

# **INSTITUTE AND FACULTY OF ACTUARIES**

## **EXAMINERS' REPORT**

September 2018

### **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.

Mike Hammer  
Chair of the Board of Examiners  
December 2018

**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.  
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***

The overall standard of scripts was similar to the previous session, with candidates over recent years maintaining a very consistent level of performance. This was a well-balanced exam paper and the better prepared candidates passed.

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.

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).

**C. Pass Mark**

The Pass Mark for this exam 63

## Solutions

### Q1

(i)

- Trust Deed and Rules [½]
- Investment Performance [½]
- Contribution Income [½]
- Previous actuarial valuation reports and associated documents [½]
- The current funding objective [½]
- and last times' valuation assumptions and results [½]
- Scheme booklet [½]
- Minutes of Trustee Meetings [½]
- Any announcements to members [½]
- Details of special arrangements for any members [½]
- Details of pension increases granted [½]
  - and the intentions for the future [½]
- Including any discretionary increases / allowance for discretionary benefits [½]
- Details of the actuarial factors used by the Scheme [½]
- Assessment of employer covenant [½]
- Data relating to the future operation of the Scheme, including: [½]
  - Current / Future investment strategy [½]
  - Any planned benefit changes [½]
  - Events that might affect the sponsor covenant [½]
  - Views on future discretionary practices [½]
- Annual accounts for the Scheme for the intervaluation period [½]
- Details of the Scheme's assets at the valuation date [½]
  - and at the previous valuation date [½]
  - to permit an analysis of experience [½]
- Historical mortality data split by category [½]
- e.g. factory, administration and management etc [½]
- Historical scheme specific experience [½]
- e.g. leavers, ill health retirements, proportion married etc split by category [½]
- Information from the sponsor regarding any planned activity e.g. redundancy, withdrawal and early retirement policy [½]

[Max 6]

(ii)

#### Financial assumptions

- Pre –retirement Investment return [½]
- Post- retirement Investment return [½]
- Price inflation [½]
- Pension Increases [½]
- Salary growth [½]

#### Demographic assumptions

- Mortality in retirement [½]
- Estimated take up rate of options [½]

- and the option terms [½]
  - e.g. cash commutation [½]
  - Other assumptions of secondary importance:
  - Family statistics (ie proportion married and age difference between member and spouses) [½]
  - Age difference between member and spouses [½]
  - Rate of early retirement [½]
  - Rate of withdrawal before retirement age [½]
  - Pre-retirement mortality [½]
- [Max 4]

(iii)

Investment return / discount rate

- Assumed annual rate set with regard to the return expected to be achieved from the scheme assets [1]
- i.e. based on the expected return of the 60% in equities and 40% in bonds [½]
- or based on an asset allocation benchmark [½]
- Separate assumptions for pre and post retirement may be used [½]
- Or could combined pre & post assumptions [½]
- reflecting the weighted average of the individual discount rates based on the proportions invested in each asset class [½]
- Could assume that a 'bond yield plus equity risk premium' approach is use [½]
- reflecting how the investment strategy might change over time [½]
- or other methodology as appropriate using separate pre and post discount rates [½]

Price inflation

- Use long term view of expected price inflation [½]
- Could compare the yield on fixed interest and index linked Gilts / Bonds [½]
- or Government projections of price inflation [½]
- possibly with an adjustment for an inflation risk premium [½]
- and allow for any caps or floors [½]

Pension Increases

- Defined in scheme rules or established practice [½]
- If related to price base on price inflation assumption derived above [½]

Salary increase assumption

- Allow for general inflationary increases in salaries [½]
- linked to price inflation [½]
- and consider an allowance for promotional increases [½]
- Could use information from a discussion with the employer [½]
- or more likely to use general industry salary information [½]
- and the derived price inflation assumption [½]

Mortality in retirement

- Look at scheme experience of separate homogenous groups [½]
- eg manual / office based workers [½]
- Determine a suitable base mortality table [½]
- Probably based on standard tables with an appropriate adjustment [½]

- The adjustment should consider scheme experience / specific industry / geographical region [1/2]
- allow for future improvements in mortality [1/2]

Take up of options and option terms e.g. cash commutation

- Could be based on scheme experience [1/2]
  - Family statistics - perhaps use standard assumption or base on scheme experience [1/2]
  - Rate of early retirement - perhaps use standard assumption or base on scheme experience [1/2]
  - Rate of withdrawal before retirement age - perhaps use standard assumption or base on scheme experience [1/2]
- [Max 12]

