

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

April 2019 Examinations

Subject SP7 – General Insurance Reserving and Capital Modelling Specialist Principles

Introduction

The Examiners' Report is written by the Chief 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
July 2019

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

1. The aim of this General Insurance Reserving and Capital Modelling Specialist Principles subject is to instil in successful candidates the ability to apply, in simple reserving and capital modelling situations, the mathematical and economic techniques and the principles of actuarial planning and control needed for the operation on sound financial lines of general insurers.
2. Candidates who are well prepared generally appear to perform reasonably on SP7 (and previously on ST7), although a number of candidates do not appear to be adequately prepared, or show poor exam technique. The following points are always worth considering to improve performance:
 - a. Lists are hugely valuable for breadth of point generation but candidates should always exercise judgement when applying them. In many instances questions will be specifically designed to render a number of the standard point inappropriate and marks (often generous multiple marks) will be available for identifying and articulating these nuances well.
 - b. Calculation questions will come up on a regular basis within SP7, as candidates can clearly observe from examination of historical ST7 papers. Candidates should always be prepared for such staples as balance sheet preparation, triangle manipulations & projections and reinsurance layer calculations (along with being able to carry out any necessary adjustments including inflation, exposure, earning distortion and time period issues). Further, if the examiners cannot follow candidate's logic they cannot give partial credit for incorrect calculations. Therefore a clear audit trail should be left to help secure appropriate method marks where the calculations are incorrect.
 - c. Capital questions should be expected on every paper and represent a sufficient proportion of the course content that candidates should not expect to be able to pass on their reserving knowledge alone. Those who do not encounter capital work in their professional lives should be particularly careful to ensure that they take time to familiarise themselves with this element of the course.
 - d. Candidates should aim to be able to give near exact glossary definitions as incoherent or vague descriptions will not score marks. If candidates struggle to remember definitions verbatim, they should take the time to properly analyse the glossary definition to ensure they have fully absorbed all the nuances of the definition.
 - e. It is important to always read the question properly and to answer only what you are asked.

- f. Always assume that question content is there for a reason. If something is pure bookwork, it should be obvious as such as it will generally go straight to a question with little or no specific context. These are the only sorts of questions where you should expect to provide generic answers. Otherwise you will need to make reference to the situation posed in the question to score well. For example if lines of business, types of insurance entity, a specific set of regulatory requirement or anything else is mentioned they have been chosen as they have an impact on the answer. If numbers are mentioned, they are there because we expect you to look at them, think about them and offer some comment or display some ability to notice unusual features of a table of numbers (a key skill for an actuary). Every exam there will be a significant number of candidates who are clearly extremely well prepared, who write very long answers that clearly display all the based knowledge one might require to be able to think intelligently about a question, but they score poorly because the answer is purely generic with no obvious attempt to actually address the question scenarios.
3. Candidates who give well-reasoned points, not in the marking schedule, are awarded marks for doing so.

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

1. Overall the performance was reasonable with a handful of very well answered (and high scoring) papers.
2. As has been the case for previous ST7 papers, time pressure was an issue for a few candidates who either struggled with completing the paper or rushed the answers.
3. Responses to questions 2, 7 and 9 were generally the poorest on the paper. Question 2 was surprising given it was predominantly knowledge based. Candidates struggled with the latter parts of Question 7 not linking their responses to the specifics of the question. The better prepared candidates scored well on Question 9 although a number of candidates struggled with idea generation. The balance of the paper was generally well answered particularly the knowledge based areas.
4. As usual, strong candidates distinguished themselves by linking examples to specifics in the question whereas weaker candidates seemed to repeat learned

C. Pass Mark

The Pass Mark for this exam was 65.

