

# **INSTITUTE AND FACULTY OF ACTUARIES**

**Curriculum 2019**

**SPECIMEN SOLUTIONS**

**Subject CP1 – Actuarial Practice**

**Paper One**

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

1. The aim of the Actuarial Practice subject is that upon successful completion, the candidate should understand strategic concepts in the management of the business activities of financial institutions and programmes, including the processes for management of the various types of risk faced, and be able to analyse the issues and formulate, justify and present plausible and appropriate solutions to business problems.
2. This subject examines applications in practical situations of the core actuarial techniques and concepts. To perform well in this subject requires good general business awareness and the ability to use common sense in the situations posed, as much as learning the content of the core reading. The candidates who perform best learn, understand and apply the principles rather than memorising the core reading.
3. The examiners set questions that look for candidates to apply the principles specific to the situation set out in the questions, having read the question carefully. Many candidates gain few marks by writing around the subject matter of the question in a more general fashion. Detailed specialist knowledge is not required and nor is very detailed development of particular points.
4. Good candidates demonstrate that they have used the planning time well to understand the breadth of the question and to structure their answer – this is a big advantage in making points clearly and without repetition. This also enables candidates to use the later parts of questions to generate ideas for answers to the earlier parts.
5. Time management is important so that candidates give answers to all questions that are roughly proportionate to the number of marks available.
6. The comments that follow the questions concentrate on areas where candidates could have improved their performance. Candidates approaching the subject for the first time are advised to use these points to aid their revision.
7. Candidates who give well-reasoned points, not in the marking schedule, are awarded marks for doing so.
8. In this diet the scoring for the exam was done out of 200 and therefore the mark scheme shows a total of 200 marks available for the paper.

## B. Comments on the Specimen 2019 CP1 paper

The questions in this paper are based on the following past CA1 questions:

- Q1 is based on Q3 September 2016 Paper 1 part (i)
- Q2 is based on Q3 September 2015 Paper 2 part (i)
- Q3 is based on Q4 September 2015 Paper 2 parts (i) and (ii)
- Q4 is based on Q1 April 2014 Paper 2
- Q5 is based on Q4 September 2016 Paper 2 parts (i) and (ii)
- Q6 is based on Q3 April 2017 Paper 1 parts (i) and (ii)
- Q7 is based on Q5 September 2014 Paper 2
- Q8 is based on Q7 September 2016 Paper 2
- Q9 is based on Q6 April 2016 Paper 2

### C. Pass Mark

The Pass Mark for this exam was 60.

1

(a) Systematic risk

Cannot be eliminated by diversification. [1]

The risk of the individual share relative to the overall market. **Or** the risk that affects an entire market or system, and not just specific participants. [1]

(b) Specific risk

Can be eliminated by diversification. [1]

The risk of holding a share which is unique to the industry or company. **Or** the risk that arises from an individual component of a financial market or system. [1]

[Maximum 4]

2

Individual risk events should be independent of each other. [1]

The probability of the event should be relatively small. [1]

In other words, an event that is nearly certain to occur is not conducive to insurance [1]

On the face of it, death is certain, so a whole life assurance does not fit within the above criterion. [1]

However the considerable uncertainty over timing still gives rise to an insurable event. [1]

Large numbers of potentially similar risks should be pooled in order to reduce the variance and hence achieve more certainty. [1]

There should be an ultimate limit on the liability undertaken by the insurer. [1]

Moral hazards should be eliminated as far as possible because these are difficult to quantify. [1]

There should be sufficient existing statistical data/information to enable the insurer to estimate the extent of the risk and its likelihood of occurrence. [1]

[Maximum 6]

3

- i) The main reason will be to ensure that the claim is valid. [2]

Both in terms of the peril being covered (e.g. if 3<sup>rd</sup> party liability only is the event insured) and the claim amount being commensurate with the loss/costs incurred i.e. not inflated. [1]

In particular, that the claim is in accordance with the policy's terms and conditions e.g. not subject to an exclusion. [1]

The aim being to ensure that the amount paid (or 0) is correct (not too much) e.g. to eliminate fraudulent claims. [1]

Investigation of a representative sample of claims will help the insurance company better understand the risk profile and so aid pricing and underwriting. [1]

It may help in setting terms and conditions e.g. for new developments (technology) or types of claims – risk profile changing. [1]

It may help in providing advice to the insured on how to avoid (or reduce) claims – safety and security issues. Or indeed to manufacturers on design issues.