(iv)

- Need to consider the purpose for which the assumptions are to be used [1/2]
- e.g. a funding valuation to assess any funding deficit / future contribution rates [1/2]
- We can then judge the degree of accuracy that is required [1/2]
- and make an appropriate allowance for any uncertainty about the future experience [1/2]
- with an overstatement or an understatement within the assumption [1/2]
- We need to be aware of the potential financial significance of each assumption [1/2]
- and the impact of any over / underestimate in the assumption [1/2]
- We need to consider any legislative or regulatory constraints [1/2]
- and, where relevant, the need for consistency with the previous basis [1/2]
- It is important to assess that the overall value resulting from the combination of assumptions is appropriate [1/2]
- The gaps between the financial assumptions are more important than the absolute values when determining present values [1/2]
- but it is not generally appropriate to allow for uncertainty in one assumption by introducing a margin in a different assumption [1/2]
- Where the individual cashflows are important, it may be necessary for the accuracy of each assumption to be judged [1/2]
- There may also be a need to consider the interaction between the funding method used and the valuation assumptions [1/2]
- e.g. it may be considered inappropriate to use a specific withdrawal or even a mortality assumption before retirement for a small scheme [1/2]
- For a funding valuation there may be a desire from the trustees for prudent assumptions that are expected to overstate, rather than understate, the future contribution requirements [1/2]
- The employer may however prefer more realistic assumptions [1/2]
- ..... to ensure they do not have to pay more contribution than is strictly necessary [1/2]
- The strength of the employers covenant needs to be analysed [1/2]
- i.e. the sponsor's attitude and ability to meet the future financial obligations [1/2]

[Max 4]

*Question 1 was fairly straightforward and well answered.*

*Part (i) was well generally well answered, although some candidates missed easy marks in not giving enough points, e.g. mention of historical experience or market yields.*

*Many candidates scored full marks on part (ii).*

*Again for part (iii) some candidates did not provide sufficient detail.*

*Part (iv) provided mixed responses with some key items like the gap between assumptions being important or differing objectives for trustees and sponsor missing.*

## Q2

(i)

### Defined Benefit

- Investment Risk - the Scheme's assets may not achieve the investment returns necessary to meet the liabilities [1]
- Currency risk – if assets are held in a different currency [½]
- Longevity Risk – the Scheme's pensioners may live longer than expected [1]
- Interest rate risk – funding position will be volatile in the short term if assets are not matched to liabilities [½]
- Inflation Risk – as the benefits are linked to inflation, higher than expected inflation may result in the benefits being more expensive than expected [½]
- Employer Covenant Risk – the risk that the sponsor is unable to provide any additional resources that may be required to fund the benefits [½]
- Regulatory / Political Risk – changing legislation may increase the cost of benefits [½]
- Risk of expenses being higher than expected [½]
- Risk of fraud [½]
- Selection risk – Members exercise options to their own advantage [½]
- Liquidity risk – sufficient liquid funds will not be available to pay benefits as they fall due [½]

### Defined Contribution

- Reputational risk [½]
- e.g. because of low pensions at retirement [½]
- Workforce management issues if members cannot afford to retire [½]
- Compliance risk – eg risk that requirements become more onerous [½]
- May hinder recruitment if competitors offer a DB scheme [½]
- Legislative risk [½]
- e.g. increasing the rate of required company contributions under future changes to compulsory pension provision [½]
- Actual cost too high e.g. due to high take up/low opt out, salary increases, matching requirements [½]
- Liquidity risk due to lack of flexibility in contribution timing [½]
- Administration risk [½]
- Risk that annuity rate is poor at retirement or drawdown fund runs out [½]
- e.g. resulting for example from complexity of recording contribution / investment funds etc [½]

[Max 6]

(ii)

### Defined Benefit

#### Investment risk

- Invest the Scheme's assets in lower risk asset classes such as government bonds [½]
- Consider investing in assets that are expected to earn a return 'linked' to inflation [½]
- e.g. Index linked securities, equities etc [½]
- Broadly match assets and liabilities [½]
- Undertake an asset liability exercise [½]

- Have an appropriate balance between risk and return assets [½]
- with assets matched to the currency, duration and inflation sensitivity of the liabilities [½]
- Improve diversification of the investment portfolio [½]
- Invest in interest rate swaps etc. [½]

