

**INSTITUTE AND FACULTY OF
ACTUARIES**

Curriculum 2019

SPECIMEN SOLUTIONS

Subject SA3 - General Insurance Advanced

- 1**
- (i) Prescribed formula is a “one size fits all” approach, so is unlikely to fully reflect differences in risk between insurers ½
- The current prescribed formula appears to be particularly unsophisticated For example, capital requirements do not vary between classes of business An internal model if accurate enough should provide a figure for the theoretical capital required at a given probability of sufficiency ½
- Internal models can reflect the unique risk situation of each insurer ½
- The level of risk will vary significantly between different insurers, reflecting classes written, types of insured covered, limits offered, level of reinsurance purchased, matching between assets and liabilities (or other relevant examples, ½ per example, max 1) 1
- The model will explicitly consider correlations between different types of underwriting risk and asset risk ½
- Modelling underwriting and asset risk together allows insurers to consider any correlation between the underwriting result and investment return ½
- By preparing the internal model, the understanding of risk / sophistication of insurers may increase ½
- This may allow insurers to better identify the key drivers of risk in the business ½
- This may allow insurers to better manage risks in the business, and therefore reduce the risk of insurer failure ½
- There is an additional incentive to manage and control risk under the new standards, as this should reduce the regulatory capital requirements ½
- [Max 5]
- (ii) If insurers do not already have models, compliance costs are likely to be higher under the new approach. Costs include: ½
- Staff to build and maintain the model ½
- Software costs
- Cost of increased management/board time to review and understand the model results ½
- Companies that already have models will also have higher compliance costs, as additional model review / documentation may be required by the regulator. ½
- Future regulatory capital requirements will be more difficult to predict under the new approach ½
- Model assumptions will be recalibrated periodically to reflect the emerging experience ½
- This will change capital requirements, and these changes could be material ½
- The new approach is more complex ½
- The drivers of changes in capital requirements may be more difficult for the board and senior management to understand ½
- Although this will depend on the modelling approach and how well this is

documented and explained 1/2

Insurers that have higher regulatory capital requirements under the new standards may well prefer the prescribed approach 1/2

Even if those companies were already reflecting that risk by holding a large margin over regulatory capital requirements, reflecting the risk in the regulatory capital requirement may reduce flexibility in operating the business 1/2

Under the old regime the capital required is a fixed amount as per the formulae whereas under the new regime the amount could vary depending on the model and parameters used 1/2

[Max 5]

(iii) The profile of operational risk and risk management more generally may be increased by its inclusion in a capital standard 1/2

This may encourage further analysis of operational risk, which may achieve the results the regulator anticipates 1/2

Premium forecasts are required under the new standard, but not under the old standard. This may cause insurers to improve the sophistication of their budgeting 1/2

Strategies involving high premium growth would typically be associated with higher than usual levels of operational risk 1/2

It is therefore appropriate that the capital requirements depend on growth rates 1/2

The operational risk component will increase the regulatory capital requirements of some insurers, so may reduce the risk of insolvency 1/2

High premium growth is by no means the sole driver of operational risk, but is the only driver included in the proposed capital requirements

Many insurers who do have operational risk will therefore have operational risk charges of nil – so the measure is unlikely to change the risk on insolvency for those insurers 1/2

As insurer growing at around 25% per annum may try to restrict growth to under 25% as otherwise there will be a large hike in its capital requirement.

This also may be difficult for the insurer to judge. 1/2

The proposed standard does not require insurers to undertake any analysis of operational risk, but only multiply forecast premium by either 25% or nil 1/2

Risk management is about identifying, understanding, monitoring and controlling risks, that is, much more than simple formulae 1/2

A particular weakness of the approach is that the operational risk charge is the same whether or not operational risk is well managed 1/2

The proposed approach may create a false confidence – directors may think operational risk “dealt with” because they have addressed regulatory requirements 1/2

This potentially increases the risk of insolvency 1/2

If a formula approach is required, a range of factors could be used, e.g.:

- higher loading if growth is in a new market or product line
- higher loading if monitoring arrangements are not in place
- scaling factor for the operational risk percentage related to rate of premium growth 1

(1/2 per example, max 1)

[Max 6]

(iv) *Liability*

The capital charge for liability risk is unchanged for Company A, but has halved for Company B.

