

# INSTITUTE AND FACULTY OF ACTUARIES

## EXAMINERS' REPORT

September 2016

### **Subject SA3 – General Insurance: Specialist Applications**

#### **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 General Insurance Specialist Applications subject is to instil in successful candidates the ability to apply knowledge of the United Kingdom general insurance environment and the principles of actuarial practice to providers of general insurance in the United Kingdom.
2. Our expectation of a passing candidate at this stage is that, broadly, they should appear capable of stepping up to a head of function (pricing / reserving / capital) role at a small-mid sized organisation or being a senior member of a function team at a larger organisation. They should demonstrate not only a grasp of the technical aspects of general insurance actuarial work, but should also a good sense for products, the competitive marketplace, regulatory environments and the operational aspects of an insurance company. They should be able to pull these areas of understanding together to provide well rounded advice to the users of their services.
3. Consistent with previous examiners' reports, we would offer candidates two key pieces of advice – (i) read the question properly and (ii) take the time to actually think about what is going on. Further to previous reports, we would stress that candidates do not need to get the majority of the points included in this report in order to pass (there are significantly more than 100 marks available for the points in this report). Time spent making sure that you are answering the question that is asked is therefore more valuable than a panicked rush to put down as many points as possible, regardless of whether they are relevant.
4. On the first issue, candidates should always work on the assumption that the question wording has been carefully chosen. It is therefore essential to read the question properly.
5. If something is not asked for then candidates will waste valuable time writing answers that will gain no marks. These broader answers may be a logical next step to the question and so may be appropriate for candidates to discuss in a professional context. This is an exam however with a finite number of marks available and so the scope must necessarily be limited and specifically defined.
6. If a question does specifically mention something, candidates should also assume that there are definitely marks available for this aspect of the question. During the exam setting process, any content that is superfluous will have been removed. A clear implication of that is that if there are numbers provided in the question paper then there are marks available for comment and consideration of those numbers.
7. Wording of question sections should also be considered in the context of the position within the overall question. Where new question information is provided between sections, candidates should recognise that this information is specifically relevant to the following section or sections. When answering preceding question sections, candidates should not consider any subsequent information in their answers (although it may cover similar ground).
8. Various examples from this paper of recurrent failure to read the question are noted below. On the second issue, candidates should note that SA3 is the key paper at which

we test candidates' broader thinking. This is generally the final paper before qualifying as a professional, and we consider a capacity for broader thinking to be one of the best indicators of a candidate's suitability to act in a professional capacity once qualified.

9. As such we aim to design exam papers so that it is difficult to pass without displaying some capacity for independent and broad thinking, as well as to heavily reward instances where these skills are displayed. When reviewing past papers, candidates should assume that the marks available for generic points are substantially less than those awarded for the more challenging points that would be the mark of high quality professional insight in a practising actuary. Marks available for list items from bookwork are lower still.
10. We strongly recommend that candidates step back and take the time to thoroughly think about what is actually going on in question situations proposed rather than simply considering numbers to be analysed with standard techniques. For example, candidates might stop to think about what claims actually are for a particular class of business, considering factors such as what actually causes the claim, who brings the claim, how it is dealt with once brought, what makes one claim small while another is substantial etc.
11. This more grounded, real world perspective will help candidates to consider such things as practical issues, stakeholders involved and their potentially diverging objectives, wider impacts, regulatory or ethical issues, inappropriateness of certain actuarial techniques for the specific situation, current economic or cyclical effects etc. This is likely to lead to significantly broader point generation (and indeed reflects the thought processes of the examiners in drafting the questions and solutions) and a more rounded understanding of the underlying risks and dynamics which should also be of value to candidates when dealing with different stakeholders in their professional life.
12. Again, some examples of this failure to think more widely on the current paper are below. More generally, we would also advise candidates to employ basic exam techniques such as well structured answers and effective time management.
13. 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. Overall okay performance with a reasonable effort from all credible candidates to consider specifics of a situation.
2. A number missed key marks for not knowing DFA differences to generic stochastic modelling.
3. A number were not clear on general wordings (differences between events, benefits and exclusions for example) causing some drift in their answers.

4. As always we would recommend that candidates try to get out of their core comfort zone. Candidates will do better in SA3 (and hopefully in their careers) if they develop at least a rudimentary understanding of what needs to happen out in the real world before premiums or claims manifest in an insurance portfolio, and a basic awareness of all the activities that are involved in running an insurance business.

### C. Pass mark

The Pass Mark for this exam was 59.