Solutions

Q1

To determine liabilities to be shown in the insurer's published accounts	[½]
If separate accounts have to be prepared for the purpose of supervision of solvency, to determine the liabilities to be shown in those accounts e.g. Solvency II.	[½]
To determine the liabilities to be shown in internal management accounts, business plans and budgets	[½]
To provide an independent opinion on the reasonableness or adequacy of the reserves booked by the insurer	[½]
To provide information to management as to how areas of the business are performing, and provide an indication as to the profitability of business currently being written	[½]
To estimate the claims costs incurred in recent periods as an intermediate step in the rating process	[½]
To value the insurer for purchase or sale, given that any estimated surplus or deficit in the booked reserves (as compared to the best estimate of the reserves) will directly affect the valuation of the company	[½]
To negotiate a commutation for the buyer or seller	[½]
To transfer a book of business (including determining an RITC premium for Lloyd's business)	[½]
To ascertain the tax liabilities of a general insurance provider	[½]
To test the adequacy of case estimates.	[½]
To identify and analyse trends in claim losses for Management Information	[½]
To consider as part of reserve risk / uncertainty assessment	[½]
	[6½, max 3]

A straightforward question that was generally well answered.

Q2

<u>Copulas (Stochastic allowance):</u>	[½]
Copula is a mathematical relationship between individual distributions of random variables and the joint distribution	[½]
Simple correlation factors give rise to symmetric dependency structures	[½]
Some risks correlation vary in more complex ways (e.g. greater dependence in tail than around the mean)	[½]
Copula allows greater flexibility when modelling multiple dependencies than single correlation factor	[½]
Example of commonly used copula in insurance is Gumbel copula (½ mark given for this or any other relevant example with extra ½ mark available for formula)	[1]
<u>Deterministic allowance:</u>	[½]
Where risks assessed in deterministic or semi stochastic method, apply standard methodology for summing variances of distributions (extra ½ mark available for formula)	[1]

Apply correlation matrix to extend method to two or more risks	[½]
Assume we can combine capital amounts in the same way as standard deviations of distributions	[½]
Where capital amounts are at extreme percentiles / tail of skewed distributions, this may not be mathematically correct	[½]
<u>Implicit correlations:</u>	[½]
E.g. natural catastrophe event giving significant tail dependency for different classes	[½]
By measuring overall correlation, can validate whether this is consistent with explicit correlation assumptions being made and assess extent of implicit dependencies	[½]
Example of implicit correlation is driver correlation	[½]
<u>Linking assumptions:</u>	[½]
If two assumptions in capital model explicitly linked through formulae already an implicit correlation between them	[½]
E.g. claims inflation assumption expressed as a margin above price inflation	[½]
<u>Explicit correlations:</u>	[½]
For some assumptions, it may be appropriate to apply an explicit correlation factor (or a correlation matrix for multiple parameters)	[½]
	[11, max 5]

There was a surprisingly wide variation of answers here which meant it was one of the worst answered questions on the paper. Some candidates described capital allocation methods which was not what was asked for. Others described correlations between different risk types (so reserving risk vs underwriting risk). Those that did not make these mistakes generally answered the question well.

Q3

Loss ratios	[½]
• Example – e.g. changes in rate	[½]
• Example – e.g. errors	[½]
Paid to incurred ratios	[½]
• Example – e.g. case estimate strength change	[½]
• Example – e.g. change in business	[½]
OS to incurred ratios	[½]
• Example – e.g. case estimate strength change	[½]
• Example – e.g. change in business	[½]
Average OS	[½]
• Example – e.g. case estimate strength change	[½]
• Example – e.g. mix change to large claims	[½]
Other valid 1 (e.g. IBNR / OS, Survival ratios, Claims frequency, ACPC, NvG, Settlement ratios, case per open claims, paid per settled claims)	[½]
• Other valid example	[½]
• Other valid example	[½]
Other valid 2 (e.g. IBNR / OS, Survival ratios, Claims frequency, ACPC, NvG, Settlement ratios, case per open claims, paid per settled claims)	[½]
• Other valid example	[½]

