INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS’ REPORT

April 2022

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 Specialist Advanced (SA) and Specialist Principles (SP) 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.

Sarah Hutchinson
Chair of the Board of Examiners
July 2022

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

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 techniques and the principles of actuarial planning and control needed for the sound financial operation of general insurers.

Candidates who pass the exam are expected to analyse hypothetical situations, within the context of general insurance, including using judgement to assess the implications of possible actions and to develop appropriate proposals or recommendations relating to reserving and capital modelling.

Candidates who are well prepared generally appear to perform reasonably well on SP7, although a number of candidates do not appear to be adequately prepared and are unable to generate sufficient distinct points in their answers or show poor exam technique. The points provided in this report are worth considering to improve performance.

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 points inappropriate and marks will be available for identifying and articulating these nuances well.

Calculation questions will come up on a regular basis within SP7 papers. Candidates should always be prepared for such staples as balance sheet preparation, triangle manipulations and projections and reinsurance layer calculations (along with being able to carry out any necessary adjustments including inflation, exposure, earning distortion and time period issues). All workings and rationale should be clearly shown to allow credit to be given for workings even where the calculations are incorrect.

Candidates should expect the examiners to set questions from all parts of the syllabus in order to test as wide as possible a range of skills and, in particular, to achieve a fair balance between capital and reserving, including reinsurance.

Candidates who answer the questions with bigger marks first seem to not run out of time. Although this can vary from individual to individual, time keeping is of essence.

The depth and breadth of an answer needs to be in line with the command verb and marks allocated to the question.

While the marking schedule is discussed extensively to cover as many points as possible, candidates who give well-reasoned points not in the marking schedule are awarded marks for doing so.

B. Comments on *candidate performance in this examination.*

The paper was generally well attempted, except for question 5 and question 9 where the marks were often lower due to candidates not answering precisely the question asked. Responses to knowledge based questions were generally good. Questions that tested application and higher order skills proved more challenging, and candidate responses to these questions often lacked the breadth and detail needed to score well. Question 6 was the only calculation question in the exam paper and most candidates answered this question well, although some found challenging to come up with sufficient distinct diagnostics A common theme that came through was candidates not tailoring solutions to the specific information or situation given.

The comments that follow the questions concentrate on areas where candidates could have improved their performance. Candidates are advised to include these areas in their revision.

C. Pass Mark

The Pass Mark for this exam was 64
317 presented themselves and 141 passed.

Solutions for Subject SP7 - April 2022

Q1
Fidelity Guarantee Insurance:
Type of Financial Loss Insurance [½]
covers the insured against losses caused by the dishonest actions of its employees [½]
Usually indemnifies for the loss of goods/money, but may or may not indemnify the expenses incurred in establishing the loss [½]
This will usually be a one-year policy [½]
The maximum indemnity payable will be specified in the policy schedule [½]
Inflation should therefore be a minor issue [½]
Legal expenses involved in establishing that the employee is indeed at fault could be substantial [½]
which may not be covered under the product being sold, and need to be considered accordingly while setting up reserves [½]
Will usually come with a discovery period after the end of the policy period [½]
this should be factored in when setting up the claims reserves, as it may take some time to discover the dishonest act [½]
However, once the discovery period is over, there is no possibility of claim being reported [½]
Due to the nature of the product, policies are usually individually underwritten with bespoke T&Cs which can cause heterogeneity within loss triangles [½]
this should be carefully considered if triangulation methods are used for calculating case reserves [½]
Determining the amount of loss can be a long-drawn process so there is a potential for long settlement delays [½]
Whether there is a limit on the legal expenses which will be covered under this policy [½]
Whether the consequential loss is covered or not should be considered when setting up the case reserves, as this could lead to the losses being much bigger [½]

Any excess/deductibles on the policy will also influence the amount of reserves to be kept aside for these policies [½]
Policies might be sold with an aggregate limit on top of per event limits, and the same should be considered [½]
Any other suitable comments [½ mark each, maximum 1]
[Marks available 10, maximum 3]
[Total 3]

Overall, the question was reasonably answered, although the majority of candidates did not provide enough points specific to the product features to score full marks.

Q2
(i)
Operational risk as the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events [½]

For each of the risks below, ½ for naming the type of operational risk, ½ for providing a suitable example in relation to Company A. No more than a ½ for a suitable example per risk.

Administration risk: The risk associated with the administrative aspects of the firm's operations [½]
the company will likely be relying on a third party to provide the weather index which could not be made available on time/appropriate format/calculated incorrectly compared to what was pre-agreed [½]
Compliance risk: The risk of non-adherence to legislative and internal firm requirements [½]
the company could end up violating the regulatory requirements of holding a deterministic reserve which suggest a payment in all circumstances, only to be released once the event hasn't triggered the parameter threshold [½]
Event risk: The risk associated with the potential impact of significant events on the operations of the firm [½]
an unforeseen weather event/arson/mischief leading to damage to the instruments used to measure the event intensity to be used to determine the payment [½]

Fraud risk: The risk associated with intentional misappropriation of funds, undertaken with the objective of personal benefit at the expense of the firm [½]
internal - intentional misreporting of the parameters triggering the pay out in collusion with the insured, employee theft; external - robbery, computer hacking [½]
Governance risk: The risk associated with the board and/or senior management of the firm not effectively performing their respective roles [½]
fiduciary breaches, sale of unauthorised products [½]
Strategic risk: The risk arising from the inability to implement appropriate business plans and strategies, make decisions, allocate resources or adapt to changes in the business environment [½]
it is a new company and might have expected for the weather index to capture certain aspects which it fails to capture once implemented, or the uptake is less leading to concentration of risk/adverse selection [½]