This means that the amount required to increase the probability of sufficiency to the 75th percentile is equal to 25% of outstanding claims for Company A and 12.5% of outstanding claims for company B. 1/2

Possible reasons for the changes include:

Type of business 1/2

Company B may write short tail business and Company A long tail business. Outstanding claims tend to represent a smaller proportion of annual premium for short tail compared to long tail (or other example). Note that the capital requirement depend on both the amount and vitality of the outstanding claims provision. 1/2

The premium and outstanding claim data for two companies are consistent with this hypothesis (both have same premium, Company B has lower outstanding claims) 1/2

Alternatively both may be writing the same long tail class of business, with Company B having started underwriting recently, meaning that outstanding claims have yet to be built up 1/2

Reinsurance – there may be differences in arrangements that reduce variability in outstanding claims 1/2

For example, stop loss may be used by B (or other example) 1/2

There may be limited potential for deterioration in Company B’ estimates for some other reason, for example, policies near limits (or other relevant example) 1/2

Reserving policies – the provision on the balance sheet for Company B may be closer to 75% probability of sufficiency that the provision for Company A 1/2

This could be because Company B already holds a risk margin in addition to the expected cost of claims 1/2

Alternatively, the distribution of claims for Company B may be skewed so that the mean is close to 75% probability of sufficiency 1/2

Both companies have assets of 300. Charges vary from 1% of value for defensive assets such as cash to 25% of value for growth assets such as equities 1/2

Company A has a lower charge under the current standards than Company B, so Company A's portfolio must include a greater proportion of defensive assets than Company B's portfolio.

As the current requirement only gives two categories of asset one could assume that A has 8 in growth assets, 292 in defensive whereas B has 92 in growth, 208 in defensive 1/2

The proposed capital requirement combines asset and underwriting risk, so we cannot be certain whether the changes reflect differences in asset or underwriting risk 1/2

For Company B, asset risk charge is 25 under the current standard, whereas total charge (asset and underwriting risk) is 5 under the new standard.

Company B must therefore hold assets that have a high charge specified under the current standard, but have been assessed by Company B as having a low risk at the 95th percentile 1/2

Company B may have underestimated the riskiness of its asset portfolio 1/2

Alternatively, the current standards may target a much higher probability of sufficiency than the proposed standard 1/2

Company A and Company B may underwrite different classes of business

Both companies have premium of 100. The underwriting risk charge is currently 25 for each company, being 25% of premium (a fixed charge not varying depending on the classes of business underwritten) 1/2

The proposed capital standard recognises differences in riskiness between lines of business 1/2

There may be other differences in the nature of risks underwritten 1/2

For example, Company B might write business with a very low frequency of very large claims, this risk lying beyond the 95th percentile (or other examples, 1/2 per example, max 1) 1/2

The regulatory capital requirement is equal to the expected reduction in capital under the 95th percentile scenario 1/2

Company B may have a higher level of expected profits than Company A 1/2

Alternatively,, Company B may write business that has very stable profits 1/2

Reinsurance 0 there may be differences in arrangements that reduce variability in underwriting risk 1/2

For example, Company B may make extensive use of excess of loss / cat XL (or other example) 1/2

The required capital for Company B may be reduced through diversification, for example between: 1/2

Lines of business – for example, Company B may be a diversified insurer and Company A may be monoline 1/2

Assets and liabilities, e.g. Company B may have attached assets and liabilities to a greater extent than Company A 1/2

The new standard is forward looking and current standard is based on earned premium from prior period 1/2

Difference in capital requirements may reflect differences in plans rather than differences in current business activities 1/2

Note that Company A must be growing quickly as it has an operational risk charge 1/2

Points that could apply to either risk grouping

There may be differences in the modeling approach between the insurers, for example:

- A technical error in the modelling 1/2
- One of the insurers may have misunderstood the proposals 1/2
- Different judgements with respect to assumptions, noting that there may be limited data to produce a 95th percentile 1/2
- However, it would be difficult to put such a large difference in results entirely down to differences in judgements 1/2

