for any sensible answer. No marks for simply pointing out that the option is only appropriate if it is available]**

Gradual removal of liabilities by the continuation of the scheme without any further accrual of benefits
Most appropriate when:

- The original sponsor may is willing and able to make good any shortfall that arise in the future. [½]
- The sponsor can ensure that generations of members are treated fairly [½]

Transfer of liabilities to another pension scheme with the same sponsor

- Appropriate when the risk that the funds will be used for the benefit of others (or will be supported by funds that should be providing benefits for others) is not considered material. [½]
- The sponsor can continue to provide future benefits which are consistent with members of the receiving pension scheme [½]

Transfer of the funds to the beneficiary to extinguish the liability

- The sponsor wants to provide complete flexibility to members in terms of what they do with their funds [½]

Transfer of the funds to an insurance company to invest and provide a benefit

- The sponsor wants to provide flexibility to members in terms of benefit provision but ensure members to not squander the funds before retirement [½]

Transfer of the liabilities to an insurance company to guarantee the benefits

- Appropriate if there is a desire to guarantee the benefits to ensure that the beneficiaries are not subject to future experience risks. [½]
- The sponsor can afford the cost of a buyout for example because there is a surplus on a buyout basis [½]

Transfer of the liabilities to a central discontinuance fund

- Appropriate if better benefits are not available elsewhere [½]
- Where the CDF is well-funded or has a strong likelihood of meeting the benefits (e.g. is backed by the government) [½]

[Maximum 3]

[Total 12]

Part (i)	Well answered.
Part (ii)	Answers were mixed with better candidates being able to clearly set out the key features.
Part iii)	Poorly answered by many, with candidates struggling to give the most appropriate circumstance for each approach.

Q5 (i)

- Discount rate [½]
- …possibly split pre/post retirement or by duration of liability [½]
- Mortality [½]
- …possibly split pre/post retirement [½]
- Projected future improvements in mortality [½]
- Future salary growth [½]
- Price inflation [½]
- Early retirement [½]
- Increases in payment [½]
- Rate of revaluation in deferment [½]

[Maximum 4]

(ii) **Discount rate**

- The starting point is the yield available on the appropriate assets consistent with the valuation method [½]
- Data on the riskiness of the investment policy and covenant … [½]
- … in order to adjust for margins for prudence [½]
- Expected returns from fixed interest securities [½]
- And 'risk free' real returns from current yields on index Linked bonds [½]
- Dividend yields [½]
- Expected Equity risk premiums [½]

Future salary growth

- Past data on salary in the particular country [½]
- Industry specific [½]
- Company specific [½]

Price inflation
- Relationship between current yields for fixed and index linked bonds [½]
- Policy statement by Government or central bank [½]

Mortality
- Historic levels of mortality in a country (standard tables) [½]
- … the industry [½]
- … the Company [½]

Mortality improvements
- Data on projected improvements from relevant professional bodies [½]
- Adjusted using data as for mortality [½]

Early retirement
- Past data from scheme experience [½]
- Or from similar schemes in similar industries [½]

Pension increases and revaluation in deferment
- Provisions for guaranteed increases in the rules [½]
- History of any discretionary increases … [½]
- … and employers intentions for the future [½]

[Maximum 6]

(iii) **Discontinuance valuation**
- This depends on how it is assumed the scheme will be discontinued e.g. buyout, self-sufficiency [½]
- Explicit reserves for expenses may need to be made as the employer may not continue to meet these. [½]
- If a buyout (solvency) valuation then this assesses the cost of securing the liabilities with an insurance company [½]
- Hence valuation assumptions are very prudent [½]
- Mirror the terms offered by insurers [½]
- Discontinuance assumes the scheme will no longer be supported by the employer [½]
- No future salary increases [½]
- 100% withdrawal at date of valuation [½]

Accounting valuation
- Funding valuations are usually the responsibility of the Trustees, whereas the sponsor will determine the accounting approach [½]
- There may be separate discount rate and expected return on assets assumptions [½]
- Calculated in accordance with any prescribed accounting regulations [½]
- Funding valuation might include a margin for prudence [½]
- Whilst Accounting valuation has 'realistic' assumptions [½]

- Might allow for options and guarantees differently [½]
- Funding basis might allow for discretionary benefits [½]

[Maximum 6]

[Total 16]

Part (i)	Well answered, although many candidates listed out all the assumptions they could think of without considering which assumptions were key.
Part (ii)	Answers were mixed, with better candidates giving sufficient breadth in their answers. Some candidates wasted time by talking about the method of deriving the assumptions which was not required by the question.
Part (iii)	The points on discontinuance valuations were generally covered well, but answers on accounting valuations were mixed. Some candidates discussed the assumptions used for a funding valuation, which was not required.

Q6 (i)

- **Professionalism** [½]
- The exercise should be completed by someone experienced in the analysis and interpretation of the results; meeting any professional requirements. [½]

- **External environment** [½]
- Consider common practice and meet any restrictions. [½]
- **Specify problem** [½]
- i.e. using the results of the analysis of post retirement experience to inform future experience [½]

- **Develop the solution** [½]
  This includes:

Monitoring experience
- Collect relevant data [½]
- Relevant date could include sex, date of birth, pension, postcode, previous occupation, date of death, contingent dependants' benefits [½]
- Put data into homogeneous groups, for example by sex, category, age [½]
- Group into, say, five year bands rather than single year bands [½]
- There needs to be sufficient data for it to be statistically credible [½]
- For each age band calculate the number of deaths (or amount of pension "dying") divided by the number (or amount) exposed to the risk benefit [1]
- Consistency is required between the date on deaths and exposed to risk [½]

- Compare the result with the assumption adopted to determine if they appear to be more appropriate to the scheme [½]
- An alternative approach is to calculate the expected number of deaths (or amount of pension dying) over the inter valuation period using the mortality tables adopted for the previous valuation [1]

Produce / implement action plan

- This could include whether the results of the analysis can be used to derive or amend the valuation assumption [½]
- Or the projections for future improvements [½]
- or further analysis is required to determine the standard deviation of the actual experience [½]

- **Monitor and review** [½]
- Repeat process at each subsequent actuarial valuation [½]

[Maximum 7]

(ii)

- The results of any analysis should not be used blindly [½]
- Is the period under investigation typical and representative of future experience [½]
- e.g. any abnormal events or significant random fluctuations [½]
- Changes in the way the data was recorded [½]
- Changes in the balance of any homogeneous groups underlying the data [½]
- Investigate any long term trends [½]
- Will they continue into the future [½]
- Need to consider future projections of mortality improvements to allow for changes over time [½]
- Allow for any cohort effect i.e. strong patterns by year of birth [½]
- External Industry [½]
- and Country specific mortality studies should be taken into account [½]
- The valuation assumption may also allow for a degree of prudence which needs to be factored in separately [½]

[Maximum 5]

[Total 12]

Part (i) Most candidates were able to set out the ACC, but few managed to tailor it to the specifics of the question.

Part (ii) Answers were mixed. Only the better candidates were able to go into the detail on the limitations and adjustments that need to be considered.

END OF EXAMINERS' REPORT