IT risk: The risk of error or failure associated with the technological aspects of its operations [½]
hardware systems, software utilised, telecommunication problems and utility outages [½]
Any other suitable comments [½ mark each, maximum 1]

Note: events which lead to higher underwriting losses are not valid for this example. The event should cause an impact on the operations of the company

[Marks available 8½, maximum 5]

(ii)
Regular stress and scenario testing of impacts of the various risks within the risk register [½]
Implement rigorous internal controls and processes [½]
Regular internal/external audits/peer-review of processes that could result in Operational Risk [½]
Undertake detailed study of local laws and regulations so avoid regulatory/compliance risk [½]
Ensure that the details of the pre-agreed weather index are not ambiguous and subject to interpretation [½]
D&O cover reducing governance risk and similar insurance covers for other risks [½]
Disaster recovery planning [½]
Internal fraud prevention processes [½]
Strong complaints handling guidelines [½]
Incentivise staff to enforce proper controls [½]
Relevant and regular Staff training [½]
Vetting of hiring [½]
Widespread adoption of ERM methods [½]
Sufficient and suitable IT controls [½]
Any other suitable comments [½ mark each, maximum 1]
[Marks available 8, maximum 3]
[Total 8]

This question was generally well answered. Most candidates scored well on part (i) with several scoring full marks. Candidates less prepared did not provide enough distinct points to score highly on part (ii).

Several types of operational risks are provided in the Core Reading, so it was expected for the candidates to be able to list out at least 5 of them with one example for each.

Q3
(i)
Binding authorities are contractual agreements setting out the scope of delegated authority [½]
allowing cover holders to enter into contracts of insurance and to issue insurance documents on behalf of Lloyd's managing agents/insurer [½]

without seeking approval from the insurer for writing risks within a pre-agreed risk framework [½]
these will normally have defined parameters for the types of risks that can be insured and the authority to handle claims on behalf of the insurer [½]
the classes of business covered and the policy wordings that are to be used [½]
Agencies are paid commissions for this service [½]
Note: Max 1 mark for defining Binding Authorities

A motor insurer, for example, could enter into a binding authority arrangement for another State in the USA where it doesn't have its own agency workforce [½]
Or an insurance company writing home insurance could provide underwriting authority to the cover holder to write certain post-codes or types of properties where the insurer doesn't have expertise in [½]
The frequency of claims is usually high for personal lines and it is quite possible that the customer care and/or claims handling/settlement could be passed on to the binding authority as well [½]
although claims beyond a certain size might still be settled by the insurer itself [½]
The binding authority may also set out other responsibilities for the cover holder, such as handling insurance premium monies [½]
Any other suitable comments [½ mark each, maximum 1]
[Marks available 6½, maximum 3]

(ii)
Advantages
Underwriting costs can be saved if the binding authority can be negotiated in a way that entrusts some of the underwriting expenses with the cover holder [½]
who could perform the same tasks in a more cost efficient way due to specialisation and economies of scale [½]
Depending upon the nature of the contract, claim handling costs could also be saved [½]
For the Lloyd's Syndicate/Insurers, it provides them with a great deal of expertise without having to build it in-house [½]
since cover holders will usually have considerable expertise in the particular niche product and regions, having excellent local relationships [½]
this can allow for more business to be underwritten rather than the agency having to seek approval for each risk [½]
This allows them to diversify business without incurring the set up costs for venturing into a new area of underwriting [½]
From a cover holder's perspective, it allows them to get underwriting expertise, without having to bear the risk [½]
Especially if it is for Lloyd's syndicate, this also provides the cover holder with access to the Lloyd's brand, security and ratings [½]
Any other suitable comments [½ mark each, maximum 1]

Disadvantages
One big disadvantage is that the insurer/Lloyd's Syndicate may not have full understanding or sight of the business being placed on its behalf [½]
especially if the degree of delegation is high [½]
If the claims handling has been delegated as well, this could lead to poor claim settlement as there is little incentive for the cover-holder to reduce claims cost in most cases [½]

There could be delays in the policy and claims information being made available to the insurer [½]
giving rise to potential issues with reserving, pricing, and capital management [½]
Especially if exposure-based techniques are being used [½]
Commissions/Expenses can be quite high [½]
Since the relationship is commission based, there can sometimes be a conflict of interest [½]
in writing more premiums vs quality/profitability of the business underwritten [½]
although some of this can be mitigated with suitable checks in place [½]
Possibility of default risk if the premiums are collected by the cover holder [½]
Possibility of fraud increases with any outsourcing of activities [½]
Any other suitable comments [½ mark each, maximum 1]
[Marks available 12½, maximum 4]

(iii)

Likely most candidates will assume it is new business on the existing lines of business, and the below answer is based on that assumption, otherwise an increase in incurred loss ratios isn't of much interest.

New business could also refer to new business written on new lines of business altogether. Award marks for points written in that context as well, subject to them being relevant to such business being written through binding authorities.

The question asks for reasons behind changes to the incurred loss ratio, which could be interpreted as including or excluding IBNR. Marks to be awarded for both interpretations, subject to relevant follow up points mentioned.

