

# **EXAMINERS' REPORT**

*November 2022 examinations*

## **Subject F103 — *General Insurance* Fellowship Principles**

### **INTRODUCTION**

The attached report has been prepared by the subject's Principle Examiner. General comments are provided on the performance of candidates on each question. The solutions provided are an indication of the points sought by the examiners, and should not be taken as model solutions.

## QUESTION 1

- i. a. The largest Sum Insured which can be retained by the insurer (from either category of risk) is \$4m.

The largest Sum Insured which will be accepted by the Surplus reinsurer is:

$$7 \times \$4\text{m} = \$28\text{m}$$

Hence the largest Sum Insured which can be written by the insurer (allowing for the 20% QS) is:

$$(\$4\text{m} + \$28\text{m})/0.8 = \$40\text{m}$$

- b. The maximum Quota Share recovery =  $0.2 \times \$40\text{m} = \$8\text{m}$
- c. A surplus recovery will be made on each claim paid on that policy.  
However, the claim may be negligibly small so the recovery could be any amount larger than (and possibly very close to) \$0.

- d. The smallest proportional retention takes place when the maximum number of surplus lines is used, i.e. when the Sum Insured is \$40m.

At that point the retention is:

$$= 0.8 \times 1/(1 + 7) = 0.1$$

- e. For  $S < \$5\text{m}$ , no surplus lines are used.

The number of lines used for a Sum Insured of  $S$  ( $> \$5\text{m}$  and  $\leq \$40\text{m}$ ) is (using linear interpolation between the minimum (0) and maximum (7) number of lines available):

$$(S - \$5\text{m})/(\$40\text{m} - \$5\text{m}) \times 7 = S/5\text{m} - 1 = 0.2 S \text{ (now in \$ millions)} - 1$$

- f. As the claims are always split in the proportions agreed up front, the proportional recoveries are not dependent on ( $>0$ ) claim size.

For any claim ( $>0$ ), the Surplus recovery will be equal to the retained amount when 1 line of cover is used, i.e. when the Sum Insured ( $S$ ) is such that:

$$(S - 5\text{m})/(40\text{m} - 5\text{m}) \times 7 = 1, \text{ i.e. } S = \$10\text{m}$$

Hence for any claim on a policy with a Sum Insured larger than \$10m the Surplus recovery would exceed the retained amount (as a greater proportion of surplus cover would be used).

- ii Factors contributing to suitability:

- The proportional covers will allow the insurer to spread risk and write more (and larger) business.
- The proportional covers improve the insurers solvency ratio and help the insurer to satisfy the statutory solvency requirement.
- The (simple) QS cover may be all that is required for the smaller (Category 1) risks.
  - QS is simpler and cheaper than surplus cover to operate.
  - E.g. There is no need to record separately for each risk the amount to be ceded.
  - These risks may not merit the additional cost for the more refined cover offered under the (more complex) surplus arrangement.

- The size of the quota share (20%) may be a little high, but may not be unreasonable for an established insurer.
- For the larger (Category 2) risks the surplus component provides additional cover.
  - The proportion of surplus cover increases as the size of the sum insured increases.
  - This is of particular relevance for commercial property insurance where the sizes of the risks can be quite varied and where it could be sensible to reinsure an increasing proportion as the sum insured increases.
  - This surplus cover is also relatively easy to implement as the proportion to be reinsured is clearly set out up front and so no further judgement is needed.
- However, the fact that Sum Insured is used rather than Expected Maximum Loss to determine the proportional split may not be ideal.
- The proportional covers may offer attractive reinsurance commission.
  - This would not likely be available with excess of loss cover.
  - This may benefit the insurer's cashflow and allow it to write more business.
- The complexity of additional excess of loss cover is avoided.
- Some level of excess of loss cover (possibly with a high excess point) may be appropriate, however, even for an established company.
  - This could help cover large aggregations or catastrophes.