### Solutions

- Q1 (i)** Business planning:
- to assess the benefits and costs of reinsurance [½]
  - to assist in the design of a suitable reinsurance programme [½]
  - to estimate the likely variability of claims experience [½]
  - to reserve for uncertainty, for example, to estimate the possible effect of industrial diseases on the reserves run-off [½]
  - to value portfolios for purchase/sale [½]
  - to optimise investment strategy and asset performance [½]
  - to identify trends in claims at an early stage, for example, decline in performance of certain contracts [½]
  - to assist senior management in strategic decision making and developing business strategy [½]
- Assess impact of alternative expense strategies [½]
- Assess reinsurance strategies & levels [½]
- Determine impact of changes to the business environment [½]
- Review liquidity needs and strategy [½]
- Optimise premium rates and retention strategies [½]
- Project solvency positions [½]
- Other valid example of financial planning [½]
- Other valid example of financial planning [½]
- Models can also be used in other activities which may assist with financial planning [½]
- e.g. pricing, reserving, capital modelling etc. [½]
- [Maximum 4]

Many candidates focused on standard uses of actuarial modelling (attracting far fewer marks) rather than on broader planning objectives for a business

- (ii) Specify the purpose of the investigation. [½]  
 ...all models have limitations, without being clear on the purpose of the model  
 it is difficult to assess whether these are acceptable or not. [½]  
 Consider the grouping of data and whether any modifications are required [½]  
 ...relying simply on the past data may incorporate events which are not  
 relevant to the future [½]  
 ...e.g. claims from a discontinued business segment [½]  
 Consider the use of appropriate estimation techniques for parameters. [½]  
 ...there may be missing data [½]  
 Check that the goodness of fit is acceptable and attempt to fit a different model  
 if not. [½]  
 Run the model using selected values of the variables. [½]  
 Run the model using estimates of the values of variables in the future. [½]  
 Run the model using different values for the variables to assess the sensitivity  
 of the results to these. [½]  
 Run the model using values consistent with alternative scenarios to assess  
 whether the model results are consistent with expectations [½]  
  
 Compare to appropriate benchmarks [½]  
 Ensure compliance with any relevant regulation [½]  
 Check for internal consistency within any individual scenario [½]  
 Backtesting / AvE [½]  
 Out of sample testing [½]  
 Ensure appropriate training & documentation [½]  
 Check calculations implemented correctly [½]  
 Check model & infrastructure are appropriately stable [½]  
 Check maintenance costs are viable [½]  
 Check reporting outputs are adequate [½]  
  
 Consult with a suitably experienced person to help assess / select some of the  
 parameters, [½]  
 ...as data may either be scarce or not capture features that may be expected to  
 occur. [½]  
 Follow any internal model governance procedures [½]  
 e.g. gaining approval from relevant model oversight committees [½]

[Maximum 5]

Many candidates didn't venture beyond standard SII driven internal model validation terminology, or consider the implications of deterministic modelling

- (iii) DFA is essentially a stochastic model that incorporates feedback loops and  
 "management intervention decisions". [½]  
 This enables management to evaluate differences in financial results arising  
 from alternative strategic decisions, [½]  
 ...by replacing one set of strategic decisions with another [½]  
 ...re-running the model and comparing the ranges of possible outcomes under  
 each decision path. [½]

DFA has a wider range of purposes compared with deterministic modelling: [½]

It can provide management with:

...information about the interaction of decisions from all areas of company operations [½]

...a quantitative view of the risk-and-return trade-offs inherent in emerging strategic opportunities [½]

...a structured process for evaluating market alternatives [½]

With DFA tools, management should be better equipped to achieve three fundamental aims of an insurer: [½]

...absorb the transfer of policyholders' risk [½]

...earn an appropriate return on shareholders' (or other) capital [½]

...minimise the company's exposure to insolvency. [½]

An integrated DFA model will have more functionality than a deterministic model, [½]  
it can:

...apply the same macroeconomic conditions across all divisions and departments of the insurer [½]

.....(for example, interest rates, inflation rates and catastrophic events) [½]

...allow management to consider operating needs and conditions in the financial markets as they make investment decisions [½]

...examine the risk-and-return trade-offs of investment and operating decisions for the entire organisation [½]

...allow management to choose the reinsurance programmes for the various departments [½]

and coordinate them for the entire company, all at once [½]

An adequately structured DFA model with sufficient, reliable and relevant data will better support strategic decisions, [½]  
in the following areas:

...Realism of a business plan. [½]

...Product and market development. [½]

...Claims management. [½]

...Capital adequacy. [½]

...Capital allocation. [½]

...Liquidity. [½]

...Reinsurance structure and cost. [½]

...Asset/investment strategy analysis. [½]

...Rating agency support (demonstration of risk management techniques). [½]

...Merger and acquisition opportunities. [½]

...Closure of books of business. [½]

*General stochastic model points:*

Production of full distribution of outcomes useful for assessing percentiles [½]

Can dynamically reflect correlations & interactions [½]

May be better perceived by regulators or other stakeholders [½]

Better able to reflect the complexity of a typical insurance business [½]

More effective for assessing performance of non linear features such as non proportional reinsurance	[½]
Can address extreme events	[½]
Other valid advantage of stochastic model	[½]
Other valid advantage of stochastic model	[½]

[Maximum 8]

[Total 17]

Many candidates clearly were not aware of any differences between DFA and more generic stochastic modelling, limiting themselves to only a small number of available marks