- Other valid example [½]
- Other valid 3 (e.g. IBNR / OS, Survival ratios, Claims frequency, ACPC, NvG, Settlement ratios, case per open claims, paid per settled claims) [½]
- Other valid example [½]
- Other valid example [½]
- Other valid 4 (e.g. IBNR / OS, Survival ratios, Claims frequency, ACPC, NvG, Settlement ratios, case per open claims, paid per settled claims) [½]
- Other valid example [½]
- Other valid example [½]

[12, max 6]

Knowledge based question which was generally well answered. Weaker candidates did not give examples but instead simplistically outlined the definition of the diagnostic, e.g. higher loss ratio = more claims incurred, whilst stronger candidates gave actual examples e.g. what could explain the higher loss ratio. Candidates who outlined pure balance sheet ratios did not pick up marks.

Q4

- (i) An event, peril or cause defined within the policy document as being beyond the scope of insurance cover. Exclusions are clauses in a policy that limit the circumstances in which a claim may be made. [1]
[1, max 1]
- (ii) Exclusions are used to avoid payment where the policyholder is at an advantage through possessing greater personal information [½]
- E.g. knowledge of potential subsidence [½]
- And to avoid payment where the claim event may be largely under the control of the policyholder [½]
- E.g. leaving doors unlocked [½]
- Or claim event difficult to verify [½]
- E.g. loss of money [½]
- Exclusions can be used to combat fraud [½]
- E.g. through underinsurance or non-disclosure [½]
- To reduce premium for competitive reasons [½]
- E.g. excluding items whilst away from home would lower premiums [½]
- Avoid concentrations of risk [½]
- E.g. excluding natural cat events [½]
- Loss occurs as part of the normal course of events and could be considered to be depreciation [½]
- E.g. wear and tear of clothes [½]
- There is the potential for illegal or immoral events [½]
- E.g. exclusion of property that has been illegally obtained [½]
- Without an exclusion there would be a very high probability of a claim [½]
- E.g. house on edge of cliff. [½]
- The risk could not be reasonably estimated [½]

- E.g. war risks to building [½]
 - Exclusions are also used where the risk is covered by a third party such as the Government [½]
 - E.g. Terrorism resulting in destruction of building [½]
 - Or by another policy [½]
 - E.g. goods outside of the home covered by travel policies [½]
 - Exclusions are also used to limit the scope of the policy to make it more appropriate for a particular target market [½]
 - E.g. US policies may not cover flooding or French policies may not cover windstorms [½]
 - Or to be able to charge additional premiums as a tailor made product offering [½]
 - E.g. charging additional for possessions outside the home [½]
 - Giving insureds the option to choose different cover elements can give additional information about their risk profile [½]
 - E.g. charging additional for accidental damage cover as the nature of insureds who opt for this cover is considered more risky. [½]
 - Marks for other sensible examples (*½ per example*) [1]
 - E.g. Marks for other sensible example description (*½ per description*) [1]
- [17, max 7]

[Total 8]

Generally well answered by most candidates who were able to tailor their answers to the specific situation.

Q5

- The options available to the regulator will depend on the legislation in the jurisdiction in which the regulator operates [½]
- Require that the company identifies the underlying reasons there is a high risk of failure (in case these are not known) [½]
- And develops a plan to reduce the risk of failure [½]
- And shares the plan with regulator [½]
- Plan could include risk based capital calculations / risk-based type approach [½]
- Plan should include measurable targets and triggers to assess performance against plan [½]
- Regulator could require that an external expert be appointed to prepare a report on the company. [½]
- Restrictions on the amount of business the company can underwrite [½]
- Restrictions on the classes of business the company can underwrite [½]
- Restrictions on offering high risk features in certain types of business [½]
- Such restrictions ensures company has sufficient capital and expertise to underwrite [½]
- Requiring the company to withdraw from or reduce participation in a profitable class of business could increase the likelihood of failure [½]
- However expansion or diversification plans could be put on hold until the capital position improves [½]
- Requirement to purchase additional reinsurance [½]
- Requirement to improve the credit quality of its reinsurance partners [½]