[Max 14]

(v) The current regulatory capital requirement for Company B is \$60 million. The company will have to continue to meet this requirement until new standards come into force. 1/2

The proposed capital standards may not be enacted before the end of the financial year, or may never be enacted. 1/2

The proposals may be revised following consultations, resulting in a higher capital requirement for Company B. 1/2

Consider whether regulatory capital requirements might be further revised at a later date. 1/2

Assuming the new capital standards do come into force, the company could pay an \$80 million dividend with capital remaining comfortably above the regulatory minimum 1/2

The exact level of surplus capital depends on the level of profits/losses during the remainder of the financial year. 1/2

paying the dividend reduces assets, which would likely further reduce the asset risk component of the capital requirement 1/2

While companies must always hold at least the regulatory minimum amount

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| of capital, there are typically a number of other drivers of capital | 1/2 |
| A change in regulatory capital requirements doesn't necessarily change a company's economic capital target. | 1/2 |
| The economic capital target may be expressed as part of a risk appetite statement. | 1/2 |
| Capital requirements may be based on probability of technical insolvency. | 1/2 |
| Company may perform scenario analysis to determine capital requirements in addition to regulatory minimum, for example, considering the impact of a number of large losses. | 1/2 |
| The company may target a higher level of capital in order to maintain a particular credit rating. | 1/2 |
| The proposed capital requirements are based on a 95 th percentile for asset and underwriting risk, and a 75 th percentile for liabilities. | 1/2 |
| While the overall probability of sufficiency will vary from company to company, it is likely to be less than 95% | 1/2 |
| This would be considered to provide an inadequate level of security in many jurisdictions. | 1/2 |
| Company B proposes holding around \$20 million of capital (around 2 times minimum), which would result in a higher level of sufficiency. | 1/2 |
| However, the directors may still consider the level of sufficiency to be too low/probability of insolvency too high. | 1/2 |
| Alternatively, there may be some other factor, for example, business might be highly profitable with a high degree of confidence, meaning that the financial strength is stronger than apparent. | 1/2 |
| Even if the regulatory capital minimum is the main driver of the amount of capital held, there are reasons for holding a margin over the regulatory minimum. These include: | 1/2 |
| Ensuring a low probability of falling below the minimum | |
| Providing flexibility to the business to respond to adverse changes before the regulator takes control | 1/2 |
| Reducing the level of regulatory involvement in the business, noting that this will increase as the margin over regulatory minimum capital reduces | 1/2 |
| The company should consider whether the \$80 million dividend leaves a sufficient margin over the regulatory minimum capital level. | 1/2 |
| We do not know how the capital requirements allow for different types of asset, and in particular non-tangible assets. | |
| The assets remaining after the large dividend may be predominantly intangibles, for example, goodwill, deferred acquisition costs. | 1/2 |
| These assets are generally considered inadmissible in capital standards. | 1/2 |
| The \$80 million dividend would not be appropriate if this left Company B with insufficient high quality assets. | 1/2 |
| Assuming the capital is indeed surplus to immediate requirements, company should consider whether paying a dividend is the most appropriate use of | |

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| the surplus. | 1/2 |
| Company should consider whether there are other opportunities available to the business that would generate an appropriate return for shareholders | 1/2 |
| Company should consider future capital needs based on medium term business plans | 1/2 |
| Consider ability to raise additional capital in future should this be necessary (for example, due to adverse future experience) | 1/2 |
| Expectations of shareholders should be considered. | 1/2 |
| There may be a particular reason for the dividend, for example, Company B could be a wholly owned subsidiary and parent company requires capital for another business activity (or other example) | 1/2 |
| Would the stakeholders take a positive / negative view of the company holding assets significantly in excess of regulatory requirement? (or other example) | 1/2 |
| How would prospective policy holders and credit agencies view this? | 1/2 |
| There may be other regulations that prevent the payment of the dividend. For example, dividends may be limited to current year profits, or to total retained profits on the balance sheet (or other example) | 1/2 |

[Max 12]