*In part (i), (a)&(b) were correctly answered by the vast majority of candidates. Thereafter, answers were very poor. The remainder of part (i) asked for solutions to particular situations. Candidates often answered different questions to what was being asked. Some just wrote down answers with very little in the way of explanation. It was clear that most candidates do not have a sound understanding of reinsurance calculation, and struggle as soon as a non-standard scenario is presented. Some referred to "EML" which was not mentioned in the arrangement and some thought the number of lines of cover needed to be a whole number.*

*Part (ii) was reasonably answered by the better prepared candidates. Many, however, trotted out very generic answers. Many also stated that the surplus arrangement offered flexibility to the insurer, which it most certainly does not.*

## QUESTION 2

### i. Deterministic:

- As this is a recently established insurer, there may not be sufficient internal data to build stochastic models. As such, simplified deterministic models may be better more appropriate;
- A deterministic model may be faster to implement, quicker to run, and take less time to understand and validate the results from the model when compared to a stochastic model;
- It may be easier to build in complex features of the insurer such as complex reinsurance structures that may be in place;
- A deterministic model's results may be easier to explain and as a result quicker to embed into the decision making process of the insurer;

- A deterministic model can also be used for scenario and “what-if” testing and may be used in the interim until more sophisticated models can be developed to cater for more complex scenarios.

Stochastic:

- Data permitting, a stochastic model can test a wider range of scenarios than a deterministic model, including those that were not thought of in the deterministic scenarios;
- Probability distributions can be derived from outcomes of the stochastic model and a particular confidence level can be calibrated;
- Should different distributions be fitted to different lines of business or risk types, these may be easier to combine while maintaining the desired chosen confidence level.

ii. Uses of an economic capital model:

- Reinsurance – Reinsurance purchase decisions can be optimised by considering the capital requirement reduction gained from various reinsurance structures. For example, it can help inform retention levels and the need for catastrophe reinsurance.
- Investments – Scenario analysis looking at the effects of changing the investment mix can inform investment decisions. Additionally, the capital model can be modified to allow for explicit cashflows to assist in Asset Liability matching decisions.
- Pricing – The insurer can allocate capital to various segments and lines of business. The cost of capital for these segments can then be allowed for in the pricing of the insurance contracts.
- Reserving – Should reserves be required to be held at a higher confidence level than best estimate, the reserve risk component of the capital model can be leveraged to look at a range of outcomes and thus inform the confidence level to be held.
- Strategy – Senior management can use the results to help inform the best place for capital reinvestment in the company and look for potential diversification benefits in new strategies.
- Risk management – The capital modelling process can be used to identify key risks that the insurer faces and the model should be able to assess the impact of potential mitigation strategies.
- Monitoring of experience – claims, premiums and expenses can be assessed and compared with prior model outputs to see if assumptions have significantly changed.

*In part (i) some candidates did not read the question correctly and provided drawbacks/disadvantages for the two model types while the question asked for merits. Often insufficient detail was provided for an “outline”.*

*In part (ii) some candidates misinterpreted the question completely and gave reasons why an economic capital model is better than a regulatory model. Others gave items related to the*

*capital process (e.g. allocating capital) while the question asked for “other” uses. A common theme was that candidates did not have a good grasp on what a capital model is used for and how its assumption base is different to that of other models (e.g. pricing and reserving models). Those that scored well understood these differences and identified areas in the business where the economic model’s results could be used.*

### QUESTION 3

i. Risk factor :

- A factor that is expected, possibly with the support of statistical evidence, to have an influence on the intensity/amount of risk in an insurance cover.

Rating factor:

- A factor used to determine the premium rate for a policy.
- It must be measurable in an objective way and relate to the intensity of the risk.
- It must, therefore, be a risk factor or a proxy for a risk factor or risk factors.

ii. Rating factors:

- Level of education as an indication of technological proficiency. We would expect that the more educated an individual, especially in a computer-based qualification, the lower the likelihood of this individual being subject to phishing and malware scams. This may include any certification or courses done on internet security.
- Occupation as an indication on the amount of time likely spent online and likelihood of an individual being subject to online scams (e.g. phishing). There may also be certain types of jobs which are targeted more frequently than others.
- Self-estimation of number of hours spent online. There may be a correlation between the number of hours spent online and the likelihood of an individual being exposed to a scam. Alternatively, an individual that spends many hours online may be less likely to be exposed to a scam as they are more aware of the potential scams being used.
- Number and types of devices used. More devices may provide more opportunities for malware to be installed on an individual’s device. Different devices may have better general online security than others.
- Age. Older individuals who have less exposure to technology are likely to be more susceptible to online scams. Additionally, older individuals are more likely to have larger bank balances built up over time and so have higher severity.
- Average amount of money retained in a bank account within a given month which would impact the severity of any scam.
- Banking institution. Different banks will have different levels of protection. Larger more established banks may have better protection and thus reduce the likelihood of a scam. This includes the type of account the customer has with that institution
- The score from a questionnaire used to test knowledge of general scams. During the initial underwriting, a questionnaire may be used to gauge an individual’s

knowledge of potential scams. An individual that does well in the test is likely to be more aware of the scams and hence this may indicate a reduced likelihood of being subject to these scams.