[Maximum 8]

- (ii) The main criterion would be the amount of the claim.

Either actual claim amount or in some cases (e.g. liability) the estimated potential claim amount.

Large claims e.g. over a threshold would be investigated.

The rationale being that the potential savings on investigating small claims wouldn't compensate for the expense, time or hassle involved.

The amount could be a fixed cash value or may be relative to average claim amounts.

Allowance would be needed for inflation of claims cost i.e. the threshold may change over time.

The threshold may vary by type of claim or other rating factor e.g. location or if certain suspicious signs were present – see (iii).

[Maximum 6]

[Total 14]

4

*Specify the problem* [1]

The problem is to determine appropriate premium rates that would be suitable for each of the events, all of which are likely to have slightly different risks. [1]

The rates will need to ensure that they deliver an acceptable profit to the company; and are competitive in the market place otherwise little business will be written. [1]

The company will need to bear in mind that it is new in the market and as such has little or no experience of the product. [1]

*Developing the solution* [1]

The company will need a pricing model that can project the future development of this line of business in various circumstances. The model needs to be developed or acquired, or an existing model modified. [1]

The first stage is to determine the assumptions around possible claims. [1]

The actuary will need to consider the possible claims costs that might arise if the festival claimed – this will be considering all the possible risks that could occur and then applying an expected claim amount and also the probability of these occurring. [2]

Risks relating to the music festival could include injury if stage collapses, falls caused by badly maintained grounds (e.g. if very wet). [1]

Will need to consider the additional risks that a firework display could create along with the probability of these occurring. These risks could relate to fire damage or injury caused by the fireworks. [2]

Will also need to understand what exclusions might be included in the policy wording; and the safety controls the individual events would have – this would probably mean that some elements of the festivals would be individually priced. [1]

Judgement will need to be applied as to the extent of any margin for prudence included in the reserving basis. The assumed reserving basis will also be an input to the profit testing of the product. [1]

As this is a new development, the model will be run several times to test the sensitivity of premium rates and profit emergence to changes in assumptions (differing probabilities and costs). [1]

The resultant rates will be compared with those available elsewhere in the market.

*Monitoring the experience* [1]

After each of the festivals the company will want to monitor the experience and whether any claims have been made; and how they compared to the assumptions initially made. [1]

It will then feed this back into the model. [1]

All parts of the cycle will need to be considered in the context of the relevant economic and commercial environment. In addition the requirements of professionalism must be recognised at all stages of the cycle. [1]

If the company is not winning any business it may want to consider revising the assumptions. [1]

If the festivals are claiming significantly more than expected then the company will want to review the assessment of the probability and claim amounts and adjust the assumptions accordingly. [1]

Changes to premium rates offered by competitors will also need to be monitored to ensure the rates do not become uncompetitive – especially if each festival is being priced on an individual basis. [1]

The company may find that it cannot offer a price in the market that is both competitive and makes the required return, and hence might withdraw from the market; equally if the company has not priced the risks sufficiently the company could have issues of claims being way too high. [2]

[Maximum 18]

## 5

(i) Information asymmetry is the situation where at least one party to a transaction has information which the other party or parties do not have. [2]

(ii) General point for any of (a) – (b):

There is a difference in expertise and/or negotiating strength between policyholder and insurer. [1]

(a) **Impaired life annuity**

The policyholder gets a higher annuity if they have an impairment affecting their life expectancy. [1]

The prospective policyholder has more information than the insurer on their health. [1]

The policyholder will want to over disclose medical impairments or exaggerate them. [2]

Policyholder will know underwriting costs money so all information will not be fully checked. [1]

For example ex-smokers who have not disclosed they have stopped smoking to doctors claims to still smoke. [1]

Split their fund value between product providers so fund values stay below levels for enhanced underwriting. [1]