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| 2 | (i) | • Data triangles | 1/2 |
| | | ○ Paid loss | 1/2 |
| | | ○ Incurred loss | 1/2 |
| | | ○ Reported claim numbers | 1/2 |
| | | ○ Settled claim numbers | 1/2 |
| | | ○ Additionally if available | 1/2 |
| | | ▪ Closed claims with payments | 1/2 |
| | | ▪ Other exposure measures e.g. vehicle years Settled claim numbers | 1/2 |
| | | ○ Recoveries | 1/2 |
| | | ○ Claims handling expenses | 1/2 |
| | | • Premiums | 1/2 |
| | | • Recent loss ratios for Bornhuetter-Ferguson | 1/2 |
| | | • Plan or Forecast loss ratios or claim projections | 1/2 |
| | | • Unallocated claims handling expenses | 1/2 |
| | | • Data split by: | 1/2 |
| | | ○ Homogeneous groups | 1/2 |
| | | ○ Lines of business e.g. Personal Motor/Commercial Motor | 1/2 |
| | | ○ Claim type e.g. bodily injury/damage/windscreen etc. | 1/2 |
| | | ○ Claim size e.g. attritional, large, catastrophic | 1/2 |
| | | ○ Accident year, or some other appropriate origin | 1/2 |
| | | ○ Gross and net of reinsurance | 1/2 |
| | | ○ Claims made and occurrence | 1/2 |

- European country 1/2
 - Currency 1/2
 - Results from previous internal or external reserve reviews 1/2
 - Results from any internal or external audit reviews 1/2
 - If net data only are available, details of any changes in reinsurance programmes 1/2
 - Details of major weather and other catastrophe events 1/2
 - Individual large loss data 1/2
 - Transactional data for constructing individual claim development triangles 1/2
 - Details of any claims handling / process change initiatives 1/2
 - Deductibles in place 1/2
 - Cover offered 1/2
 - Changes in cover offered 1/2
 - Details of other classes 1/2
 - (marks for examples of other details where they differ, 1/2 per point, max 1) 1/2
- [Max 6]
- (ii)
- Reserve estimation to establish 1/2
 - The best estimate valuation for the balance sheet 1/2
 - Any shortfall in the provisions held 1/2
 - If discounted what rates used and whether appropriate
 - Qualitative and quantitative assessment of claims to understand risks and uncertainties in the provisions 1/2
 - e.g. impact of:
 - Large losses 1/2
 - Claims subject to legal dispute or court decision 1/2
 - Reinsurer credit default 1/2
 - Uncertainty due to coverage 1/2
 - Calculation of volatility loading 1/2
 - With reference to specified risk appetite e.g. selected percentile 1/2
 - Reinsurance analysis

- To assist with reserve estimation to obtain a net result 1/2
- To understand the reinsurance protection in place and costs of reinsurance 1/2
- Claims subject to reinsurer dispute 1/2
- Claims handling expense review
 - Allowing for any anticipated savings 1/2
 - Unallocated claims handling expense split to determine valuation of claims for the balance sheet 1/2
- Claims analysis to understand
 - Exposures 1/2
 - Any aggregations 1/2
 - Claims trends e.g. frequency, inflation 1/2
 - Policy holders' behavior, for example, the likelihood that they will renew the policy or cancel midway through the policy period 1/2
 - May feed in to any future claims projections to determine franchise value 1/2
- Assessment of synergies created e.g.:
 - Expertise of staff 1/2
 - Established processes 1/2
 - Streamlining of staff/processes 1/2
 - Impact on projected claims costs and expense base 1/2

Data

- Assessment of quality and quantity of data
e.g. range of data, history, granularity, completeness, accuracy, systems related issues 1/2
- This will determine extent to which additional external data will be needed
e.g. industry data, use of consultants to provide market insights 1/2
- Determine whether data have been adjusted or need to be adjusted 1/2
- Data should be checked
 - Detailed policy and claims checks will not be appropriate/feasible 1/2
 - Some reliance will have to be placed on controls and governance in force and local checks 1/2
 - Focus will be on reconciliations e.g. reconciliations with published accounts
 - Reconciliations with local regulatory accounts
 - Gross = net + ceded
 - And identifying/explaining distortions