- Q2** (i) Cover losses suffered by the policyholder in connection with their use of internet and email. [1]
- Losses relating to damage to, or loss of information from, IT systems and networks [1]
- Business interruption losses to the policyholder arising from loss of use of IT systems/hardware/websites as a result of an insured peril [1]
- Virus damage*
- A virus infecting a computer system and causing damage [½]
- ...such as failure to start certain programmes [½]
- ...slowing performance speed [½]
- ...corrupting or deleting data [½]
- Employee accidentally opens infected email [½]
- Policyholder accidentally transmits the virus to anyone they do business with or via their website [½]
- Hacker attack*
- A hacker takes control of computers [½]
- ...or website [½]
- ...and steals customer data [½]
- ... or releases data [½]
- ...uses computer for malicious purposes (e.g. distributing spam) [½]
- A hacker may hold an organisation to ransom [½]
- ...threatening to release data [½]
- ...or damage a website [½]
- May access or steal assets [½]
- Or intellectual property [½]
- Policyholder's use or access to their own systems may be suspended during a police investigation into a hacker attack. [½]
- Infringement of intellectual property, defamation or libel
- Policyholder accidentally infringes a trademark on their website [½]
- Email from policyholder (or its employees) causes defamation or libel... [½]

...or policyholder's website [½]

*Online identity fraud*

A third party fraudulently uses policyholder's online identity to enter into a contract/agreement. [½]

*Other perils not suggested:*

Personal data or privacy issues, e.g. loss of or disclosure of private data [1]

Losses relating to breaches or actions by suppliers or business partners [1]

*Other valid points*

[Maximum 6]

Many candidates struggled with the carefully chosen English in this question. **Events** are things that happen in the real world. Some of them are **covered** by insurance policies, in which case policyholders might make a **claim** to receive the **benefits** on offer under the policy, unless there's an **exclusion** that restricts something that would otherwise be covered.

In the case of this question, many candidates started talking about claims or benefits rather than things happening in the real world which might give rise to a claim for some benefits. Each part of this question was carefully segmented, credit was not given in other sections (unless the candidate actively referred back and acknowledged overlap in their answers).

- (ii) Policies generally include significant assistance with the management of the incident itself rather than or in addition to paying a "sum insured". [1]  
This can help to minimise reputations damage associated with cyber breaches. [1]

*Virus damage*

Insurer could help rebuild computer system/website following damage. [1]

Insurer could help restore company data [1]

Payments for increased costs of working or business interruption [½]

Negligent onward transmission of a virus [1]

*Hacker attack*

Insurer could pay to repair a damaged website. [½]

Pay for remedial legal costs [½]

Pay for remedial PR costs [½]

Pay a ransom to a hacker threatening to destroy website/release sensitive data [1]

Provide loan equipment/Pay to replace equipment for the duration of any policy investigation [1]

Costs of any amounts extorted [½]

Coverage for the costs of notifying customers or a security or privacy breach [1]

Coverage for any investigation costs into attacks [1]

...and defence costs and/or civil damages arising from breach [½]



*Infringement of intellectual property, defamation, libel*

Cover compensation policyholder has to pay [½]

*Other valid suggestions*

*Online identify fraud*

Insurer could pay costs incurred [½]

*Other valid suggestions*

[Maximum 6]

As before, candidates were often unclear on **benefits**. Some talked perils, or claim types, or events or other features.

- (iii) Usually an excess payable [½]  
 ...reduces insurers claim cost and thus policyholders premium [½]  
 ...ensures policyholder retains an interest in avoiding a claim [½]

Viruses created by the policyholder [1]

Deliberate or reckless acts [½]

Acts of deliberate or clearly negligent infringement of intellectual property, defamation or libel [½]

...to protect against moral hazard [½]

Policy may be restricted to business activities taking place in a particular jurisdiction [1]

...limits the scope of the policy to one understood by the insurer [½]

...certain countries maybe more prone to attacks [½]

Claims relating to download of inappropriate business materials [1]

...e.g. pornographic or obscene materials, [½]

...as these tend to be high risk for the transmission of viruses. [½]

Any damage caused by an employee of the company [1]

...or anyone given deliberate access to computer systems (e.g. subcontractors) [½]

...as this should be covered by other insurance policies [½]

Any damage which is recoverable against a third party [1]

...for example failure of 3rd party software where there is a claim against the 3rd party [½]

State sponsored attacks [1]

... for accumulation control or other valid suggestions [½]

Issues related to provision of professional advice or services [½]

As covered by E&O [½]

Failure of ISP or hosting [½]

to avoid accumulations [½]

IP breach [½]

to limit latent issues	[½]
Personal injury or damage as secondary outcome of an event	[½]
to avoid coverage creep	[½]
Claims relating to issues or events already known about by insured and not declared	[½]
to reduce anti-selection	[½]
Failure to notify law enforcement promptly	[½]
or commence remediation	[½]
or communicate to affected individuals	[½]
Or to notify insurer	[½]
To avoid paying for unnecessarily inflated costs due to poor response	[½]
Reputation or goodwill	[½]
as impossible to quantify	[½]
Data loss if no backup (or IT with no firewall, no antivirus or other poor behaviours)	[½]
to encourage good risk management	[½]

*Credit for other valid suggestions with valid reasons.* [Maximum 5]

The main mistake made was commenting on circumstances where you would not offer cover at all, which is not the same as an exclusion (which by its nature excludes some aspects from cover that is provided).