The product provider will understand the underwriting factors better than policyholder and could ask for less policyholder details so as to offer a lesser annuity. [2]

(b) **Car insurance with two named drivers**

Insurers will make assumptions based on the information about each driver to calculate the risk. This includes how much, when, where and purpose each driver drives. [2]

For example a parent may be named as owner of a car and main driver on which a son or daughter is actually the main user to get a lower premium (i.e. “fronting”) [2]

Due to the information asymmetry the insurer is likely to under-price the risk. [1]

This is more of a risk if one of the drivers has access to more than one vehicle. [1]

The insurer may decline claims on technicalities or minor reasons. [1]

[Maximum 8]

(iii) In all cases, Information asymmetry can be reduced by requiring disclosure of full information that is clear and concise, from both policyholder and insurer. [2]

Also via better education of consumers and appropriate regulations. [2]

(a) Initial underwriting at outset by the insurer, to understand level of health impairment. [1]

More detailed doctor’s reports/medical tests for larger cases. [1]

To avoid split fund value problems, policyholder should be required to disclose aggregate retirement fund, not just the part being annuitised with this particular insurer. Insurers could share information to prevent fraud here. [2]

Margins in pricing basis, but conflicts with competitiveness. [1]

- (b) Require disclosure of main driver and insurer must make clear to policyholders that insurance can be invalidated if false disclosure made and may affect future ability to take out insurance [3]

Premium could be based on higher risk driver only, but conflicts with competitiveness and could produce premium anomaly compared with single driver policy. [2]

[Maximum 8]

[Total 18]

## 6

- (i) Diversification – total capital required is less than the sum of the parts. [2]

Diversify by: [5]

- lines of business.
- geographical region.
- providers of reinsurance.
- investment – asset classes.
- investment – assets held in each class of business.

Underwriting at proposal stage [1]

Claims control procedures – only pay out claims intended and defined in the policy. Paying more claims will reduce profit but consider cost of claims control. [2]

Management control systems – good management controls can reduce provider's exposure to risk [2]

including – good quality data. [1]

Monitoring of liabilities to detect accumulation of risk. [2]

Accounting and audit – ensure accurate provisions and capital requirements are calculated, premiums are collected. Reassures providers of finance. [2]

Options and guarantees – care must be taken, particularly those that appear to have limited value when granted but become valuable if market or other conditions change. [2]

Reinsurance used to reduce capital or reduce the level of claims [2]

Alternative Risk Transfer – produces tailor made solutions for risks that the conventional market would regard as uninsurable [1]

These could include: Integrated Risk Cover, Securitisation, Post Loss funding, Insurance derivatives, Swaps [2]  
[Maximum 16]

- (ii) Underwriting refers to the assessment of potential risks so that each can be charged an appropriate premium. [2]

Protection from anti selection, including misrepresentation at the proposal stage [2]

Identify risks for which special terms need to be quoted. A provider may however aim to accept a large proportion of business at standard rates. [2]

For substandard risks, the underwriting process will identify the most suitable approach and the level of special terms to be offered. [2]

Risk classification to ensure all risks are rated fairly. [2]

Ensure that claim experience does not depart too far from that assumed in the pricing basis. [1]

Financial underwriting to reduce risk for larger proposals. [1]

Consider cost / benefit of each level of underwriting [1]  
[Maximum 8]

[Total 24]

## 7

- (i) Scenario analysis is a method of evaluating risk where a full mathematical model is not appropriate. It is the process of measuring the impact of the risk as a result of changes for combinations of variables under plausible scenarios. [2]

Stress testing measures losses under extreme values of individual variables, to identify weak areas or the impact of a stress [2]

Stochastic Modelling is an extension of stress testing where some variables are stressed, so deriving a distribution of outputs. [2]

[Maximum 6]

- (ii) Stress testing. The extreme value of the FTSE after a fall could be applied in the valuation interest rate calculation for example [2]

An individual company capital assessment review would look at plausible adverse scenarios and quantify the impact of them. For example a key

member of staff gets run over by a bus: this is not quantifiable by mathematical model and so scenario analysis is used in this situation [2]