- E.g. large losses/outliers
- Analysis of movements
- Unusual diagonals e.g. due to change in legislation
- Changes in claims handling processes, case estimation
- Changes in mix of business
- Changes in terms and conditions
- Seasonality

(1/2 per example, Max 1)

Analysis

- Approach will depend on:
 - Quality and quantity of data 1/2
 - Time available 1/2
 - Types of claims and profile e.g. long tail 1/2
 - Desire to obtain a best estimate without hidden margins 1/2

- Group data in to homogenous groups allowing for volume of data 1/2

- Focus will be on Motor given its dominance in the book 1/2

- If data allows, separate analysis of large losses/cats e.g.: 1/2
 - Claims development or 1/2
 - Exposure based approach 1/2

- Expect to use a range of methods: 1/2
 - Chain ladder (applied to paid, incurred, claim numbers) 1/2
 - Key assumptions include tail factor especially for liability component of Motor and any other longer tail classes in the book 1/2
 - Adjust for distortions e.g. remove outliers, adjust development factors using judgement or benchmarks 1/2
 - Curve-fitting for tail factors, if insufficient data 1/2
 - Expected loss-ratio 1/2
 - Bornhuetter-Ferguson method 1/2
 - Average cost per claims 1/2

- Stochastic reserving to estimate mean as well as variability around the mean 1/2
 - Specify distribution e.g. ODP, LogNormal and fit parameters to the data 1/2
 - Mack model is a distribution-free approach, requiring the first two moments only to be specified and reproduced the chain ladder estimates 1/2
 - Simulation methods, including bootstrap can be used to derive distributions 1/2
 - Or a blend of stochastic methods 1/2
 - Consider cost of capital approach 1/2
 - Consider comparison with regulatory approaches 1/2
 - Need to consider correlations and to allow for diversification between the lines of business 1/2

- Compare range of deterministic projections as a sense check on the stochastic results 1/2

- Solvency II considerations [Max 1]
[Total max 15]

- (iii) ● Weaknesses in operational claims processes may mean
 - All losses and claims affected? 1/2
 - Abnormal claims handling, settlement and/or case activity 1/2
 - Unreliable cases estimates and/or settlement data 1/2
 - Distorted, unreliable case and payment data 1/2
 - May not be possible to strip out the effect from the data 1/2
 - Projections therefore unreliable 1/2
 - May have to rely on more broad brush approaches such as market benchmarks 1/2
 - Risk of underestimation and considerable uncertainty around the estimates 1/2
 - Purchase price therefore difficult to determine 1/2
 - Post-acquisition remediation may take time and be costly 1/2
 - May be a drag on performance in the meantime and shareholders/stakeholders may be dissatisfied 1/2
 - May prove to be a distraction to management in respect of the wider business 1/2
 - Risk of regulatory sanction 1/2
 - Risk of reputational damage 1/2[Total max 3 1/2]

- Regulatory changes
 - Data may not be available to strip out the effect 1/2
 - May not be yet in the data, and therefore the challenge will be to make a reliable allowance for this 1/2
 - There may be no market consensus or understanding of the impact 1/2
 - There will be a potentially significant risk for the BI changes for Motor and for any other changes that affect Motor 1/2
 - The change could be beneficial and an indicator of positive trends in the market and therefore an incentive for acquiring the business 1/2
 - Prospective change – would need to understand the likelihood of any retrospective impact as well as the quantum of the impact 1/2
 - May impact policyholder behavior which will influence strategic view of entering the market and assessment of franchise value 1/2[Total max 2]

- In both cases the effects could increase the range of estimates and the difficult in coming to an agreement with the vendor [Total max 6]