Regulations on the rates the company can charge	[½]
For example, requiring the company to increase rates for loss making business	[½]
Or act to reduce the riskiness of the class of business	[½]
E.g, through regulation on product design, etc	[½]
Requirement to deposit assets to back reserves	[½]
May be particularly important if this is a branch/subsidiary of an overseas insurer, and there is concern policyholders may not be able to access the assets in the event of insurer failure	[½]
Requirement to maintain a higher level of solvency, in addition to any regulatory minimum	[½]
Or a requirement to increase capital held, expressed in some other way	[½]
Capital buffer should reduce the likelihood of failure	[½]
However if company is not able to increase capital, more onerous requirements may increase risk of failure.	[½]
Restrictions on the amounts of dividends the company is permitted to pay	[½]
Restriction on the types or amounts of certain assets to demonstrate solvency	[½]
For example, transferring from volatile assets into bank deposits would reduce the risk of failure arising from investment losses	[½]
Custodianship of assets	[½]
The use of prescribed bases to calculate premiums, asset values and liabilities to demonstrate solvency.	[½]
Restriction on discounting of liabilities and discounting rates that can be used.	[½]
Restriction on countries a general insurance company can write business in	[½]
Ensure risks relating to asset matching are reduced, so short term movements don’t result in losses	[½]
For example, require matching of assets and liabilities by term	[½]
Or requiring matching of assets and liabilities by currency	[½]
Alternatively, additional regulatory capital requirement in case of mismatching	[½]
Additional reporting requirements	[½]
For example, prepare regulatory returns monthly rather than quarterly	[½]
Additional visits from regulator to company	[½]
Require additional advice / certifications from independent actuary	[½]
Additional audit requirements	[½]
Require changes to management and/or board	[½]
Require changes to ownership, or sale of insurer to a well-capitalised parent	[½]
If failure considered inevitable, manage the orderly run-off of the insurer	[½]
Alternative strategies may be appropriate if several insurers participating in the same class of business are at risk of failure.	[½]
Improve the quality of assets backing its capital.	[½]
Close to new business entirely	[½]
Ensure legally enforceable guarantee between insurer and any parent company of insurer.	[½]
Marks for other sensible comments (<i>½ per comment</i>)	[1]
	[25, max 9]

Whilst this question was generally well answered, there were many marks available and candidates needed to answer in sufficient depth in order to score full marks. A number of candidates struggled to generate sufficient points

Q6

- (i) Diversification effects arise because the various risk exposures from a company's operations are partially independent. [1]
It allows for the fact that different adverse risk outcomes would not be expected to occur simultaneously. [1]
Therefore the aggregate capital charge can be less than the sum of individual charges [1/2]
[2½, max 2]
- (ii) The capital requirement post acquisition will depend on the level of diversification between the two businesses. [1]
The greater the level of diversification, the lower the capital required by the combined entity (for a given risk appetite). [1]
These capital synergies will increase the return on capital available from the combined entity. [1]
Diversification will also be relevant to:
Impacts on allocation of capital held between classes, products or individual policies [1]
This will allow the benefit of any capital synergies to be notionally allocated between the existing business and the acquired business. [½]
Impacts on reinsurance purchasing [1]
If there is a high level of correlation between the businesses, it may be necessary to purchase additional reinsurance, for example, higher limits on excess of loss covers. (Or other relevant example). [½]
Impacts on asset allocation studies [1]
This would include assessing any concentration risks if both insurers hold similar assets. (Or other relevant example). [½]
Studies of other enterprise level risks such as credit and operational risk [1]
Allocation of capital for pricing purposes to determine a 'technical price' benchmark [1]
So a well-diversified company may be able to charge lower premiums. [½]
[10, max 4]
- (iii) C highest [½]
 - Same class of business and country [½]
 - Most events which impact UK property underwriting could be expected to impact both companies A and C. [½]
 - Could be some geographical diversification within the country [½]
D next highest [½]
 - Different class of business but some shared exposures to catastrophe events / seasonality effects (e.g. hail / flood) as in same country [½]
 - Shared second order exposures to economic conditions / propensity as in same country [½]
 - They may be purchased by the same insured [½]
 - Otherwise diversification as different types of business [½]
B third highest [½]
 - Same country so some exposures to UK economic conditions/propensity to claim [½]
 - Otherwise minimal overlap between product lines [½]