(iv) Increase the insurance excess	[½]
Decrease the insurance limit	[½]
...but it would need to consider whether this would be within the companies risk appetite	[1]
Extend / include a waiting period	[½]
Adopt a product with narrower cover or select reduced cover options	[1]
Carry out an audit of insurance policies to check for any overlapping coverage	[1]
...for example property insurance may cover computer hardware	[½]
Enhance risk management processes to reduce the risk of a claim	[1]
...this should lead to lower insurance premiums	[½]
...but will need to be able to evidence initiatives to insurers	[½]
Examples include:	
...ensuring anti-virus software is in place throughout the organisation	[½]
...and maintained up to date	[½]
...installing firewalls	[½]
...implementing appropriate user access rights to hardware and software systems	[½]
...adopting screening process for everyone given access to company systems	[½]
.....e.g. criminal record disclosure, checking references etc	[½]
...restricting employee internet access to those with a business need	[½]

...adopting policies and procedures to reduce exposure to harmful viruses [½]  
 .....e.g. not permitting employees to use personal internet based email  
 accounts [½]  
 .....e.g. restricting software that can be installed on company computers [½]  
 .....e.g. providing employees with encrypted means for transferring data [½]  
 ...carrying out appropriate training for employees so they are aware of the  
 policies and procedures. [½]

Limiting the amount of customer data stored [1]  
 or time stored [½]  
 ...and the ability to transfer this data [½]  
 ...e.g. putting in place safeguards to prevent downloads of mass data to  
 removeable storage devices [½]

Working with appropriate third parties to protect very sensitive data [1]  
 ...and where possible to avoid collecting and storing this information in the  
 first place [½]  
 ...e.g. working with banks or organisations such as PayPal to keep card details  
 safe [½]

Working with third parties to test the effectiveness of security procedures [1]  
 ...e.g. undertaking penetration testings [½]

Ensure that contract agreements with customers limit the liability of the  
 company [1]  
 ...e.g. ensuring the customer is liable for any intellectual infringements,  
 defamation or libel [½]  
 ...e.g. ensuring Websites-R-Us are not liable for any damage caused by hacker  
 attack to individual websites [½]  
 ...(although they are unlikely to be able to limit liability where they are shown  
 to be negligent, or where they trade on the security of their website hosting)  
 [½]

Websites-R-Us should seek to understand which countries their customers are  
 intending to operate in and where necessary limit these. [½]  
 Negotiate with insurers and brokers to ensure insurance pricing is competitive  
 [1]

[Maximum 9]

[Total 26]

A number of candidates proposed fundamental changes to the policyholders entire business just to manage their insurance premium (i.e. discontinuing major customer segments or income streams). While this would technically reduce the insurance premium (as would stopping doing any business at all) it did not attract marks as it is unrealistic. Setting up captives was similarly not considered as a credible answer (and many credible answers were available).

Passing premiums on to customers does not reduce the premiums themselves.

Many candidates seemed to think that we were assessing their ability to become IT managers rather than actuaries, and while they would have got some marks for some surprisingly good knowledge of IT security best practice they would not have scored well overall without also considering more standard insurance premium management such as cover or excesses.

- Q3** (i) Strictly, latent claims are those claims that result from perils or causes that the insurer is unaware of at the time of writing a policy [½]  
and for which the potential for claims to be made many years later has not been appreciated. [½]

In common parlance, latent claims are also those that generally take many years to be reported. [½]

[Maximum 1]

Generally well answered

- (ii) Insurer I is unlikely to have provided cover if there was a suspected a link between the product and cancer. [½]  
Or if concerns as raised by company M employee were disclosed [½]  
If claims begin to emerge now, there will have been at least a 15 year delay between consuming the product and making a claim (manufacturing ceased in 2000). [½]  
It could therefore be argued that the claims meet the “strict” definition of a latent claim. [½]  
The claims certainly meet the alternative definition of claims which simply take many years to be reported. [½]  
It is also possible to argue that these aren't strictly latent claims. [½]  
Any food product could have an unintended impacts on health, particularly if the product is of a new or unusual type. [½]  
Underwriters may therefore have considered the potential for claims of this type when deciding whether to insurer the manufacturer. [½]  
Cover spans a long period however and awareness in e.g. 70's is likely to have been lower [1]  
There may have been previous studies regarding similar products and the potential health impacts. [½]

Company M may have had to pay higher insurance premiums than other food manufacturers, given the nature of the product and the potential for claims of this nature. [½]

[Maximum 3]

Some candidates got ahead of themselves and discussed validity of the claim, where the question only asked whether a claim that did arise would be latent.