Depending upon the incentivisation structure, the cover holder may be more focussed on generating higher premiums to earn more commission income [½]
without worrying about the quality of the risks being underwritten [½]
There could have been a lack of oversight on the part of the CUO on the nature of risks [½]
too much authority provided [½]
The CUO might be writing those lines through the binding authority where they have limited experience themselves, and the provisions defined for the cover-holders to write that business might have been incorrect leading to adverse selection [½]
Could be driven by some large loss event that happened in these few quarters which affects those particular lines [½]
The nature of business being underwritten through the binder may be different to what the company has been writing on a direct basis, which is what the actuary might be comparing to [½]
There could be an issue with the rate adequacy on the business being written through the binding authorities [½]
or the market could have become soft over this time horizon, having nothing to do with the binder arrangement [½]
Or claims inflation could be driving the increase, whereas the rates could have been locked in for several renewals under the binding authority contracts [½]

If the Claims handling authority has also been delegated, there could be an issue with the quality of claims handling, leading to poorer outcomes than when it was being handled internally [½]
The case/IBNR reserving basis could have changed over this time [½]
If the premium used for incurred loss ratio calculation is net of commissions, and if more commissions are paid to the cover holders compared to writing them directly, the loss ratios will go up [½]
Any other suitable comments [½ mark each, maximum 1]
[Marks available 7½, maximum 4]
[Total 11]

This was an application question on binding authorities. Part (i) was not very well answered; while most candidates scored the marks for defining binding authorities, they did not tailor their answer to explain how it could work in practice.

Part (ii) was answered well with many candidates scoring full marks but for part (iii), candidates did not provide sufficient points tailored to the situation provided in the question. A vast majority of the candidates interpreted new business as being additional business underwritten on the existing lines, although marks were provided for the alternative interpretation.

Q4

(i)

Stress testing quantifies the effect of varying a single parameter that can affect the financials in the business planning exercise and is useful for understanding the potential impact of individual risks in isolation [½]
Scenario testing quantifies the effect of a simultaneous change in a combination of parameters. It is useful for considering the combined effect of a number of risks [½]
Business planning is a complex and forward-looking exercise [½]
understanding what could cause the actual performance of the business to be different to that projected is, therefore, important [½]
stress testing could provide the insurer with a more targeted impact of change in one parameter, e.g. motor loss ratio, and specific action items could be assigned to specialists (e.g. Motor Underwriter) [½]
However, insurance companies are exposed to multiple risks which can be inter-related [½]
so it is also important to understand what the impact of a plausible scenario could look like when multiple risks get triggered at the same time [½]
Stress tests would usually help us understand what can be termed as a 'P&L event', whereas Scenario tests could help us understand 'Capital events' [½]
hence both need to be undertaken to try to make the business planning exercise more meaningful [½]
To determine a suitable investment strategy by stressing the assets and liabilities [½]
Can be used to determine a suitable reinsurance structure for the period under planning [½]
Determining the level of capital to be held by the company to support the business the insurer plans to write, especially during times of growth [½]

To assist with the expense planning, e.g. the impact of a demand surge under a particular scenario [½]
Any other suitable comments [½ mark each, maximum 1]
[Marks available 7½, maximum 3]

(ii)
Note: Maximum 2 marks per LoB
Motor insurance
Short term:
There will be a reduction in usage of cars [½]
Lower car usage means fewer claims [½]
Hence higher profitability [½]
There could be a demand surge due to fewer workshops and personnel available to provide relevant services if a claim does happen [½]
Motor Third party is usually a compulsory cover, so renewability shouldn't be an issue, although the regulator might temporarily influence this [½]
Resulting in a reduction in premiums being received [½]
An increase in theft as cars due to economic hardships [½]
But equally could be a reduction in theft as most cars are parked at home in safer areas compared to when being driven around [½]
Delayed settlement of claims that require physical inspection or court rulings [½]
will depend upon whether the courts are open and surveyors are going out for claims inspection etc [½]

Long term:
increased usage of cars because people do not want to use the public transport due to risk of infection [½]
Equally, it could lead to a reduced usage of cars because people continue to work from home as they may get used to it [½]
There might be no long-term impact as things might get back to normal as soon as the economy opens up and the pandemic subsides soon after 3 months [½]
Any other suitable comments for LoB [½ mark each, maximum 1]
[Marks available 7½, maximum 2]

Trade credit insurance
Short term:
Pandemic has resulted in closure of non-essential businesses, which will cause subsequent reduction in their revenues and hence their ability to pay creditors [½]
some business may go bankrupt with subsequent bad debt for their creditors [½]
Overall an increase in trade credit claim lines loss ratios [½]
Rate hardening due to increased demand and increased loss experience [½]
Long term:
stricter policy wordings at renewal might mean the impact of the disease will be reduced/removed [½]
the restrictions are only for 3 months, so might not have a long-lasting impact regardless of change in policy terms [½]
wider adoption of trade credit insurance [½]
no long-term impact as people may think of the pandemic as a short-term blip and things might resume to being normal once the economy opens up [½]
Any other suitable comments for Trade Credit LoB [½ mark each, maximum 1]

[Marks available 5, maximum 2]

Business interruption insurance
Short term:
Covers businesses for lost profit while unable to trade. Heavy losses expected to arise under this line of business if the closure due to diseases is covered in the policy [½]
Increase in loss ratios [½]
Hardening of rates for the business interruption cover due to a surge in demand for such covers [½]
Insurers may stop offering the cover altogether to avoid exposure while waiting for the pandemic to subside [½]
Long term:
Continued increased demand for the product [½]
no long-term impact as people may think of the pandemic as a short-term blip and things might resume to being normal once the economy opens up [½]
pandemic exclusions might start to feature in the future policies [½]
Any other suitable comments for Business Interruption LoB [½ mark each, maximum 1]
[Marks available 4½, maximum 2]