- Some similarities in terms of inflation drivers possible [½]
 - F fourth highest [½]
 - No geographical proximity so unlikely to be any shared accumulation events [½]
 - Both property however so may be some second order effects through e.g. shared reinsurers or materials costs for reconstruction [½]
 - Currency related diversification [½]
 - E lowest [½]
 - Very different lines of business without any particular drivers of similarity [½]
 - No geographical proximity [½]
 - Currency related diversification [½]
- Lose 1 mark for company placed out of relative order (maximum ½ mark available for that company provided a reasonable rationale given) or not discussed. Each subsequent company can still obtain up to a maximum of 1½ per company.

[10½, max 7]

[Total 13]

Parts (i) and (ii) were two of the worst answered questions on the paper. In particular part (ii), where some candidates received no marks and a significant number of candidates could not link the idea of diversification with a positive impact on capital requirement, and spoke broadly only about acquisition price.

In contrast part (iii) was generally well answered with candidates scoring relatively well and mostly only one entity was selected out of order meaning candidates could still pick up most marks.

Q7

- (i) Sum insured – greater the sum insured the greater the risk [1]
 Occupation – dangerous occupations distinguished from safer ones. [1]
 Hazardous hobbies – possible higher risk than average [1]
 Gender – women less prone to accidents than man although note EU Gender regulations [1]
 Age – not usually major risk until old age where cover is not usually sold [1]
 Marks available if PA cover is considered as group or individual or both. [5, max 2]
- (ii) Level of premium rates restricted [½]
 Or the use of prescribed bases to calculate premiums [½]
 To ensure premium rates are sufficient to meet future claims. [½]
 Information used in underwriting and premium rating restricted [½]
 Or prohibiting illegal products from being sold. [½]
 For ethical / anti-discrimination purposes [½]
- Level and/or type of cover offered restricted [½]
 Or requirements to offer cover (e.g. to those with risky occupations/past-times) [½]
 Or cooling off period (e.g. fourteen-day cancellation rules on policies issued) [½]
 Or regulations with respect to treating customers fairly [½]
 Or restrictions with respect to anti-competitive behaviour. [½]