Stochastic Modelling is applicable here. We are looking at the entire portfolio and also the modelling of guarantees requires that some variables are modelled simultaneously. [2]

[Maximum 6]

- (iii) A standard model for SCR is a single standard model used by all insurers other than those with an approved internal model. [1]

A standard model has to be able to be used in a cost effective way for a wide range of insurers; with different risk profiles and of different sizes. [1]

The standard model is therefore required to be less complex; and less time-consuming [1]

However, the standard model has the disadvantage that it aims to capture the risk profile of an average company; and approximations are made in modelling risks; which mean that it is not necessarily appropriate to the actual companies that need to use it; and the regulator might need to build in appropriate prudence accordingly. [2]

An alternative to the standard model is the internal model designed by an individual insurer to calculate the solvency capital requirements reflecting the specific risk profile of the insurer; within parameters set by the regulator. Selection issues, could choose the model that allows the company to adopt lower capital requirements [2]

An internal model being designed by the insurer can be more complex and sophisticated tailored to the risk profile. It can also be closely aligned with the insurer's economic capital model; allowing a higher degree of consistency between the SCR and the economic capital. Being tailored to the company it can avoid unnecessary prudence (i.e. lower SCR). [2]

There will be considerable cost involved in developing/maintaining an internal model; and gaining approval for its use. [1]

For a regulator a standard model provides a comparable basis for comparing a wide range of companies. So the use of a single standard model makes it easier for the regulator to decide which companies need most regulatory attention. [1]

The regulator needs to define the standard model; and ensure that it is appropriate for the range of insurers being regulated [1]

An internal model requires the approval of the regulator before it can be used. [1]

There will also be considerable time and effort involved on the part of the regulator in reviewing and approving an internal model. The cost of an insurer developing an internal model will act to limit the number of insurers where it is economical to develop an internal model. For the regulator this will act to limit the number of internal models applied for and so the resources the regulator needs to approve and then to continue to supervise approved internal models. [2]

An internal model is tailored to the risk profile of an individual insurer, however, the risk profile will change over time; so the regulator will require that the internal model is kept up to date and developed further so that it continues to fit the risk profile of the firm. [2]

The regulator has the responsibility for maintaining confidence in the financial system and protecting consumers. [1]

The regulator in approving either a standard or internal models needs to make sure the model will be effective at maintaining confidence in the financial system and protecting the consumers of the insurer; not just at the point of initial approval, but also that it is resilient over time. [2]

[Maximum 16]

[Total 28]

8

(i) *Advantages* of valuing using the ELL system compared with the spreadsheets:

**Less prone to model errors than spreadsheets (more valid/rigorous)** [2]

because:

- extensively used across industry [1]
- individual users can't amend ELL code but can amend spreadsheets [1]
- ELL code original build will be better controlled and tested [1]
- ELL code changes will be better controlled and tested [1]
- ELL will be externally audited [1]
- ELL will receive wide peer review internally [1]
- and be subject to more formal governance controls [1]
- version control will be much clearer [1]

**Less prone to data errors than spreadsheets** [2]

because

- the ELL data feeds will not be open to individual manipulation or error like the data feeds to a spreadsheet would be

- and so easier to be convinced of completeness of data

and therefore results should be available more quickly as less need to manipulate data. [3]

**Better documented** [2]

- less chance of key-person dependency that can arise with spreadsheets [1]

and because of all the above

**Independent verification of outputs for reasonableness (or external audit) should be easier/cheaper** [2]

**Workings of the model should be easier to appreciate and communicate** [2]

and therefore

**Less likely to have material errors in the valuation results** [2]

- so the Directors should have more confidence in being able to sign off results [1]
- complying with professional guidance should be easier and cheaper [1]
  - e.g. standards on model building or on data [1]
- regulator should have more confidence in results [1]
  - and less need to intervene or ask questions of the insurer [1]
  - and less requirement for capital add ons to be held [1]

Supervisory valuations may well require individual policy valuation; large numbers of policies may become impractical to manage using spreadsheets [2]

ELL could be quicker to complete calcs [1]