All lines short term
Pandemic is likely to adversely impact reinsurers, particularly those covering trade credit and business interruption lines [½]
There could be an increase in fraudulent claims due to the economic hardships [½]
Reinsurers may fail, resulting in higher than expected losses across all lines of business [½]
Liquidity issues if large Trade Credit and Business interruption claims have to be paid at a short notice, subject to company's investment portfolio [½]

All lines long term
Government may increases taxes in the longer term, to try and recoup spending that was necessary during the period of reduced economic activity [½]
Once pandemic passes, there may be a period of fast economic growth, which could have positive impacts on the Company's investments [½]
If some insurers failed during the pandemic, may be reduced competition in the market and hence insurer may be able to make higher profits [½]
The world may have seen the value of insurance products during the pandemic (e.g. trade credit/business interruption insurance) and hence may be increased demand for these products going forward [½]
Any other suitable comments for All LoB [½ mark each, maximum 1]
[Marks available 5, maximum 2]
[Marks available 22, maximum 6]

(iii)
Motor Insurance
Stress lower than expected frequency of motor losses [½]
Stress uptick in frequency of fraudulent claims [½]
Overall scenario test to model is a reduction in overall loss ratio but also a sizeable reduction in business volumes (which increases expenses per policy) [½]

Scenario where the pandemic lasts so long that people stop purchasing OD covers as they don't foresee using their cars [½]
reduced premium income could lead to change in the business mix [½]
Scenario where certain distribution channels may no longer be viable due to a lack of face to face interaction [½]

Trade credit insurance
Stress significant increase in frequency [½]
and severity for this line [½]
Accumulation of risks as multiple insured may have the same underlying debtor [½]

Business interruption insurance
Heavy losses expected to arise under this line of business (stress frequency/severity increase) [½]
Scenario test best/worse case scenarios from a claims perspective, combined with significant settlement delays [½]

Credit/Liquidity risk issues
Test the failure of one or more reinsurers [½]
Stress failure of other counterparties (e.g. largest broker balance) [½]

Operational risk issues
Stress risk of claims getting larger if not settled in a timely manner [½]
Stress tax rates rising as the Government may seek to recoup revenue [½]
Several members of a team falling sick at the same time leading to issues with the business not being able to continue operating for a few days [½]
Increased errors in work performed if team has to process things digitally whereas previously only used to working with physical paperwork, for instance [½]

Other issues
Test heavy fall in value of any equity and property investments [½]
Stress Company's own credit rating being reduced causing reputational damage and lost business [½]
Correlations in Company's capital model should be stressed (e.g. between lines of business) as they may be different in adverse scenarios [½]
Any other suitable comments [½ mark each, maximum 2]
[Marks available 12, maximum 4]

(iv)
Possible mitigation actions include:
Purchase additional reinsurance protection that includes provision for reinstatements to ensure adequate reinsurance protection [½]
Arrange credit lines that could be drawn on at short notice as a large amount of claims is likely to need to be paid quickly [½]
Tighten terms/conditions of future policies [½]
implement enhanced claims handling (e.g. for potentially fraudulent claims), subject to treating customers fairly [½]
Invest in technology and associated equipment, such that employees across all departments can work effectively from home [½]
Stop offering certain products/change in business mix [½]

Change in the investment strategy [½]
Any other reasonable mitigating action [½ mark each, maximum 2]
[Marks available 5½, maximum 3]
[Total 16]

This was a question on the impact of a pandemic, which is quite contextual and therefore many candidates were able to provide a good breadth of points in their answer.

Parts (i) and (ii) were answered well with many candidates scoring full marks.

Parts (iii) and (iv) were application and higher order in nature and were answered relatively less well with candidates failing to think more widely.

Q5

(i)

The underwriting cycle can be described as follows, choosing high profitability as a starting point:

At the start of the cycle, (re)insurance is generally highly profitable (hard market phase) [½]

The level of profits attracts new entrants to the market and encourages existing (re)insurers to write more business [½]

to fill the extra capacity, premium rates are reduced to attract business [½]

eventually premium rates fall to an extent that (re)insurance is generally loss making (soft market phase) [½]

(re)insurers leave the market in response to the level of losses and reduce the level of business they write [½]

with restricted capacity and availability of (re)insurance, premium rates increase [½]

eventually premium rates rise to the extent that (re)insurance is generally highly profitable [½]

(which is the start of this cycle all over again)

Maximum 1 mark for defining the underwriting cycle

In an insurance or reinsurance market, it has been observed that (re)insurance premium rates have varied in ways that do not reflect the underlying cost of providing insurance [½]

The different phases in an underwriting cycle are the same for insurers and reinsurers [½]

But the timing of the underwriting cycle for insurers and reinsurers may not be in sync due to different factors driving the cycles [½]

for example a shortage of catastrophe reinsurance capacity driven by a recent major catastrophe event increasing reinsurance premiums quickly [½]

whereas the direct market not being impacted immediately as the event is mainly absorbed by the reinsurance market [½]

Reinsurance also works as a catalyst for the underwriting cycle for insurers, with cheaper reinsurance allowing the direct insurers to reduce price, triggering the start of a hard market [1]

The different in the timing of the underwriting cycle between insurers and reinsurers can also be influenced by the type of reinsurance, i.e. proportional vs non-proportional [½]

proportional reinsurance is usually going to be more in sync [½]

with non-proportional being impacted more by the timing of large/CAT events [½]
Reinsurance is usually longer tailed compared to direct so the impact of underwriting cycle will be more pronounced [½]
Direct insurance and reinsurance could be impacted by demand surges differently [½]
Benchmarking and monitoring of trends in rates for the direct book is often easier compared to reinsurance which may take a bit longer to get the impact of changes in the direct portfolio [½]
Any other suitable comments [½ mark each, maximum 1]
Note: Max 2 marks for describing the underwriting cycle with no contrasting the impact on direct insurers and reinsurers.