- To protect policyholders and claimants and to ensure consistency of cover. [½]
 Method of sale restricted (e.g. licensed agents only to sell insurance) [½]
 Or restrictions on the type / amount of business / classes of business a general insurance company can / is authorised to write. [½]
 Or requirement to file / publish premium rates before they can be used. [½]
 To ensure company has necessary expertise and that insured is well informed. [½]
 Marks available for other sensible examples with reasons (½ for each relevant example and ½ for corresponding relevant reason)
 [8, max 2]
- (iii) (a) Parameter uncertainty refers to the uncertainty arising from the estimation of parameters used in a model. [½]
 Given how long PA Insurance has been writing business, the availability of credible historical experience is likely to be limited. [½]
 As a result, lack of internal data available for assessing the capital requirement / parameterising the model is likely to be the largest source of parameter uncertainty [1]
 This is particularly the case in the tail of a distribution which is difficult to assess in any case where there may be distorting large claims or a lack of large claims. [1]
 Assumptions will have been made relating to the frequency and severity of the fixed benefits expected which are unlikely to have been back-tested at this early stage. [½]
 Marks available for other sensible comments [½ per point] [1]
- (iii) (b) Assumptions may have been maintained from pricing assumptions with no use of own data given lack of credibility. [1]
 To the extent that own data has been used, an adjustment may have been made for distorting or a lack of large losses. [½]
 Benchmarks may have been used with appropriate adjustment [½]
 but may not have been available as a small country [½]
 Expert Judgement and Stress/Scenario Testing are likely to have been considered to validate assumptions [½]
 Given the parameter uncertainty, the regulator may have imposed a minimum capital requirement or indeed required PA Insurance to use a prescribed capital model. [1]
 Marks available for other sensible comments [½ per point] [1]
 [9½, max 6]
- (iv) Limited data so use of triangular methods using own data unlikely [½]
 Could use chain ladder method using benchmark claim development pattern [½]
 With consideration of whether benchmark pattern is applicable [½]
 For most recent year could use a Bornhuetter Ferguson method with benchmark pattern and initial expected loss ratio per initial plans [1]
 Or could use initial expected loss ratio or other loss ratio method directly [½]
 With consideration of whether the initial plan loss ratio is applicable [½]
 Expect to make specific adjustments for any large claims if aggregate methods used [1]
 Depending on volume of claims data, given fixed benefits and relatively short tailed, could construct a specific model allowing for features of business [1]
 E.g. payments over a defined term or lump sum etc. [½]

And an assessment of frequency and severity per claim type	[½]
Marks available for other sensible comments with suitable explanation [1 per point]	[2]
	[8½, max 4]
	[Total 14]

*A number of candidates struggled with this question.
Part (i) was misinterpreted by a number of candidates where instead of 'risk factors', they spoke about 'risks' e.g. new product hence little expertise in underwriting
Part (ii) was better answered, with most candidates scoring full or close to full marks.
Part (iii) was again generally answered poorly - only those who understood parameter uncertainty well could generate sufficient points as many did could not articulate the main source of parameter uncertainty. Stronger candidates made clear and constant links between the methodology / parameters and the lack of credible data
Part (iv) was answered well by the majority of candidates.*

Q8

- | | | |
|------|---|--------------|
| (i) | Limit exposure to risk / spread risk | [½] |
| | • Single risks | [½] |
| | • Aggregation | [½] |
| | • Accumulations | [½] |
| | Avoid single large losses | [½] |
| | Smooth results | [½] |
| | Increase profitability | [½] |
| | • Plan more accurately | [½] |
| | • Pricing arbitrage | [½] |
| | Improve solvency margin | [½] |
| | Increase capacity to accept risk | [½] |
| | • Underwriting capacity: singly or cumulatively | [½] |
| | Financial assistance | [½] |
| | • Reduce new business strain | [½] |
| | • Increase free assets | [½] |
| | • Merger / acquisition | [½] |
| | Availability of expertise if going into new products / markets | [½] |
| | Regulatory benefits (e.g. reduction of statutory solvency levels) | [½] |
| | Tax advantages (in some regimes) | [½] |
| | Marks available for other sensible comments [½ per point] | [1] |
| | | [10½, max 3] |
| (ii) | Co-insurance: | |
| | An arrangement whereby two or more (re)insurers enter into a single contract with the insured to cover a risk in agreed proportions for a specified premium. Each (re)insurer is liable for their own proportions of the total risk only. | [1] |
| | Inwards reinsurance: | |
| | Reinsurance business accepted or written by an insurer or reinsurer, as opposed to outward reinsurance which is ceded to a reinsurer. | [1] |