**Outputs from ELL are likely to be clearer – more standardised /consistent** [2]

- across products and valuation dates
- and therefore results are quicker and easier to interpret and communicate/require less senior review
- and quicker to consolidate/aggregate/disaggregate
- changing the frequency of output, e.g. monthly rather than annual results should be easier

[4]

**Stochastic modelling, where required, should be more accurate and quicker** [2]

- easier to cover full range of scenarios
  - easier to allow for interactions at Company level as model will be able to aggregate product lines together
- [2]

Other:

Consistency with economic capital methodology

Easier to use within Enterprise Risk Management

Automatic tie in to pricing [3]

Systematic changes can be rolled out once to all products (rather than having to change multiple spreadsheets) [1]

Given ELL is already being used for most products, more efficient to use it for all. [1]

More support should in theory be available e.g. consultancy helpdesk. [1]

May have a more user-friendly interface. [1]

*Disadvantages* of valuing using the ELL system compared with the spreadsheets:

**Higher costs** [2]

- may be ongoing license fees to pay for using the software [1]
- and the hardware necessary to run the system will entail further costs [1]
- any developments/new products will have to be coded, tested, and approved within governance strategy before any results can be obtained [1]
- Company has no control over upgrades to software issued by actuarial consultancy [1]
- May be poorly supported in reality (e.g. if consultancy helpdesk overwhelmed by demand from other clients) [1]

**Less flexible** [2]

- longer to develop and refine [1]

- requires specialists to code [1]
- adhoc/experimental changes to products/valuation methods – or just general “what if” scenarios are usually not possible, quickly, using ELL [1]
- longer to get alternative/additional runs [1]
  - getting extra runs can be delayed until ELL processing time becomes available
    - or it may be necessary to go through the central team to get the additional runs
    - or due to licensing the software can be used only by restricted numbers of people
    - [3]
  - similarly, analysis of surplus may require additional adhoc/sensitivity runs, and these will be more difficult to accommodate within a tightly controlled ELL approach [1]

**Less transparent** [2]

- users of the ELL cannot see the code or data
- and therefore may be less likely to spot problems with either
- the ELL code is less likely to be readily understood, by a range of people, than spreadsheet formulae, making debugging more difficult in case of alleged errors or concerns
- systematic errors will affect multiple processes compared with spreadsheet errors which affect only supervisory valuation
- insurer may have a false sense of security about system e.g. treat as black box [5]

Dominance risk – exposed to failure of software/consultancy. [2]

[Maximum 18]

(ii) **General**

- keep a watching brief on key milestones at outset of project
- and monitor progress updates during implementation
- to ensure project is on track to implement in time for next valuation

- and check that plans are still in place to roll out the old procedures (i.e. manual data and spreadsheet) as a contingency if the implementation fails
- ensure key dependencies are being continually managed
  - particularly that the data team will provide the required feeds to the ELL team
  - and that all necessary valuations (plus a contingency margin) are able to be produced from ELL for next valuation
- consider need for peer review

[8 – one mark for each bullet point]

### **Data specific**

- will want to be satisfied that data used in ELL valuation is accurate and complete [2]
- and can be reconciled to the manual data used in spreadsheet [1]
  - it may be necessary to ask for a parallel run of both these data systems at the same date [1]
  - and ideally the data will match exactly (once formatting differences have been removed) [1]
  - if possible each individual policy's data should be cross matched [1]
  - failing this, key summary statistics could be compared, e.g. number of policies, aggregate benefits, and so on [1]
  - it may be that the data sets do not reconcile [1]
  - in which case further investigations and reports should be requested to get to the bottom of which data set, if either, is accurate and complete [1]
  - any differences between data sets should have their financial impact assessed and documented [1]
  - so any material difference between the two valuation systems can be understood [1]