- (iii) This remains only a potential latent claim: Information about the possibility of claims has emerged but no clear link or liability has been proven. [½]  
There are a number of stages in the development of a latent claim. The issue regarding Company M is at a very early stage. [½]  
It is uncertain whether this claim will come through all (or any) of these stages, and result in claims for an insurer. [½]  
A scientific study has suggested a link between the product and cancer, but we don't know the strength of the correlation, or whether this is a credible/reputable study [½]

**It is possible no one will make any claims against the manufacturer** [½]

This may be because the evidence of a link is not strong, or the research is subsequently discredited [½]

If there is a strong evidence of a link between the product and cancer, it is likely there will be some claims. [½]

The likelihood of claims being made against the manufacturer will also depend on the jurisdictions in which the product was distributed (some jurisdictions are more litigious than others) [½]

**Claims against the manufacturer may be unsuccessful** [½]

The requirements of claimants to obtain compensation will vary between jurisdictions [½]

The likelihood of a claim succeeding will therefore depend on the jurisdiction [½]

Claimants need to establish a link between the product and an injury/illness they have suffered [½]

Since there are many causes of cancer, claimants will have to demonstrate that the sweetener was the main or a material cause of the cancer [½]

Demonstrating this causality is often difficult, although some cancers are linked to specific exposures (for example, mesothelioma is the signature disease of asbestos exposure) [½]

Other sweeteners or products may also have been found to cause cancer, in which case claimants may need to prove exposure to this manufacturer's brand of sweetener [½]

Sweetener may have been consumed as an ingredient in other products, so claimants may find it difficult to prove they have even consumed the sweetener, or estimate the amounts consumed [½]

Claimants potentially need to prove they consumed a particular food many years ago, and that this sweetener was an ingredient in that food [½]  
 Claims may be time barred by a statute of limitations [½]  
 Insurers may still be liable to contribute to the manufacturer's legal costs in defending these actions [½]

**Even if claims against the manufacturer are successful, they may not be covered by insurance [½]**

There is an allegation that the company was aware of the link between the sweetener and cancer [½]  
 There may therefore be coverage disputes, if the company did not disclose the link to its insurers [½]  
 The policies may specifically exclude cancer claims, or contain another relevant exclusion [½]  
 This also appears unlikely, but is possible if there were questions about the product's safety when the insurance was underwritten [½]  
 Other actions by the manufacturer may void cover, e.g., in settling claims directly with customers [½]

**Even if claims are covered by insurance, policies issued by insurer I may not respond [½]**

It will be necessary to determine which years of coverage respond to claims [½]  
 This is complex when claims arise due to exposure over a number of years [½]  
 Manufacturing processes have changed over time – Insurer I may be able to demonstrate safe processes were used during its period of insurance [½]  
 Policies may have been written on a claims-made basis, and so not respond now [½]  
 Or other forms of cover providing limitations, e.g. sunset clauses [½]  
 However this would be unusual given the years Insurer I provided insurance [½]  
 If follow market, lead or coinsurer may reject claims [½]  
 If there is awareness may become D&O rather than PL [½]  
 Claims may be below the \$1 million excess [½]  
 It may be unlikely that a single claimant is awarded more than \$1 million (depending on jurisdiction) [½]  
 However multiple small claims from a single source may be aggregated for insurance purposes. [½]  
 Records may be lost / missing – Manufacturer may be unaware it was insured by Insurer I [½]  
 Policy may have previously been exhausted by other claims [½]  
 Policy may previous have been commuted/ cancelled [½]  
 Insurer I may be unable to pay claims because it has no assets [½]

Other insurances held by the manufacturer or others may respond, meaning claims don't reach Company I's policy [½]

[Maximum 8]

Many candidates would have fared better with a more logical and methodical approach. The outline above may be helpful, setting out the sequence of events that need to happen (there has to be a link, people have to make a claim, the claim has to be successful, they have to be covered by insurance and specifically by company I). Thinking through all the steps between something happening in the real world and insurers paying out claims (and identifying valid points at each stage) is likely to be useful for a number of SA3 questions.

- (iv) Estimate the total number of people who will claim compensation [½]  
 And the average compensation amount [½]  
 Multiple these amounts together [½]

***Number of claims***

Estimate the number of people who have been exposed to the product [½]  
 There may be statistics available on the manufacturer's historical market share, revenue, production output, export markets, etc. [1]  
 And the proportion who will go on to develop cancer [½]  
 The scientific study may have some information on this, for example, it may be based on an epidemiological model [1]  
 If warranted, a study could be commissioned by insurers / actuaries [½]  
 Estimate the proportion who develop cancer who make a claim for compensation [½]  
 And the proportion of those claims that will be successful [½]  
 If there is a long latency period, may need to consider factors such as changes in life expectancy, comorbidities, etc. [1]

***Average claim size***

Look at historical compensation awards for similar claims [½]  
 Consider whether these claims are likely to result in higher or lower claim costs than these benchmarks [½]  
 For example, compensation may be higher if cancer tends to impact younger people [½]  
 Compensation may be lower if the sweetener is one of a number of possible causes of cancer (or other example) [½]  
 Include an allowance for potential legal costs [½]  
 And the costs of administering compensation payments, making medical assessments etc. [½]