[Marks available 11, maximum 3]

(ii)
This refers to the phenomenon which shows that during a soft market phase of an underwriting cycle, incurred claims development patterns are slower to develop (or longer-tailed) than in a hard market [1]
so that an unadjusted projection can underestimate ultimate claims in a soft market [½]
and equivalently, overestimate them in a hard market, when insurers can afford it [½]

[Marks available 2, maximum 1]

(iii)
Construction line of business is usually a long tailed line of business [½]
hence claim development can take a long time to fully develop [½]
When the market is soft, this tail is further extended due to slow claims reporting [½]
lower premiums in a soft market can lead to weakening of reserves [½]
so that an unadjusted projection can underestimate ultimate claims in a soft market, and lead to holding less reserves [½]
causing the portfolio to look more profitable than it is, and further accentuating the soft market through lower pricing [1]
and equivalently, the converse will be true in a hard market where the book will be over-reserved when the market is hard [½]
claims are being reported faster than usual and it may lead to the actuary perceiving the book to be less profitable than the long-term trend [½]
the impact of reserving cycle could be exacerbated by the often increasing exposure and claims incidence in the later part of construction projects [½]
Engineering is relatively short tailed line of business (e.g. installation of machinery), and might not be as much affected by the reserving cycle [½]
since the losses may reach the ultimate values lot quicker [½]
Any other suitable point directly relevant to the Engineering and Construction business [1]

[Marks available 7, maximum 3]

(iv)
Rate indices would not adequately allow for differences between new and renewed business [½]
Which in the case of Company C is even more tricky given 60% of the premium typically comes from new business [½]
Even for the renewal business, the nature of construction business could mean it is not a like for like renewal [½]
As the terms and conditions might change, or the nature of exposure might change [½]

As quite a few of both Engineering and Construction policies are likely to be one-off in nature [½]
Using rate indices based on the historical small renewal base which keeps changing due to new business coming in each year can be misleading [½]
And cause the insurer to capture the trends in underwriting cycle incorrectly [½]
Hence leading to an over/under estimation of reserves [½]
Also, Construction projects can be long tailed, and claims inflation can be an important component of trends, so rate indices may miss this aspect [½]
and may have to be adjusted before using them to calculate, let's say, the expected loss ratio for loss ratio based reserving techniques [½]
Also for commercial business such as this, rate indices can be formed based on subjective assessment of the underwriters [½]
Rate indices also fail to remove the underlying trends in the claims experience, which often also change along with the underwriting cycle [½]
It could be possible that the rate hardening in the market is disproportionately reflected in Company C's in-house rate indices, leading to incorrect reserve estimation [½]
Any other suitable comments [½ mark each, maximum 1]
[Marks available 7½, maximum 4]
[Total 11]

In Part (i) candidates did not contrast the impact of the underwriting cycle on insurers and reinsurers. Candidates appearing for the SP7 exam are advised to read and understand the concepts on reinsurance equally well as insurance.

Part (ii) was well answered. For part (iii) most candidates did not tailor their answer specific to Engineering and Construction. In Part (iv) overall, most candidates scored low.

Some candidates answered the question mistaking Construction and Engineering to be one line of business, whereas they can be quite different depending on the underlying risk.

Q6
(i)
[Net Operating Expenses 100000 + Claims Incurred Net of Reinsurance 125000] / Net Earned Premium 250000 = 90% (rounded to one decimal point) [2]

(ii)
Business Volumes Possible Diagnostics:
Possible ratios that the candidate would calculate for coming up with business diagnostics:

Premium Growth	2021	2020	2019
GWP	20.3%	9.4%	
RWP	15.3%	27.5%	
NWP	24.4%	-2.3%	
NEP	18.5%	5.5%	
RWP/GWP	43.8%	45.7%	39.2%
Gross Claims Ratio	45.7%	94.6%	44.8%
RI Claims Ratio	39.9%	136.6%	44.4%
Net Claims Ratio	50.0%	62.6%	45.0%
Expense Ratio	40.0%	40.8%	45.5%
Combined Ratio	90.0%	103.3%	90.5%

Correct GWP movement calculation [½]
Correct NEP movement calculation [½]
Correct RWP movement calculation [½]
Correct Gross Claims Ratio [½]
Correct RI Claims Ratio [½]
Correct Net Claims Ratio [½]
Correct Expense Ratio [½]
Correct Combined Ratio [½]
GWP Increases in both 2020 [½]
but the NWP falls in 2020 despite the increase in GWP [½]
2020 RWP increase proportionally more than GWP increase which could indicate reinsurance rate increases greater than gross (or ongoing changes to reinsurance programme at Company P) [½]
The company had a combined ratio of 90.5% in 2019 when it decided to cede a higher proportion of the GWP to the reinsurer [½]
Ordinarily this means ceding more profits to the reinsurer [½]
but 2020 turned out to be a year with high losses since the company had a bad gross loss ratio in 2020 [½]
the RI Claims ratio is very high in 2020, suggesting a meaningful reinsurance cover has been taken out by the company [½]
The expense ratio of the company in 2020, however, has been lower than in 2019 despite a high loss year [½]
which is bit unusual [½]
but possibly the RI has picked a lot of these costs [½]
or it could be one single big claim which might not have made a dent on the expense ratio [½]
The GWP increase in 2021 could be driven by rate increases following the high losses in 2020 [½]
The company ceded a slightly similar proportion of business in 2021, but the RI claims ratio has reduced compared to 2020 and 2019 [½]
This could mean that the reinsurer has been cautious in accepting risk after the high loss ratio in 2020 [½]