Longevity risk

- consider insurance products such as annuities [½]
- or the use of longevity insurance / swaps [½]
- Inflation risk – ensure bonds are correctly matched to inflation linked liabilities [½]

Employer covenant risk

- Use prudent assumptions to calculate technical provisions [½]
- or fund on a self-sufficiency basis [½]
- Invest cautiously [½]
- so that Scheme is less reliant on financial support from the sponsor [½]
- Consider investments that will pay out in the event of sponsor insolvency, e.g. credit default swaps, insolvency insurance [½]
- Ask for contingent assets that will be taken over by the Scheme in the event of sponsor insolvency [½]
- such as a fixed charge over land or property or a floating charge over other assets... [½]
- Regulatory / Political Risk – take regular professional advice [½]
- Expense Risk – regular benchmarking of service providers and robust fee and service level agreements [½]
- Fraud – have robust internal controls in place [½]
- Liquidity risk – review profile of contribution and investment income versus benefit outgo and ensure sufficient liquid assets are held to meet any shortfall [½]
- Ensure good admin practices and good governance [½]
- Set up a Defined Contribution arrangement or a hybrid pension scheme to replace the Defined Benefit Scheme [1]

Defined Contribution

- Increase employer contributions [½]
- Encourage members to contribute more via a matching contributions strategy [½]
- Regular pension statements and good communication may result in better member outcomes [½]
- Educate members to ensure they understand the risks [½]
- Ensure good governance [½]
- Provide a default investment fund, for example that includes lifestyling [½]

Give credit for any other reasonable points [Max 6]

(iii)

- Consider the level of benefits to be provided [½]
- subject to any cost constraints [½]
- Level of employer contributions [1]



- Level of employee contributions [1]
  - Any employer matching employee contributions [½]
  - Targeted population e.g. different scales for different parts of the workforce or categories of membership [½]
  - Range of investment funds to be offered [½]
  - Default Investment funds [½]
  - Employee profile, new hires etc [½]
  - Death in service benefits [½]
  - Any payroll constraints [½]
  - Eligibility requirements [½]
  - Availability of other benefits e.g. state benefits [½]
  - Employee needs / expectations [½]
  - Competitors provision [½]
  - Tax efficiency [½]
  - Guarantees and underpins [½]
  - Governance structure [½]
  - Level of outsourcing [½]
  - Member communication / interaction (eg ability to view and edit investment funds online) [½]
- [Max 6]

(iv)

- The investment guarantee could be based on either a minimum fixed, indexed or real investment return [1]
  - which may be checked each year [½]
  - or over the term to retirement [½]
  - The actual amount will depend on the length of time over which the guarantee is averaged [½]
  - Members may choose 'risky' funds as they will benefit from the underpin if performance is poor [½]
  - so may need to restrict the investment fund choice to control risk [1]
  - Costs of running scheme likely to increase with increased complexity [½]
  - How you would estimate the cost of the 0% guarantee? [½]
  - Investment return min 0% - need Stochastic modelling of assets to understand probability of negative returns occurring in any particular year [½]
  - but impossible to calculate cost exactly [½]
- [Max 3]

*Question 2 was generally well answered although part (iv) was the trickiest bit. In part (i) candidates who set out the key risks and then applied them to each of DB and DC scored well. Some candidates included risks not considered key. The better candidates scored well for part (ii), although not many mentioned changing DB to DC or hybrid. In part (iii) many candidates were able to score full marks. Candidates were struggling to pick up relevant marks in part (iv), e.g. not many mentioned guarantee level being fixed/indexed. Quite a few mentioned members choosing risky strategy and need for restriction of fund choice.*

### Q3

(i)

- The transfer value can be determined by setting up an equation of value based on the benefits given up [1/2]
  - calculated on a given set of actuarial assumptions [1/2]
  - Transfer payment should be no less than the expected cost of providing the benefits within the original scheme of the deferred benefits given up [1/2]
  - It is usual to calculate the transfer value with regard to prevailing market conditions [1/2]
  - since the transfer of benefits involves a physical movement of assets [1/2]
  - The transfer value is often calculated on a best estimate valuation basis [1/2]
  - with reference to the investment strategy within the scheme [1/2]
  - Pension increases that are promised in the scheme's rules must be allowed for [1/2]
  - The transfer value may or may not be an allowance for any discretionary pension increases [1/2]
  - Other consideration arising from the transfer of benefits include; how to protect the security of other members' benefits in schemes with a funding level below 100%, for example by reducing values [1/2]
  - how to ensure that full value for money is granted in respect of benefits previously transferred in from another scheme [1/2]
  - If the Trustees wish to provide more than the minimum transfer value, the sponsor should be consulted [1/2]
  - This may be the case in situations where the scheme wishes to de-risk by encouraging transfers from the scheme [1/2]
  - The cost of options or guarantees available to the member must be allowed for if these are more expensive to provide than the pension benefit [1/2]
  - Allowance may be made for the cost of calculating the transfer value [1/2]
  - Administrative considerations (eg having relatively stable factors) [1/2]
  - Need to consider any professional/regulatory requirements [1/2]
- [Max 3]