Average claim size and number of successful claimants will vary by jurisdiction [½]  
 Separate estimates will therefore be required for each jurisdiction in which there is the potential for claims [½]

Need to consider the expected time when claims will emerge, and payments will be made [½]

If claims are not expected to emerge for many years, discounted will be material in estimating claim costs [½]

Each of the estimates required will be uncertain, due to the limited information available [½]

There may be no information / almost no information available at present, so considerable judgement may be required [½]

It will be appropriate to develop a range of estimates, considering the possible values for each assumption [½]

Information on how previous latent claim types have developed may be helpful [½]

Although each type of latent claim has its own unique nature, so this experience may not be relevant [½]

Medical advice may be useful in assessing the severity and development characteristics of this risk [1]

... Or of any subcategories of cancer that might result [½]

The figure quoted in the newspaper article may be helpful in estimating compensation payments [½]

The assumptions underlying the estimate may be helpful in estimating costs [½]

Alternatively the estimate may be based on very little [½]

### ***Costs to insurance / reinsurance industry***

Top down [½]

derive an estimate of the cost to insurers by taking the “global estimate” (using the frequency / severity method we’ve already described) and assuming a proportion of this cost is recoverable from insurers [½]

allow for the terms and conditions that are likely to have been in place since the product was first manufactured, eg exclusions, limits, claims basis etc [1]

this is likely to be quite complicated, since coverages will: [½]

– have changed over time [½]

– differ between insurers [½]

apply individual companies’ market share to estimate the cost to each insurer / reinsurer ... [½]

...although the calculation of costs to individual reinsurers will be much more complex. [½]

... Choices of excesses & limits in particular will have a major impact [½]

... Will interact with any class action vs individual case law [½]

Bottom up [½]

reviewing which of its policies may be susceptible to claims [½]

estimating the liability for the insured (eg using the frequency / severity method already described) [½]

calculating the proportion of this liability covered by the insurer. [½]

Reinsurers would have to take particular care using this approach, to allow for aggregation risk. [½]



Casualty catastrophe models can also help, although these are in their infancy.  
[½]

[Maximum 8]

Again many candidates would have fared better with a more logical and methodical approach. Reduce the overall problem to something simple (how many claims, average cost per claim, allocation to insurers) and then there is a clear structure for adding breadth and depth.

(v) **Company M** [½]

From capital

- Either from the company's reserves, or other financial assets held by the company [½]

- The company may be required to sell assets in order to fund compensation claims [½]

Future profits, paying claims as they arise [½]

Future profits, through a formal trust structure. [1]

- If claims are material, the potential compensation available may be maximised by allowing Company M to continue to trade, with a proportion of future earnings going into a trust fund to cover future claim costs [1]

However the Company may have gone out of business or have negligible resources compared to claims [½]

Parent company [½]

**Insurance market**

Company M's insurers [½]

Insurer I [½]

Other product liability insurers [½]

- Other layers [½]

- Other years [½]

Other insurances held by company M [½]

- For example D&O, if directors knew of cancer risk [½]

- Workers comp – Company M's workers may be at particular risk of cancer [½]

Other corporates [½]

Reinsurers of all of the above [½]

And reinsurers' reinsurers [½]

The broader insurance industry and policyholders, if some of the insurers have failed and claims are paid by a guarantee fund [½]

**Other sources**

Suppliers to company M, if the cancer causing ingredients were sourced from a third party, or product was tested by a third party [½]

Customers of company M [½]

For example, claims may be made against food manufacturers who used the sweetener as an ingredient [½]

For example, claims may be made against companies who distributed those products, for example, restaurants which served products containing the sweetener (or other example) [½]  
 Insurers and reinsurers of the customers and suppliers [½]

Individuals employed by company M may be deemed personally liable, for example, if they covered up the potential for cancer claims [½]

Existing compensation funds e.g. FSCS [½]  
 Industry levies may be established for similar reasons [½]  
 Brokers may also contribute [½]

The government / taxpayers – the government may decide to establish compensation fund [½]

For example, if this is regarded as a practical / efficient way to ensure people with cancer receive a reasonable level of compensation [½]

For example, if the amounts available from other sources are not sufficient to cover reasonable compensation claims [½]

[Maximum 7]

[Total 27]

Few candidates managed much broad thinking and a number of weaker candidates had a very narrow focus on insurers and sources of insurer funds rather than a broader market perspective.