resulting in a higher net loss ratio for Company P when compared to 2019 when the RWP/NWP was a lower percentage [½]
Gross claims ratio in 2021 is closer to the 2019 levels but the net claims ratio has increased which suggests that reinsurance costs have impacted profitability [½]
Business written has generally been profitable with combined ratios below 100% other than in 2020 [½]
where it is likely a major catastrophe occurred [½]
Improved profitability in 2021 compared to 2020 despite large increase in business volume but not down to levels prior to 2020 [½]
2019's overall profitability was helped by the profits from foreign exchange, but is more loss making than in 2021 without that [½]
Would want to investigate further whether new (or increased) business written was as profitable as the previous business. [½]
Reinsurance clearly effective in 2017 and 2018 in particular where Net Claims ratio improved significantly compared to the Gross. [½]
2020 RI Claims ratio suggestive of a major catastrophe which reinsurance responding effectively [½]
Would want to investigate further whether the reinsurance is utilised effectively but would need more information to conclude on this [½]
Note: Alternative definition of expense ratio as a proportion of the GWP should also be awarded marks.
Any other suitable comments [½ mark each, maximum 2]
[Marks available 18, maximum 9]
[Total 11]

Most candidates scored full marks on part (i).

In part (ii) candidates scored well where they were able to think of sufficiently many diagnostic ratios and comment on their movements. Some candidates simply commented on the numbers without providing any diagnostics, and some simply calculated the ratios and did not provide any explanations, thereby missing marks.

Overall candidates did not performed well in part (ii), resulting in a wide variation in the marks obtained. However, most candidates fared well when it came to reading the accounts.

Q7
(i)
Since the product will be under the manufacturers' warranty for the first two years, the earning should be nil [½]
with the unearned premium reserves being equal to written premium [½]
The premium will start earning from the beginning of year 3, until the expiry of the policy at the end of year 5 [½]
Note: award full marks if the candidate has assumed an earning of premium over 5 years for the screen damage part, subject to them making a suitable comment to that effect [½]
How the premium is earned over the three-year period will depend upon the pattern of claiming under an extended warranty [½]

as there is a possibility of more users claiming closer to the expiration date of the EWI policy [½]
Any other suitable comments [½]
[Marks available 3½, maximum 2]

(ii)
The screen damage claims are likely to be a higher in frequency [½]
and lower in severity [½]
compared against the manufacturing default claims, which will a low chance of occurrence [½]
and higher in severity [½]
Although the severity has been pre-specified in both the cases [½]
The above needs to be borne in mind when setting up the case reserves [½]
There is a high moral hazard risk for the screen damage claim, and sufficient IBNR should be maintained for it [½]
Since the damage that is payable in both cases is a fixed amount, there should be a limited/no IBNER [½]
The claims handling cost of a screen damage claim could be less than that of a manufacturing default as more time and effort is likely to be spent establishing the fault whereas a screen damage will be quite evident [½]
Depending upon whether product recall cover is included in the extended warranty [½]
there could be additional costs incurred for the latter, which is unlikely to be the case for the former [½]
the chances of a manufacturing default arising after 2 years of being under manufacturer's warranty are very low [½]
so only as much IBNR will need to be held against it [½]
Equally, however, if a manufacturing default is discovered, there is a potential for it to become a big event with multiple insured's claiming at the same time [½]
so some buffer needs to be kept for that in the reserves [½]
The screen damage claims are likely to be skewed more just before the policy ends, as insureds may want to get a wait until the end to get to use a new screen for as long as possible after the expiry of the warranty [½]
so an uneven earning pattern is likely to be applied for the screen-damage claims and reserves created and released accordingly [½]
This is unlikely to be the case for manufacturing default [½]
Reporting delay should be minimal for both screen damage and manufacturers' default, so IBNR will be less of a concern [½]
Stability of claim trends once it builds up. Screen damage as attritional would be stable as basis for experience based methods, while manufacturing default losses would be fewer and more volatile [½]
Whether the premiums for the two covers are combined or separate will also influence the reserving exercise, as the benchmarks and loss ratios will be affected accordingly [½]
Any other suitable comments [½]
[Marks available 11, maximum 4]

(iii)
Exposure based techniques such as
Expected Loss Ratio [½]
since it is a new portfolio [½]

will depend upon whether there is sufficient benchmarking information easily available [½]
Frequency Severity approach could be used [½]
subject to suitable data being available [½]
Holding additional 'bulk IBNR' for a major incident involving the device developing a manufacturing fault [½]
A BF method could be used [½]
once we have 1 or 2 years' worth of claims history [½]
Any other suitable comments [½]
[Marks available 4½, maximum 3]

(iv)
Marks awarded for both interpretations: customers being those of the mobile phone company or retail customers who purchase mobile phones