- (ii) Maximum marks available per line of business identified 2 (1 mark for appropriate line of business and ½ mark for each associated potential loss) with examples of lines of business / potential losses provided below.
- Commercial Property / Residential Property (Direct / Reinsurance): [1]
(1 mark available for each type of line of business provided identified distinctly with separate potential losses)
- H: Residential as well as commercial and industrial losses – built up area. [½]
H: Likely more commercial exposure on Caribbean islands (hotels etc.). [½]
H: Property damage likely (flood and wind damage) [½]
H/E: as well as potential business interruption claims. [½]
H/E: Possible additional living expense costs as well as hazardous waste clean-up / infrastructure costs. [½]
E: Similar losses to Hurricane but whilst heavily populated, may not be as insured as US/Caribbean. [½]
E: Ensuing Tsunami means different type of damage (more flood) than experienced from hurricane. [½]
E: Aftershocks from earthquake has potential for fire related losses [½]
Marks available for other sensible potential losses (½ per example) [1]
Yachts / Marine / Hull (Direct / Reinsurance): [1]
(1 mark available for each type of line of business provided identified distinctly with separate potential losses)
- H: potential exposure from losses moored in Caribbean. Would expect to have been moved with notice but in practice, where recreational vessels, may not have been possible. [½]
H: damage to vessels caught in the storm but expect limited as should have been moved out of path with notice. [½]
E: No notice with earthquake so whilst similar loss categories mitigations of being able to move vessels not applicable [½]
Marks available for other sensible potential losses (½ per example) [1]
Cargo / Specie / Goods in Transit: [1]
(1 mark available for each type of line of business provided identified distinctly with separate potential losses)
- H/E: various losses possible in this area, volume dependent on risks written and extent of damage. [½]
E: Aftershocks from earthquake has potential for fire related losses [½]
Marks available for other sensible potential losses (½ per example) [1]
Motor [1]
Potential losses relating to flood [½]
Potential losses related to wind [½]
Marks available for other sensible potential losses (½ per example) [1]
- Marks available for other sensible potential classes / potential losses:
- Line of business 1 [1]
 - Potential Loss 1A [½]
 - Potential Loss 1B [½]
 - Line of business 2 [1]
 - Potential Loss 2A [½]
 - Potential Loss 2B [½]
- [19½, max 8]

- (iii) Reserving data / information:
- Possible limited information early on as access to sites may be limited [½]
 - Unlikely to have claims notifications in the timescales [½]
 - It will take time before loss adjusters will be able to assess losses with any precision [½]
 - Early data based on modelling software (both modelled losses) [½]
 - Expect Exposure Management to be aware of risks written with potential exposure [½]
 - Core reserving information likely to be policy listings with corresponding exposure information to estimate likely losses on a probabilistic basis. [½]
 - Market loss information also likely to be critical (from market commentators, catastrophe modelling providers etc.)... [½]
 - As well as loss announcements from other insurers across the globe (particularly useful for reinsurance business to assess From Ground Up estimates) [½]
 - Very early estimates likely to be subject to change so qualitative as well as quantitative should be considered [½]
 - Expect underwriters / claims to contact key insureds for any supplementary information that they can provide (as well as to mitigate exposure where possible) although unlikely to be possible for each risk. [½]
 - Early consideration needs to be given to the possibility of demand surge in these circumstances (and associated increased costs) [½]
 - Benchmark development patterns may be of use based on development history of similar catastrophic losses in past however unlikely to be of much use at this early stage of development. [½]
 - For the earthquake and resultant Tsunami losses, need to consider timescales (hours clause) and whether this is treated as one or multiple losses [½]
 - Potentially could make use of RDSs as a starting point although would need to be tailored to the specific scenarios. [½]
 - Marks available for other sensible comments (½ per point) [1]
- [8, Max 4]

Reserving methods:

- Expect to be reserved separately from other losses due to different development pattern (quicker than attritional due to focus from stakeholders) [½]
 - Should not blindly apply benchmark development patterns without considering underlying exposure, particularly at an early stage of development [½]
 - Expect exposure based methods at this early stage... [½]
 - A combination of bottom up and top down approaches overlaid with judgement from key stakeholders (underwriters, claims and actuarial) [½]
 - Bottom up will entail policy by policy assessment of likelihood of loss... [½]
 - With judgement used to assess scale of loss before detailed claims assessment is possible [½]
 - Top down will entail assigning a market loss estimate to an individual insurer / policy level based on terms / excesses / limits / written line... [½]
 - At very early stage (where little information available) estimated losses may be based on an estimated market loss and the insurers market share [½]
 - Marks available for other sensible comments (½ per point) [1]
- [5, Max 4]