- Q4** (i) Much will depend on how Independia decide to implement the new currency [½]  
 Whether the currency is in anyway pegged to the Unitia currency [½]  
 Or another major market currency, e.g. US Dollars [½]
- Either way there is likely a fixed initial conversion rate from old currency to new [1]  
 ...therefore a need to determine policy limits and excess points in new currency for existing contracts [½]  
 ...need to determine premiums and terms for new contracts in new currency; [½]  
 ...premiums and price of add-ons often 'rounded' to a particular price e.g. 19.99 so this may not be a straight conversion [½]  
 ...there may also be cross-subsidies between policies in Independia and the rest of Unitia which Home&Cars may want to remove on independence [½]  
 ...especially if profitability or regulatory returns have to be published separately [½]  
 ...or if there are different target markets in each region [½]

Home&Cars will need to determine which third parties it works alongside will become domiciled in Independia and which will remain in Unitia [1]  
 ...it will then need to investigate what financial arrangements with third parties will be converted to new currencies and which will continue at old currency [1]  
 .....e.g. loan arrangements for debt financing or equivalent example [½]  
 .....e.g. supplier agreements for car servicing or provision of replacement household goods or equivalent example [½]  
 .....the currency may be determined by the nature of the existing contract [½]  
 .....by the terms of independence agreement [½]  
 .....or may be the result of negotiation between Home&Cars and the third party [½]

If the company chooses to continue to sell policies in Unitia and Independia then it will need to operate in multiple currencies [1]  
 ...receiving premiums in both currencies [½]  
 ...paying claims in both currencies. [½]  
 It will therefore need to maintain liquidity in both currencies [½]  
 It will also need to consider both currencies in its financial planning [½]  
 ...and its asset liability matching policy. [½]  
 The existence of potential substantial balances in both currencies will increase the exposure to currency risk [½]  
 With related capital impacts [½]  
 ...in particular the financial accounts will be presented in a single currency and therefore will reflect and volatility relative to the other. [½]

Even if Home&Cars only sells policies in Independia there will still be considerable exposure to the other currency [½]  
 ...through policyholders driving cars into Unitia or equivalent example [½]  
 ...having accidents in Independia with residents of Unitia or equivalent example [½]  
 ...policyholders buying insured goods/services from Unitia or equivalent example [½]

Currency may fall significantly with related impacts (or converse) [½]  
 May be matching issues with reinsurance [½]  
 May impact discounting allowances [½]  
 May impact overseas NB [½]  
 May impact historical data [½]  
 May be process or parameter changes to consider [½]  
 IT changes & impacts [½]  
 Internal documentation [½]  
 Policy documentation & issuance [½]  
 Investment strategy impacts [½]

Liquidity need impacts	[½]
Challenges on long term policies or PPOs	[½]

[Maximum 8]

Few candidates stepped back to think about how this might be implemented in practice, which makes a big difference to the impacts likely to insurers.

(ii) **Legal and Regulation**

An insurer operating in Independia may be subject to different laws and regulation

Changes to the legal environment could:

...introduce/alter compulsory insurance types [½]

.....and associated coverages, limits [½]

...changing the way compensation is payable to victims in liability claims [½]

.....e.g. permissible claims (pleural plaques in England vs Scotland)

Any relevant example [½]

...changing who is responsible for paying claims [½]

.....e.g. US Asbestos all sums vs pro rata Any relevant example [½]

...changing the way claims are settled between parties in particular insurance classes [½]

.....e.g. like motor knock-for-knock agreements, Italian motor compensation rules

Any relevant example [½]

Changes to the regulatory environment could

...lead to a different regulatory regime [½]

.....with different restrictions on type/amount of business HomeandCars is allowed to write [½]

.....with limits on premium rates that can be charged [½]

.....with restrictions on information that may be used in underwriting and premium rating [½]

.....with different requirements to hold deposit assets to back claims reserves [½]

.....with different minimum solvency requirements [½]

.....with different restrictions on type or amount of assets allowed to demonstrate solvency [½]

.....with different restrictions on the currency, domicile and duration of assets allowed to demonstrate solvency [½]

.....with different basis for calculating solvency [½]

.....with different regulations regarding treatment of customers [½]

There could be changes to any financial compensation scheme to protect consumers if an insurer fails [½]

.....and different levies/mechanisms for funding such schemes [½]

The level of independence to change the legal and regulatory environment will depend on whether Unitia and Independia belong to/join any wider economic/political unions that impose requirements [1]

...and if not whether they are seeking to harmonise regulation with the IAIS [½]

Ban on selling in Unitia or other restrictions [½]

Re-licensing requirement [½]

Reporting requirements may vary [½]

[Maximum 4]

Most candidates scored well with a wealth of generic material more than sufficient to cover the marks.

To be clear – where we ask for X examples, there is nothing wrong with putting X+1 examples down to leave some contingency in case one of your chosen X is a bit weaker than hoped.