- Self-reported history. The number of times an individual has been scammed in the past could be an indication of the likelihood of being scammed again in future.
- Firewalls or other protection methods used. Things like two-factor authentication, firewalls, password managers are going to decrease the likelihood of the scam
- Country of origin – Some countries may be at higher risk of being targeted by digital crime

iii. Considerations:

- Pricing – Does the additional information help to better price the underlying risk i.e. is the information of website usage a good indicator of risk.
- Quality of information collected – The level of data collected by the system. Is it as granular as seeing “clicking” information by user or high-level as just seeing timestamps of which websites have been visited. Potential sources of errors or distortions in the data need to be considered and thought of.
- Operational items: systems, models and expertise – Does the insurer have systems which can collect and store this data. Does the insurer have staff with the relevant expertise needed to set up a system to collect the data and the expertise needed to parse, interpret and model the data. If a new system is needed, can it easily be integrated with other systems.
- Cost – The potential cost of creating a system (IT infrastructure, hiring additional technical employees, sales staff etc.). Are these costs appropriately offset by the benefits.
- Regulation – What regulations are in place (in various jurisdictions) that may limit what type of data could be collected, how it may be collected and stored, or how it is used.
- Behaviour change: Moral hazard & Anti-selection – When taking up this option, policyholders may start to act less cautiously (moral hazard) while using the internet. If it is optional, then a chance for anti-selection may be present, as only those that are conscious about their web security may take up the option.
- Claim management: Can the data monitoring be used to make claims management more efficient and reduce fraud by verifying claims faster. If so this may increase customer satisfaction.
- Reserving: Could the data be used to better segment risk and better inform risk projections for reserving purposes.
- Market acceptability & reputational damage: Would policyholders and brokers accept this? What would the take up rate be? Certain markets or demographics may react adversely to the idea that their insurer can monitor their internet usage. Additionally, leaks of any of this data may have adverse reputational effects for the firm.
- Competition: What are competitors doing? If it’s a first in the market then it may be received as innovation and market leading or it may be too unusual for policyholders to buy.

*Part (i) was bookwork and was generally answered well.*

*In part (ii) some candidates struggled to generate sufficient points or to explain how the rating factor would be collected and appropriately used. Given the large range of points which could have been made, candidates should have scored well here. Those that didn't often repeated points or did not elaborate on how a factor could be used or collected.*

*In part (ii) many candidates performed well, being able to generate more than sufficient points, while others struggled to identify general and basic areas that should be considered.*

## **QUESTION 4**

i. Possible regulatory restrictions/requirements:

- Insurers could be required to be authorised to write certain types of insurance business.
- Requirement for directors to be suitably “fit and proper”.
- Regular reporting requirements and requirements around reporting (e.g. minimum disclosures).
- Regulations on premiums charged (including caps and the publishing of premiums).
- Regulations regarding benefit levels and policy conditions.
- Regulations on permissible underwriting.
- Restrictions on the distribution channels which may be used, including commissions which may be paid.
- Requirements for a certain minimum level of training/qualification for those selling the business.
- Restrictions on advertising.
- Restriction on the investments which may be held.
- Minimum capital requirements.
- Regulations on the valuation methods which may be used.
- Requirement to purchase reinsurance.
- Legislation to protect policyholders should the insurer fail.
- General TCF requirements and policyholder protection requirements, e.g. cooling-off periods.

ii. Advantages:

- Prescriptive standards should better protect policyholders than no such requirements would.
- It should improve consumer confidence in the sector.
- The government should be able to implement these standards quickly into the market as they are already developed.
- By using international standards, the insurers in the country will be more globally compliant which may allow them to expand into other countries.

- If implemented correctly, it should hopefully allow the regulator to identify companies that could potentially breach their solvency capital requirements ahead of becoming insolvent, allowing early corrective action to be taken.
- This could be used as an initial base for the regulator to start off with. They can then add on country specific regulation as the local insurance industry matures.
- More consistency between insurers improving market information. This will improve the ability of investors to better compare performance of insurers in the country

Disadvantages:

- The standards imposed may not be applicable to the Insureland market and not be easily adaptable to insurer-specific issues.
- Insurers will have to comply with the standards which will increase the barriers to entry of new participants.
- Growth in the industry may be discouraged, and innovation hampered, by the complexity and onerous nature of the regulations.
- Given that this is new for the country, there may not be local experts that can interpret and enforce the standards.
- Having to enforce the standards under the new regulations will increase governmental costs and industry costs which may be passed onto consumers.
- If the new regulations are not enforced, it may ultimately decrease consumer confidence as people begin to feel even more distrusting of insurers.