(ii)

- Allows flexibility of when and the amount of retirement income [1/2]
- to better suit needs [1/2]
- e.g. provide a higher non escalating pension than a lower escalating pension [1/2]
- Possible tax efficiency benefits [1/2]
- Inheritance – it may be possible to pass on funds after death [1/2]
- Transfer Value may offer good value [1/2]
- e.g. if the member has reduced life expectancy [1/2]
- or is not married and the transfer value assumes a spouses pension is payable [1/2]
- The member may believe that they can secure a higher income by transferring to a defined contribution scheme [1/2]
- For example by taking more investment risk etc [1/2]
- The member may have concerns over the financial strength of the sponsor of the scheme [1/2]

- The member may be influenced by the actions of other scheme members [½]  
[Max 3]

(iii)

- The member may ultimately receiving a lower retirement income [½]
- e.g. If they suffers poor investment returns [½]
- they live longer than expected [½]
- Inflation is higher than expected [½]
- or high expenses [½]
- if the member purchases an annuity when value is poor [½]
- If the member lives longer than expected [½]
- or if inflation is higher than expected [½]
- May risk missing out on possible future discretionary pension increases [½]
- Regulatory risk e.g. future changes to taxation [½]
- The member may lose access to risk benefits (ie on death in service or ill health) [½]  
[Max 3]

*Candidates familiar with the calculation of transfer values clearly understood the principles and scored well.*

*In part (i) some candidates missed off options/guarantees and administration considerations.*

*Most candidates managed to pick up reasonable marks on part (ii).*

*Part (iii) was less well answered than the other parts with some candidates failing to recognise key risks.*

## Q4

(i)

### Liability driven investment (LDI)

- The investment strategy is set with explicit reference to the liabilities [1]
  - with the aim is to reduce, or hedge inflation [½]
  - and the interest rate risks faced by pension schemes [½]
  - The interest rate risk results from the liabilities having a duration in excess of the duration of the assets held [1]
  - Many LDI strategies involve swaps [½]
  - Swaps provide a relatively straightforward vehicle for schemes to control the amount of mismatch in timing or maturity of the assets and liabilities [½]
  - Under a typical swap contract, the scheme will receive fixed payments for the duration of the contract in exchange for floating payments [½]
  - with the floating payments often being linked to an index [½]
- [Max 4]

(ii)

### Advantages

- Removes longevity risk [½]
- Removes investment risk [½]
- Reduces inflation risk [½]
- This will result in less volatile contribution requirements [½]
- May be able to purchase on advantageous terms if annuity market is competitive [½]
- No future funding risk or future contribution requirements for the Defined Benefit scheme [½]
- Improved security for members if the insurer's covenant is strong [½]
- Reduces future investment strategy fees [½]

### Disadvantages

- Costs may be higher e.g. insurance company profit margin [½]
- and expenses [½]
- May cause a "funding strain" [½]
- Transactional costs / fees may be significant [½]
- No opportunity for investment profit [½]
- or mortality profit [½]
- It may not be possible to match benefits precisely [½]
- e.g. where increases in benefits are based on the CPI for example [½]
- Future discretionary increases become more complex [½]
- There may be immediate liquidity constraints when buying the annuities [½]
- Administration saving may be small or not materialise [½]
- Possible communication issues with members and future benefits would be paid by a third party [½]
- Security risk if the insurer's covenant is not as strong as the employer's [½]
- hence there is still a potential contingent liability if the insurer fails [½]

[Max 10]

(iii)