Loss Ratio likely to be less when offered for free as mobile owners may forget that they have the warranty [1]
However for the opt-in, it is likely that people want to extract the value for money, so likely to have more claims for screen damage. [1]
Shouldn't make a huge difference in the case of manufacturing default [1]
Also depends upon whether there is an intermediary who can help remind the owners of this additional offer they had. [1]
Any other relevant point [1]
In the case where the candidates have interpreted the customer to be the mobile phone company, then possible arguments could be:
Company Z has offered it free to the mobile phone company as a cross-sell opportunity, generating profits elsewhere [1]
If the mobile phone company doesn't have to pay for the cost of insurance, they can be very aggressive in highlighting the availability of insurance to the retail customers [1]
Which could mean a higher propensity to claim than it would ordinarily have been [1]
[Marks available 8, maximum 3]
[Total 12]

In part (i) most candidates recognised that there would be no exposures in the first two years. Particularly for part (ii), candidates who did not score well gave generic answers rather than being specific to the products asked for in the question. Part (iii) was reasonably well answered.

There was some confusion interpreting part (iv) as the word 'customer' could have been interpreted to mean the mobile phone company or the end-customer who purchased the phone. Markers were instructed to provide marks for either interpretation..

Q8
(i)
The implication for asset choice is that the characteristics of the assets should match those of the liabilities (claims and expenses) [½]
for example in relation to:
Term of the liabilities [½]

could be short or long tailed depending on the time between receipt of premiums and payment of claims [½]
Amount of the liabilities required to be paid in a given instance [½]
will be dependent on whether there is a need for access to a large amount of funds in short timescale (e.g. big lump sum vs smaller payments paid throughout the year) [½]
or a number of large individual claims [½]
Nature of the liabilities [½]
consideration of economic related issues and how they can impact claims payments [½]
fixed or real [½]
Currency of the liabilities. [½]
depend where business is written and where risks are located [½]
where the claims are paid [½]
How volatile the liabilities are [½]
Any other suitable comments [½ mark each, maximum 1]
. [Marks available 7½, maximum 4]

(ii)
Worldwide Property Catastrophe:
Generally reported quickly [½]
settlement can take long, e.g. clean-up costs etc can take long to be finalised [½]
quickly compared to liability claims [½]
Usually written as a reinsurance class [½]
which could lead to a longer tail than the direct insurer [½]
Claim payments will be in multiple currencies [½]
and the value of the loss is usually straightforward to establish [½]
Although there can be exceptions as there are delays in accessing sites [½]
Or other costs associated with demand surge [½]
Claims could be in multiple currencies as it is a worldwide cover [½]
Likely to experience a low frequency and high severity claims [½]
Possibility of accumulation exists [½]
Such a class would typically have a retrocession cover which could limit the maximum claim value [½]
Seasonality of claims [½]
Any other suitable comments [½ mark each, maximum 1]
[Marks available 8, maximum 2]

Domestic Mortgage Indemnity Guarantee:
Generally these risks tend to be short-tailed [½]
even if the policies concerned have relatively long terms [½]
The claims experience on mortgage indemnity guarantee insurance depends heavily on economic factors [½]
Severity could depend upon the ongoing house prices [½]
Accumulation of risks is a possibility [½]
There are likely to be settlement delay if the property has to be auctioned [½]
Any other suitable comments [½ mark each, maximum 1]
[Marks available 4, maximum 2]

Domestic Personal Accident:
Claims are usually reported quickly [½]

They may be settled quickly, although if a claim is for permanent total disability it may be necessary to wait some years for a claimant's condition to stabilise [½]
Claims can be large: cover of several hundred thousand pounds per person is not uncommon. [½]
As the claim cost is known for these claims the settlement delays are reduced. [½]
The incidence of an event is usually very clear (so reducing reporting delays), [½]
although with accidental death claims the insured's dependants may not always know the policy exists and may discover their entitlement after an extended period [½]
The claim frequency tends to be low. [½]
Can be offered as a Group cover which can potentially cause an accumulation of risk [½]
Any other suitable comments [½ mark each, maximum 1]
[Marks available 5, maximum 2]

(iii)
Given the exposure to large catastrophic events in particular will need to have significant liquidity [½]
Other liabilities are also predominantly short tailed so will need to have liquidity to pay the ongoing attritional claims [½]
Likely to be able to make some longer term illiquid investments given the MIG cover [½]
since the premiums are payable upfront for long term of exposures [½]
Depends upon how much reinsurance the company has and whether they can bank upon the reinsurers for it [½]
Also if it is a large insurance company writing a diversified portfolio of the given LoBs, there is likely to be a steady stream of premiums which can be tapped into when required [½]
Given the accumulation risk posed by worldwide property catastrophe and Mortgage Indemnity cover, the company should keep sufficient liquid assets [½]
Any other suitable comments [½ mark each, maximum 1]
[Marks available 4½, maximum 2]
[Total 12

Candidates generally scored well on this question with many obtaining full marks for parts (i) and (ii).

Part (i) was mainly knowledge based and most candidates scored well. Candidates were able to generate a wide range of points for part (ii) but some were confused with how Trade Credit insurance works in practice. Better prepared candidates were able to associate their points to each of the different lines of business quite well. Part (iii) was less answered in comparison to the first two parts.