### **Model specific**

- will want to be satisfied that the calculation method is accurate on ELL [2]
- and it can be reconciled to the calculations used in the spreadsheet [1]
  - the team coding the ELL should document their formulae [1]
    - and the valuation actuary should compare this with the spreadsheet [1]
  - allowing for the possibility that the ELL's calcs have been developed compared with spreadsheet
  - e.g. to allow for recent changes to valuation rules [2]
- it would be useful to spot check the valuation result for some example policies across the two approaches [1]
- will also want to review the available output formats from the ELL system to ensure they contain all the required information [1]
  - and can be downloaded successfully into other systems for further summarising or manipulation [1]
- a run integrity report should also be reviewed that shows how many policies were input to the ELL and how many policies ended up with a reserve calculated (i.e. extent of any errors must be understood) [1]
- a report should also be obtained to demonstrate that the valuation result remains unchanged for the pre-existing lines of business on the ELL [1]

### **Parallel run**

- will want to be satisfied that the valuation result can be reconciled between ELL and spreadsheet [2]
  - both systems should be run at the same date, with the same assumption set, and the same data [1]
- ideally the valuation result will be the same, but any material difference needs to be investigated, documented, understood, and resolved [1]
- stress/sensitivity tests should also be conducted [1]
- it will be necessary to get to the bottom of what is the correct data and what is the correct valuation result [1]
  - as well as looking at the valuation result, the valuation actuary should also ask for run time statistics to ensure the ELL can deliver results quickly enough during the real valuation. [1]

### **At point of sign off**

- Final peer review/sense check [1]
- no further information is necessary if the valuation actuary is content with the above results
- but the implementation may be allowed to proceed subject to workarounds
  - in which case reports should be obtained that guarantee the necessary workarounds will be in place for the next valuation and not disturb ability to meet deadline

[3]

[Maximum 16]

[Total 34]

- 9** (i) Legislation – regulations  
State benefits  
Tax  
Accounting standards  
Capital adequacy and solvency  
Corporate governance  
Risk management requirements  
Competitive advantage  
Commercial requirements  
Changing cultural and social trends  
Demographic changes  
Environmental issues  
Lifestyle considerations  
International practice  
Technological changes

[Maximum 10]

(ii) **Capital adequacy and solvency**

Capital adequacy and solvency is a key requirement of developed banking and insurance regulation for financial institutions. [1]

As the trust is insurance for individuals it may be required to comply with requirements for insurance companies in the country. [1]

This may lead to increased premiums. [1]

This may affect the investment strategy of the fund. [1]

Although as the government set up the trust there may be exemptions in place.

[1]

If capital is required to start up the trust, this will restrict the ability of the Trustees to lower premiums. [1]

And may result in subsidy between cohorts as the required level of capital fluctuates with the volume of business. [1]

### **Changing cultural and social trends**

With increasing home ownership and immature insurance market there may be significant interest in joining the benefit trust. [1]

Increase in prosperity may lead to an increase in the value of contents covered. [1]

If home ownership becomes more significant insurance companies may enter the market reducing demand. [1]

If the benefit trust becomes “encouraged” or “established” as a security for mortgages it could become dominant and cover the majority of mortgages. [1]

This could be driven by the mortgage providers, who may see the security of mortgage payments as beneficial to them. [1]

Depending on the level of contributions and “spare” income for individuals there may be varying participation, particularly if these change in a growing economy. [1]

### **Risk management requirements**

The Trustees will need to manage risks within the benefit trust to look after the interests of all beneficiaries. [1]

As well as looking to maintain capital they will need to consider the risk of significant cross subsidy between cohorts. [1]

Operational risk, of record keeping and management of claims will need to be considered. [1]

The Trustees will also need to manage market and credit risk. [1]  
Which will impact on the investment of assets, as well as setting premiums for different individuals. [1]

### **State benefits**

Demand for the trust will be related to the level of state support. [1]

State benefits relating to death benefits and disability / redundancy would directly reduce demand for the benefit trust. [1]

As a trust set up by the government there may be an element of subsidy in either premiums or management of expenses. [1]

There may also be implications for means tested benefits if benefits paid from the benefit trust are taxable or count against any earnings thresholds. [1]

Any changes to future levels of direct or indirect state support would lead to changes for the benefit trust which would need to be managed. [1]

[Maximum 16]

(iii) Infrastructure projects may have similar characteristics to property investments. [1]

They may be expected to carry a degree of investment risk and in return provide higher returns. [1]

As such if the benefit trust had a portion of assets invested to achieve growth, rather than being a matching asset class, this may be appropriate. [1]