- Longevity swaps work where the coupon payments are linked to the mortality experience of a particular set of lives [½]
  - such as a specific age group in the national population [½]
  - The hedge is not perfect if the population underlying the bond is not the same as that in the pension scheme [½]
  - but larger schemes may be able to arrange a longevity swaps where the payments are linked to the mortality experience of the scheme's membership rather than the national population [½]
- Other features of Longevity Swaps are;
- The fund continues to pay the pensions to the pensioners [½]
  - but the swap provider makes matching payments to the trustees [½]
  - In return the fund agrees to pay a series of fixed payments to the swap provider [½]
  - There is no upfront cash payment [½]
  - But may be requirement to post collateral [½]
  - Generally only covers pensioners [½]
  - but index contracts for non pensioners are now available [½]
  - however are relatively expensive compared to the ongoing funding reserve [½]
- Coupon payments will reduce over time in line with the mortality experience of that population [½]
  - If longevity is higher than expected, the coupon payments received will be higher [½]
  - i.e. if the pensioner lives longer than expected the fixed payments stop but the swap provider still makes payments to the fund [½]
  - thus hedging the longevity risks of the pension scheme [½]
- [Max 4]

*Question 4 was surprisingly poorly answered, with some candidates not fully understanding longevity swaps.*

*In part (i) some candidates failed to understand the primary purpose of LDI in matched liabilities. Duration considerations were often also missed.*

*In part (ii) many candidates failed to include sufficient points.*

*Part (iii) provided for mixed responses with most candidates not demonstrating a sufficient depth of knowledge to score full points.*

## Q5

(i)

### Methods

[Candidates need to name and provide an outline description for 1 mark]

- Business Outlook - An assessment of the business outlook in general and specific to the sponsor's sector [1]
  - + Relatively easy to obtain but [½]
  - Results are subjective and difficult to quantify [½]
- Financial Metrics - Financial statistics and accounting ratios can be compared with similar companies and with previous years to spot any trends, particularly any deterioration [1]
  - + Simple to undertake and [½]
  - + information is publicly available but [½]
  - Does not give an indication of the absolute level of risk [½]
  - Financial statistics of companies can be out-of date/infrequent [½]
  - Group accounts may not provide information specific to sponsor [½]
- Implied Market Default Risk - Where a sponsor has issued investments such as equities or bonds, market prices can indicate market view of sponsor's credit risks, and how views can change over time [1]
  - + Where securities traded, up to date information is easily accessible [½]
  - + Quantifiable measure of credit risk but [½]
  - Risk to pension scheme will differ e.g. priority / security provided [½]
  - Other factors determine market prices and hence yields [½]
  - Only available if investments are regularly traded and prices quoted [½]
- Credit Rating - Companies can pay a specialist agency to provide them with a credit rating [1]
  - + Based purely on financial circumstances of the company, eliminating impact of market forces [½]
  - + Agency may have access to information not publicly available but [½]
  - Only larger companies tend to have full credit ratings [½]
- Merton-type credit risk models - A model is used to determine the probability of default based on the behaviour of the equities [1]
  - + Quantifiable measure [½]
  - But requires sponsor to have traded equity [½]
  - Ratings not widely available (as securities not quoted) [½]
- Quantitatively derived credit risk - Model deriving a credit rating or probability of default from standard accounting data and credit information [1]
  - + Quantifiable output and wide usage but [½]
  - Relies on accounting information which may be out of date [½]

- Independent business review - Report by an external credit advisory specialist, typically an accounting firm, insolvency practitioner or other niche operator[1]
    - + Can take explicit account of interdependence of funding and sponsor covenant [1/2]
    - but requires sponsor cooperation for access to confidential information and [1/2]
    - can be expensive [1/2]
  - Risk based levy - Credit assessment used by central discontinuance fund when determining levy to be paid [1]
    - + Quick and easy method of obtaining a broad indication of credit rating but[1/2]
    - Only a one-year view [1/2]
- [Max 10]

(ii)

- Consider changing the scheme's investment strategy to bonds [1/2]
  - investing in assets that pay out in the event of sponsor default, such as derivatives including credit default swaps [1/2]
  - considering alternatives to cash payments, such as a charge on the sponsor's fixed assets [1/2]
  - including ratchets in contributions [1/2]
  - so that if the sponsor's financial position improves then the scheme shares in this improvement [1/2]
  - Contingent contributions from sponsor if scheme's financial position deteriorates [1/2]
  - Reduce future benefits or increase member contributions [1/2]
  - The trustees could also obtain further details about the employer covenant [1/2]
  - and have discussion with the sponsor regarding future business plans [1/2]
  - and assess the business outlook in general and for business sector in more detail [1/2]
  - The Trustees should assess the implications of the covenant assessment for their funding strategy [1/2]
  - i.e. the assessed liabilities needs to be consistent with the revised covenant position [1/2]
  - Reduce benefits [1/2]
  - Increase member contributions [1/2]
  - Extend recovery period [1/2]
  - Or could cease accrual and wind up scheme [1/2]
- [Max 4]