(iv) **Arguments for**

- The regulatory changes could be beneficial and an indicator of positive trends in the market and therefore an incentive for acquiring the business ½
- The changes may be in line with changes being adopted in other markets ½
- The recent changes may mark the end of a period of uncertainty ½
- The uncertainty attaching to the business may allow a significant discount to the valuation to be negotiated ½
- The impacts may mainly affect the smaller non-motor classes and therefore be of less significance ½
- External/market assessments may exist and give some comfort ½
- ABC may have experience of similar practices/developments and feel able to respond to the challenges ½
- The regulatory changes may be judged to be limited and not of big impact ½
- ABC may be satisfied that the impacts of the operational issues have been identified and suitable allowance made ½
- XYZ may be small relative to the size of ABC and any potential adverse impact may be considered to be non-material ½
- The strategic fit/potential may be considered to supersede the risks ½
- ABC Insurance might have surplus capital available to invest and believes the acquisition to be a better proposition for its shareholders ½

Conditions

- ABC to insist on the deal being based on their estimate using a generally conservative approach ½
- An explicit margin for uncertainty is applied at an agreed risk appetite e.g. percentile level ½
- Agreed flat loading ½
- Impose a warranty to a certain limit ½
- Impose a stop loss arrangement ½
- Exclude the business affected ½
- Exclude all past claims from the transaction i.e. future business only ½

- Indemnity arrangement 1/2
- Hold back a tranche of the purchase back until issues resolved 1/2
- May buy some of their shares rather than fully acquire 1/2
- Regulatory approval will be required 1/2
- ABC may choose not to go ahead 1/2

[Total max 6]

(v) Strong case activity may indicate:

- An increase in the number of incurred claims – these could be incurred in the year or previously incurred but not reported. 1/2
- This may be due to:
 - A cat or major weather event 1/2
 - Activity related to the legislative changes 1/2
 - e.g. claims filed to meet a deadline after which the ability to claim will no longer be available 1/2
- A reassessment of average claim sizes for claims that have already been reported 1/2
- This could be due to:
 - Legislative changes leading to increased awards – following the recent change 1/2
 - Anticipating future retrospective changes and applying them to cases already incurred 1/2
- Change in policy holder behavior – more claims aware (compensation culture); economic environment may be resulting in more claims 1/2
- Inadequate case estimates and a process of increasing them accordingly 1/2
- This may have been associated with the material weakness identified at the previous review 1/2
- New case handlers taking a different view; or new policies introduced impacting levels of case estimates 1/2

Deterioration in prior year results:

- Impacts of legislative changes not adequately reflected in the previous provisions i.e. impact is greater than anticipated 1/2
- If the case estimates were with hindsight inadequate, this may have led to an underestimate or any projections based on case incurred 1/2

- A new actuary/actuarial team may have applied different methodologies and assumptions to arrive at different views $\frac{1}{2}$
- The new team, being biased in the overseas entity will have greater access to all the information and greater insights to the market, than might have been the case when the review was done at the time of the acquisition $\frac{1}{2}$
- Any longer tail liabilities will be difficult assess and the extra year of information may be behind some of the deterioration $\frac{1}{2}$

Current year uncertainty:

- Any cat or weather related event will need to be assessed separately and by its nature will be have a lot of uncertainty attaching $\frac{1}{2}$
- Legislative changes will impact current year incurred with some uncertainty $\frac{1}{2}$
- Longer tail liabilities will not be much developed and therefore estimates may be difficult $\frac{1}{2}$
- Benchmarks and estimated loss ratios may not be reliable given changes in the market $\frac{1}{2}$
- The changes in claims processes and legislation will increase uncertainty if trying to base current results on past experience $\frac{1}{2}$

[Total max 7]

(vi) **Option A**

Advantages

- Local expertise will inform the valuation process $\frac{1}{2}$
- The local actuarial team will be able to engage with the other relevant functions (claims, underwriting etc.) to support the statement $\frac{1}{2}$
- Local knowledge will be greater than that of a remote ABC team $\frac{1}{2}$
- Less initial upheaval $\frac{1}{2}$

Disadvantages

- Local team will be unfamiliar with ABC reserving policy and possible SII requirements $\frac{1}{2}$
- It will potentially take more time to embed the new requirements $\frac{1}{2}$
- Some support from the ABC team will be needed – potentially significant in the initial stages as the XYZ team develop their