Infrastructure projects tend to be large, long term, investments. [1]

It may be that the benefit trust will have sufficient assets under management to allow it to access infrastructure directly. [1]

Access to this as a direct investment which is beyond some other investor classes may mean this is a good investment opportunity. [1]

Infrastructure may provide good diversification compared to other asset classes. [1]

Returns from the project may be linked to inflation. [1]

It may be that the value of the infrastructure project is correlated with property prices, and if so may be a good match for the property insurance cover provided. [1]

There may be a political reason why this is an appropriate investment. [1]  
For example, as the government set up the benefit trust it may hope that it can in return provide capital for some of its projects. [1]

This may be particularly relevant if the government is providing subsidy for benefits or expenses, as supporting infrastructure may lead to further financial aid. [1]

Infrastructure is likely to require significant capital, and may have a long payback period. [1]

Therefore this will be more appropriate if there is net income to the benefit trust, if disinvestment likely to be required this will be less appropriate. [1]

The appropriateness will also depend on alternative investments available. [1]

As a developing country there may not be many high quality investments available in the domestic currency. [1]

Which may increase the attractiveness of an infrastructure investment. [1]

Although overseas alternatives should also be considered, this may be less politically acceptable for the government supporting the benefit trust. [1]

The investment in infrastructure projects may be illiquid so the Trust would need to ensure it had adequate liquidity in the rest of its investments to manage liquidity risk. [1]

[Maximum 12]

(iv) Risk classification is a tool for analysing a portfolio of prospective risks by the risk characteristics. [2]

Such that each subgroup of risks represents a homogeneous body of risk. [2]

[Maximum 4]

(v) **Removing maximum contribution level**

The Trustees ability to set contributions for each individual based on the level of risk is restricted by the maximum contribution level. [1]

By removing the maximum contribution level the Trustees will be able to price all risks more appropriately. This will reduce the need for government support. [1]

This could lead to some individuals being set contributions which are prohibitive, meaning that they will not seek to join the benefit trust. [1]

With some higher risk individuals not joining the benefit trust overall claim levels may be expected to fall. [1]

As these higher risk individuals would have had contributions at the maximum level they would have made a “loss” for the benefit trust which will no longer arise. [1]

It will therefore no longer need to subsidise these individuals with higher contributions from other members, which could reduce other contribution levels. [1]

If a significant number of individuals are priced out of joining the benefit trust this may be politically difficult. [1]

Particularly if those who can no longer afford to join are concentrated in a particular region and / or are part of a vocal section of the electorate. [1]

However, if contributions could be set at a lower level for a majority of individuals that may be a positive impact on perception overall. [1]

In practice it may be that few individuals were affected by the maximum contribution level. [1]

And that as a result this proposal may have a relatively small impact on risk management. [1]

[Maximum 6]

**Allowing change to contributions for existing members.**

By not adjusting contributions levels the Trustees are unable to respond to changing market conditions or experience. [1]

They are also unable to make corrections if any initial underwriting was inadequate, either from questions asked or information withheld by individuals. [1]

For example, changes to interest rates may significantly change the levels of mortgage repayment being protected. [1]

And it will be difficult to predict interest rates over the lifetime of a 25 year mortgage. [1]

Allowing adjustments to contribution levels will allow the Trustees to respond to these changes as appropriate. [1]

This may also reduce the level of prudence required in setting the contribution levels, as the need to build in possible future changes will be reduced. [1]

This may reduce initial contribution levels, which would improve perception. [1]

However, the perception if premiums fluctuated may be negative particularly if changes are frequent and significant. [1]

An alternative approach would be to allow for some regular adjustments to contributions based on an index, for example in line with inflation or interest rates (assuming mortgage payments are linked to interest rates). [1]

This could provide a more transparent approach which may be more acceptable to individuals as it would avoid any perception of arbitrary contribution changes. [1]

Given that more claims will occur in poor economic conditions, as an increased chance of losing jobs, it may be politically unacceptable to increase contributions in those conditions. [1]

[Maximum 6]

[Total 54]

**END OF SOLUTIONS**