*Question 5 was a standard knowledge based question which was generally answered well. In part (i) some candidates missed up the advantages and disadvantages, or only provided a name with no explanation. In part (ii) the better prepared candidates were able to score full marks.*

## Q6

(i)

- Needs to allow for the projected level and incidence of that benefit outgo [1/2]
- and the contribution income [1/2]
- In projecting the level of the benefit outgo, allowance will need to be made for any inflationary growth in the benefits [1/2]
- and also for the future accrual (if relevant) of benefits [1/2]
- In projecting the incidence of the outgo, allowance will need to be made for the probabilities of exits from and entrants to, the scheme [1/2]
- e.g as a result of deaths, employees leaving / joining employment, divorce, remarriage of a widow(er), etc. [1/2]
- All methods derive an actuarial liability and standard contribution rate [1/2]
- The projected benefit payments can be considered together with projected contribution income to indicate when investment income or disinvestment is likely to be required [1/2]
- or alternatively consideration of the benefit outgo together with a projection of investment income can indicate when contribution income is likely to be required [1/2]
- The models and their parameter values should be consistent with those used to value the assets [1/2]
- Security - the method that produces the largest target fund (i.e. Actuarial Liability) will provide the greatest security [1/2]
- Stability - a stable Modified Contribution Rate (MCR) is often desirable [1/2]
- Durability – the funding method should remain stable even if a major event happens to the membership of the scheme [1/2]
- Realistic - all the methods are unrealistic to a greater or lesser extent because some of the implicit assumptions are not borne out in practice [1/2]
- Liquidity – a funding method should meet cash outgo as required [1/2]
- Flexibility - flexibility is best achieved by using a method that targets a good level of security [1/2]
- Opportunity cost – The alternative uses of money that is used to fund the scheme should be assessed [1/2]

[Max 3]

(ii) Attained Age funding method [1/2]

- the Standard Contribution Rate (SCR) is determined as the stable rate of contribution that if paid over the expected future membership of all members [1/2]
- will accumulate (with investment returns) to the value required to provide the benefits that are expected to accrue over that future period of the membership [1/2]
- Actuarial Liability is the difference between the discounted value of the total expected benefits for the members and the discounted value of the future expected contributions [1]

Entry Age funding method [1/2]



- the SCR is determined in a similar manner except the contributions and benefits are equated over the full expected period of membership for the member entering at the 'entry age' [½]
- The full expected period of membership will be based on a single assumed entry age for all of the members [½]

Projected Unit funding method [½]

- For the Projected Unit method, the Actuarial Liability is the discounted value of the benefits that have accrued over the past period of membership of the beneficiaries [½]
- In determining this value allowance is made for any future expected inflationary growth of the on-going benefits up to retirement age [½]
- target a standard level of funding with the Standard Contribution Rate being set to maintain this target from year to year [½]
- can then be adjusted as appropriate when experience does not follow the model or its parameter values [½]

Current Unit funding method [½]

- the target level of funding is determined in a similar manner to PUC except that no allowance is made for any inflationary growth [½]

In practice, a variety of other methods exist but all are some form of adjustment of the four mentioned above. Examples of common adjustments include:

- control periods applied to the Projected Unit or Current Unit methods, which lengthen the period over which the SCR is calculated [½]
- allowance for any leaving service revaluation under the Current Unit method [½]

[Max 6]

(iii) Attained Age funding method [1]

- which gives the "average" future contribution rate for the current membership [1]
- hence may be suitable for a scheme that is closed to new entrants [½]
- but need to be aware that the Attained Age method may not always be suitable for small schemes if the average age of the membership is due to change sharply [½]
- for example when a significant member is due to retire [½]
- as the result could be a sharp fall in the average age of the scheme membership [½]

Give credit for other well reasoned arguments

[Max 3]

*Question 6 was reasonably well answered in parts (i) and (ii).*

*In part (i) many candidates failed to give sufficient details, e.g. the need to project the level and timing of outgo and contributions.*

*Some candidates provided formulae in part (ii) where the questions stated "describe".*

*In part (iii) some candidates failed to score when asked to recommend a method, by "hedging their bets" or not clearly recommending a method.*

## **END OF EXAMINERS' REPORT**