Q9
(i)
By exploring combinations of randomly-generated values for the key parameters, we can explore scenarios that we might otherwise not have imagined to be important [½]
For example, two variables in the model may have a strong interaction that is not obvious [½]
and deterministic stresses might not have considered them both together [½]

Similarly, a stochastic model makes it easier to explore 'ripple effects', that is, the knock-on consequences of the crystallisation of a risk event. [½]
By estimating the full distribution of the aggregate result from the model, we can apply a number of different risk measures to the same set of final output [½]
This may be important in sharing results with stakeholders who have different risk appetites or concerns [½]
Even if we have calibrated individual stresses to represent a certain degree of extremity in their individual values, it can be very difficult to combine those stresses in a deterministic model [½]
whereas a stochastic model allows us to be sure that the final result represents a sufficiently extreme combination of circumstances [½]
A stochastic approach - in theory at least - explores all possible combinations and can rank these against the chosen risk measure [½]
We can derive a probability distribution from the outcomes of a stochastic model and calculate confidence levels, if required [½]
While the assumptions are subject to parameter error, the model is at least explicit about the assumptions being made [½]
This could be a (new) regulatory requirement [½]
The company might have started to write a new line of business which is better modelled stochastically, e.g. exposure to catastrophes [½]
The Board may be interested in understanding the ranges around the point estimate of the model [½]
New accounting standards might require a risk margin which might be best calculated on a stochastic basis [½]
Allows for a better understanding of the uncertainty, depending upon the lines of business the company might be writing [½]
Stochastic model will allow a better understanding/modelling of any guarantees embedded within the products/prices etc [½]
Might be the best practice in the industry company H operates in [½]
Could result in lower capital requirements [½]
Might be required for reinsurance pricing [½]
Any other suitable comments [½ each, maximum 1]
[Marks available 11, maximum 5]

(ii)
Underwriting risk is the risk of loss arising from the inherent uncertainties about the occurrence, amount and timing of insurance liabilities, expenses and premiums relating to risks yet to be written/earned [½]
the firm's business will have to be divided into classes/currencies/territories of sufficient granularity to model the underwriting risk [½]
ensuring that the data is representative of the historical performance [½]
model large/CAT claims separately from attritional claims [½]
so as to determine the reinsurance recoveries directly [½]
the dividing line between large and attritional claims could be the retention of the xol RI program that the company may have in place [½]
correlation among the different lines of business that Company H writes will have to be built into the model [½]
May also have to consider the future latent claims as a separate risk [½]
Large claims are generally modelled separately on a freq-sev basis. [½]
Poisson/NBinomial might be used for frequency [½]

Pareto could be used for Severity [½]
For classes with limited exposure to large losses, the loss ratio itself could be modelled [½]
Reinsurance recoveries from any QS/XoL programs will have to be modelled as well [½]
This might require modelling for the reinstatement and adjustment premiums as well [½]
Attritional claims are best modelled in aggregate [½]
A lognormal distribution could be used for this [½]
Reinsurance recoveries may not necessarily apply at this level, but if a proportional treaty is in place, the same will have to be factored in [½]
For both attritional and large, it is important to consider events not in the date (ENIDs) [½]
should model catastrophe-type claims separately [½]
further sub-division might be required for man-made versus natural catastrophe [½]
For catastrophe claims, company's own data is usually not sufficient given the low frequency of such claims [½]
A proprietary model may have to be used based on the company's exposure [½]
the model should consider the possibility of a CAT claim affecting multiple lines of business [½]
To factor in demand surge, climate cycle etc. [½]
Could also use scenario test approach to estimating the capital requirements for the underwriting risk [½]
Any future changes to the RI treaties will have to be considered [½]
Any variability in expenses will have to be considered [½]
Might be worth benchmarking the output from the different models, especially for the LoBs/loss sizes where there isn't much historical data available [½]
Any other relevant points [1]

[Marks available 14½, maximum 6]

(iii)(a)
It can be relatively more difficult to establish the actual exposure to calculate the underwriting risk for a marine cargo class, and will depend upon the following factors [½]
Whether the premium is paid before or after the shipment takes place [½]
Whether the premiums are paid on a regular instalment basis [½]
If it is an Open Cover and the premiums are received only at the very end, there will be a higher underwriting risk as the actual risk isn't know until after the shipment has been delivered [½]
Otherwise, some of the risks could possibly be foreseen and possibly be excluded/prevented [½]
For Cargo insurance, this can be further complicated as the premium may be received based on when the shipment took place and if the voyage takes longer than expected [½]
Any other suitable points [1]

[Marks available 4, maximum 2]

(b)
How are the premium adjustments calculated in relation to the base premiums being charged [½]
Marine Cargo line of business is more likely to be affected by such adjustments, especially under Marine Open Covers [½]
Must be able to differentiate the nature of the adjustment. e.g. late payment will have a different meaning compared to an endorsement [½]
There should also be sufficient capturing of the nature of endorsements, since some endorsements may not lead to an adjustment premiums, while others will not [½]

Since the company has been in operation for 3 years now, they should have some idea around the quantum and timing of adjustment premiums [½]
If they are writing very stable business, there might not be much of an impact of the adjustment premiums [½]
If the policy operates under any kind of NCD, then the discount will need to be applied to the premiums, and this should be clearly captured [½]
For treaty reinsurance business, the system should also record the amounts of reinstatement premiums which are also adjustments to the premiums [½]
Any other suitable comments [1]

[Marks available 5, maximum 3]

[Total 16]

Parts (i) and (ii) were generally answered well with the required detailed explanations provided by most candidates.

In part (iii) many candidates did not perform well. Being a higher order question candidates were expected to provide solutions discussing considerations specific to Marine Cargo insurance, where premium adjustments and the timing of premium can have a significant impact on the calculation of underwriting risk.

[Paper Total 100]

END OF EXAMINERS' REPORT