- understanding of the requirements 1/2
- XYZ local actuarial team may not embrace or embed the new requirements to the required standard 1/2
- May be unintentional or intentional bias as XYZ will wish to show their business in the best possible light 1/2

Option B

Advantages

- Allows ABC to have greater quality control and to more effectively and quickly implement the new policy 1/2
- Allows ABC to ensure a consistency of approach 1/2
- Allows ABC to employ consistent/compatible systems/interface 1/2

Disadvantages

- Local team may be resistant 1/2
- It may prove difficult to engage with the necessary functions and management 1/2
- Language may be an issue 1/2
- Difficult to obtain the same assurance around the quality and completeness of the data as might be the case for the local team 1/2
- May not be appropriate for a significant sized operation, or if the overseas business were to grow – may be considered more appropriate for the business to have a dedicated local actuarial team and to have more direct accountability for the valuation 1/2
- From the SII perspective, it may be difficult for XYZ to demonstrate to its own local regulators that there is good local understanding and use of the results 1/2
- Any additional SII considerations 1/2
- (vii) • Data and IT systems will need to be of a suitable standard to satisfy data quality and completeness checks. 1/2
- It may be necessary to replace legacy systems with single integrated systems to achieve greater efficiencies 1/2
- Actuarial models and software will need to be considered. Consistency may dictate that the same software is adopted 1/2
- Review of the claims function will be required to identify the extent and

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| | nature of the weaknesses and to instigate remedial actions | ½ |
| | • The reserving process should be supported by robust data and systems, a well-controlled claims function and input from other functions including underwriting, reinsurance, risk, finance etc. | ½ |
| | • Governance and controls need to be implemented to a high standard e.g. committee structure, sign-off procedure, documentation, peer review and audit trails | ½ |
| | | [Total max 2] |
| (viii) | • Separate best estimate and explicit risk margin | ½ |
| | • Best estimate should be probability-weighted average of future cash flows, discounted to allow for the time value of money | 1 |
| | ○ It is necessary to project the claims payment in each future time period (at least for each future year) over the remaining lifetime of the liabilities | ½ |
| | ○ Any previous implicit or explicit margins should be removed | ½ |
| | ○ Binary events – low-probability, potentially high-value future scenarios that are not included in the past data – should be allowed for in the best estimate | ½ |
| | • Premium and claim cash flows should be considered separately | ½ |
| | ○ Move from unearned premium reserves to “premium provisions”, i.e. the best estimate of future claims and expenses in respect of unearned business | ½ |
| | ○ Projected future claims + Expenses – Future premiums receivable | ½ |
| | ○ Claims/expenses relating to future exposure to which the insurer is obligated | ½ |
| | • Reinsurance cash flows should be considered separately | ½ |
| | • Reinsurance asset to take account of expected losses due to counterparty default | ½ |
| | • Best estimate assumptions should be applied | |
| | • Expert judgement may be applied in relation to the data, assumptions and methodology used. | ½ |
| | • Any judgments should be justified, explained and validated. | ½ |
| | • Contract boundaries: necessary to make an assumption regarding the boundary of an insurance contract. This contract boundary sets the point at which premiums can be recognised on existing contracts. | ½ |

- Need to recognise insurance contracts on a “legal obligations basis”, so that liabilities arising from the contract are recognised when the insurer has legally entered the contract, which is usually before the contract start date 1/2

- Risk Margin: cost of providing an amount of capital equal to the Solvency Capital Requirement (SCR) for non-hedgeable risks which is necessary to support the insurance obligations over their lifetime. Calculated on a net basis only 1

- Validation requirements; at least annually: 1/2
 - Appropriateness, completeness and accuracy of data used in the calculation of technical provisions and any adjustments to the data 1/2
 - Realism of assumptions used in the calculation of technical provisions 1/2
 - Applicability and relevance of the calculation methods used 1/2
 - Appropriateness of the level of technical provisions 1/2
 - E.g. back-testing – actual vs expected 1/2

Documentation: all aspects of the valuation are to be thoroughly documented

Effective system of governance in place: risk management, internal control/audit, actuarial function

Actuarial function to coordinate the calculation of the technical provisions

[Total max 10]

END OF SOLUTIONS