Reinsurance considerations:

Catastrophe XL is mentioned which suggests limited net impact of 5m for each event...	[½]
Assuming each class is protected by the coverage (no specific exclusions)	[½]
However will need to account for reinstatement premiums...	[½]
As well as consider any vertical exhaustion (insurer will recover 50m so if size of loss to the insurer is greater they will retain anything in excess as well as the first 5m)	[½]
No mention of other earlier losses during the year so would need to consider possibility of reinsurance exhaustion...	[½]
As well as the security of the reinsurer (possibility of reinsurance bad debt)	[½]
Whilst focussed on the catastrophe losses in question, the catastrophe cover was purchased to protect a one year period from June with only two reinstatements so future (sideways) exhaustion (on unearned losses) will need to also be considered...	[½]
Including consideration of earnings profiles and remaining exposure but given earthquake exposed then unlikely that all exposure passed at this stage	[½]
No other reinsurance cover mentioned however would expect any other cover to also be considered (e.g. small insurer so may have QS protection)	[½]
Concentration risk / default risk considerations	[½]
Consideration of exclusions under contract terms	[½]
Marks available for other sensible comments (½ per point)	[1]
	[6½, Max 4]

Reserve uncertainty:

Given limited information at this stage of development any loss estimates are likely to be extremely uncertain...	[½]
And a quantification of reserve uncertainty might be expected to be included at the time of providing loss estimates (TAS requirements)	[½]
Expect to make use of stress and scenario testing against explicit reserve assumptions...	[½]
Flexing the likelihood of losses as well as the scale of losses	[½]
Input should be sought from other stakeholders (underwriters and claims) on likely high-low estimates...	[½]
Including collating market information to inform uncertainty considerations (qualitative as well as quantitative)	[½]
Also, possible to make use of previous catastrophe losses at early stage of development and how they ultimately developed to give an indication of uncertainty...	[½]
Although as information collection / exposure data / response to catastrophe's has improved this should be factored in	[½]
Likely to make use of Large Loss Uncertainty Wording guidance issued by the IFoA for the purposes of any Statement of Actuarial Opinion due	[½]
With the limited information, unlikely to be able to make use of stochastic methods to quantify uncertainty	[½]
Marks available for other sensible comments (½ per point)	[1]
	[6, Max 4]
	[Total 16]

- (iv) Date of loss is post the accounting period so is likely to be considered a post balance sheet event... [1]
As such, no explicit adjustment would need to be made to the estimates in the accounts (provided agreed by auditors) [½]
However, it is likely that management and other stakeholders will want to ascertain the scale of the loss to potentially include in notes to the accounts [½]
It is also possible that a comment would be included in the SAO itself to identify the uncertainty (in the unearned) despite not being explicitly subject to the SAO if the new loss is material. [½]
Marks available for other sensible comments (½ per point) [1]
[3½, max 2]
[Total 28]

Parts (i) and (ii) were generally answered well. For (ii), some candidates did not outline distinct lines of business and instead gave only 2 lines (but with direct and reinsurance on each) and this resulted in them not providing 2 distinct potential losses.

Part (iii) was probably the worst answered question on the paper. A number of candidates were running out of time and did not give a sufficient number of correct points to score even half marks. Generally candidates struggled with applying the concepts of a reserving exercise to this specific example. Stronger candidates showed very good lateral thinking, and were able to give a wide range of points, even if the points were not very detailed

Part (iv) was disappointing with almost an equal number thinking it should be included as those who thought it should not be.

[Paper Total 100]

END OF EXAMINERS' REPORT