- (iii) Home&Cars regardless will have to communicate with all existing policy holders to explain the impact of independence and any decision on the company's domicile... [½]  
 ...such communication will need to be to both Unitia and Independia residents [½]  
 ...need to explain what happens to existing policies and in the event of a claim [½]  
 ...will need to outline any changes to terms and conditions as a result of legal, regulatory or currency changes. [½]  
 Will need to be timely [½]  
 Will need to be clear and transparent [½]  
 May have requirements to use specific media or a variety [½]  
 Should have website FAQs or call centre training & capacity to answer questions [½]  
 Such mass communication is likely to be time consuming [½]  
 ...and expensive. [½]

[Maximum 3]

Generally well answered

- (iv) Under a floating exchange rate the relative costs of policies and claims between Unitia and Independia will differ over time [1]  
 Along with potentially different mixes of business from both countries [½]  
 ...therefore the Home&Cars may want to consider managing the two companies separately [1]  
 ...maintaining separate management accounts [½]  
 ...pricing business separately [½]  
 ...reserving business separately [½]  
 ...having different routes to market [½]

...having different products, or varying terms and conditions [½]

Depending on the “success” of Independia’s new country there could be a difference in the purchasing power of the respective currencies or the cost of goods and services in each country [1]

...may want to consider the location of cost overheads (e.g. location of head office, call centres etc.) to take advantage of cost arbitrage [½]

...may want to adopt new supplier agreements for replacement goods or repairs. [½]

Tax differences may become relevant [½]

May impact reinsurance arrangements & consistency [½]

May need different bank accounts and processing teams [½]

Will impact liquidity requirements & management [½]

IT system impacts [½]

[Maximum 5]

Many candidates struggled to think more widely on insurance operations, although many picked up the direct impact on actuaries.

(v) **Advantages**

As motor and home insurance is compulsory, in theory, the total amount of claims risk in the market is fixed. [1]

Therefore for claims risk individual capital models are in effect only a mechanism for allocating the total capital to insurers. [1]

Calculating the total claims risk centrally therefore allows the regulator to maintain overall control of the amount of industry capital [½]

Removes the need for supervisors to review complex capital models at each company [½]

Can be combined with calculations of any central financial compensation scheme levies [½]

Potential for cost savings [½]

Potentially greater confidence in insurer solvency given government backstop [½]

Scope for efficient reinsurance negotiation at State level [½]

Greater investment freedom from centralised fund [½]

Reduced concern of capital model error or validation requirements [½]

Simplicity [½]

Compulsory products may ensure no coverage gaps [½]

Other valid comment on compulsory [½]

Capital is effectively diversified across the entire market rather than within insurers [½]

...may reduce the overall cost of capital [½]

...potentially leading to lower insurance premiums for policyholders [½]

...increasing competitiveness of Independia insurers writing business in other jurisdictions [½]

**Disadvantages**

Cost of capital to insurers is not risk based (beyond number of policies)	[½]
...therefore riskier policies are comparatively more appealing than under a risk based capital regime	[½]
...may incentivise insurers to chase higher risk higher premium policies	[½]
.....however this is only a cross-subsidy relative to risk based models so regulator may not be concerned	[½]
However, deviation from a risk based regime is a deviation from IAIS standards	[½]
...leading to divergence from global standards	[½]
...and likely to create different standards from neighbours (including Unitia)	[½]
...limiting equivalence with other countries and creating barriers for insurers writing in multiple jurisdictions	[½]
No incentive for insurers to manage extreme risk	[1]
...nor aggregations and correlations	[½]
...therefore increased risk of an individual insurer having to call upon the central capital fund	[½]
Claims risk is not the only risk that capital is held for	[1]
...some risks are insurer specific	[½]
.....e.g. investment risk, operational risk	up to [½]
...holding capital for these at the insurer level provides an incentive for insurers to minimise these risks	[½]
.....even when this creates a cost to the insurer	[½]
.....e.g. investment in risk reducing policies and procedures.	[½]
...removing this incentive could increase the overall level of risk and thus increase the overall industry capital requirements	[½]
...and therefore the cost of the levy to insurers	[½]
...and ultimately the cost to policyholders	[½]
The regulator will have to determine the overall capital requirements of the fund	[1]
...the regulator is not necessarily in a position to make such a detailed assessment	[½]
.....for example it will not have access to the same data	[½]
.....or key personnel	[½]
...requesting such data/access will significantly increase the cost of regulation	[½]
.....and the cost of producing this information for the regulator may undermine the cost savings.	[½]
...otherwise the regulator has to either over-capitalise to ensure there is no systemic shortfall	[½]
.....or risk undercapitalising the central fund and potential systemic market collapse.	[½]
Potential for best estimate arbitrage	[1]
Would be need for some standardisation / control over quality of best estimates	[1]
with related costs & inconvenience	[½]

Would potentially have major impacts on domestic reinsurance market	[1]
Concentration of risk at single source	[½]
Significant transitional costs including initial funding	[1]
May lack expertise to parameterise and manage	[½]
Compulsory products may not be affordable to all	[½]
Other valid point on compulsory	[½]

If unregulated products can also be sold by the same insurers then it is unclear whether the fund would provide capital in the event of these insurers facing a shortfall of reserves arising from unregulated products. [1]

...if so the central capital fund is effectively capitalising the market for all products [½]

...creating major incentives for insurers to write riskier business [½]

...in practise the regulator would have to create some form of barrier between providers/capital provision for motor and home vs the rest of the market. [1]

[Maximum 10]

[Total 30]

Many picked up key disadvantages. Some wasted time considering impacts to insurers or other stakeholders rather than the specific focus on regulators
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## **END OF EXAMINERS' REPORT**