*Part (i) was generally well answered. Some candidates wrote more than the 8 points asked for, which is wasted effort as only the first 8 are marked.*

*Candidates struggled to generate sufficient points in part (ii) and often repeated similar ideas across multiple points. Candidates that scored well were able to generate a diverse and well explained set of points*

## QUESTION 5

i. Uncertainty: The inability to predict the future with confidence.

Risk: The adverse variations in financial results.

In particular, risk is the possibility of outcomes being worse than expected.

Greater uncertainty leads to greater risk.

ii. Operational risk:

- Operational risk is the risk associated with the management of the company.
- It is the risk of loss resulting from inadequate or failed internal processes,
  - people and systems
  - or from external events.



Examples of operational risk for CIC could include:

- Failure of CIC's admin systems or processes, which have not been in place for long.
  - The risk associated with the failure of the company's administration services. Influenced by whether admin is done in-house or outsourced.
- Non-compliance.
  - Non-adherence to legislation or CIC's internal policies. Adherence could also be complicated by requirements and legislation that may differ by territory.
- Fraud.
  - The intentional misappropriation of funds by CIC's employees, with the intention of personal benefit – the company may not have developed the skills yet to identify unethical staff in its recruitment process.
- Poor governance.
  - The risk associated with CIC's board or senior management in failing to effectively perform their duties – e.g. due to lack of experience.
- Strategic risk.
  - The inability to implement business plans, make decisions, allocate resources and adapt to the changing business environment. E.g. due to lack of experienced senior managers.
- Failure of technology.
  - Failure associated with the technological aspects of the business. Refers to both hardware or software failures – while the systems may be relatively new, it may take many years to tailor them to CIC's needs
- Pension scheme risk.
  - The risk that CIC is required to make good on any shortfall in its pension scheme liabilities.
- Major event risk..
  - Impact of significant events on CIC's operations e.g. financial system crisis .

iii. Examples include:

- Catastrophic events ultimately leading to uncertainty as to the price and terms of available reinsurance.
- The financial impact of catastrophes is worsened where there is accumulation of risk.
- A significant fall in the value of assets (e.g. due to market risk) increases the risk that subsequent poor claims experience may jeopardise solvency.
- Regulatory changes could affect business process/staffing or reinsurance availability.

*Overall, this question was generally well answered.*

*In part (i) and the first section of part (ii) most candidates failed to give a comprehensive enough answer to score full marks, and most failed to give relevant examples of operational risks in the second part of (ii).*

*Part (iii) was well answered.*

## QUESTION 6

- i. a. Aggregate deductible:  
The maximum amount that the insured can retain within their deductible when all losses are aggregated.
  - b. Non-ranking deductible:  
The non-ranking component of a deductible (applied to each individual loss) does not contribute to an insured's aggregate deductible.
  - c. Ranking deductible:  
The ranking component of a deductible does contribute towards an insured's aggregate deductible.
  - d. Trailing deductible:  
The amount that is retained by the insured for each individual loss once the aggregate deductible has been fully eroded.
  - e. Per occurrence limit:  
The maximum amount that the insurer can retain for each individual loss.
  - f. Annual aggregate limit:  
The maximum amount that the insurer can retain when all losses for an annual policy period are aggregated.
- ii. Approach:
    - Model motor and public liability accounts separately.
    - Group claims by property damage and bodily injury per cover.
    - Model the frequency and severity separately in order to apply any deductibles.
    - Use clients' data as a starting point.
      - Choose a suitable base period.
      - Use from the ground up data.
      - Adjust for IBNR and IBNER.
      - Adjust for claims inflation.
      - Adjust for change in exposure.
      - Adjust for large claims and catastrophes.
      - Adjust for trends in data.
      - Adjust for changes in underwriting and claims handling procedures.
      - Adjust for any changes in terms and conditions over period considered.
    - Compare outcome with any internal portfolio/external benchmark data.
      - Especially for large loss assumptions.
    - Consider credibility weighting with internal rates if needed.
    - Consider any relationship between claims received under motor and public liability covers to determine any correlation in experience.
    - Could use a deterministic modelling approach to determine parameter estimates for frequency and severity for each cover.

- Consider which distributions to use and how to calibrate the parameters using the data provided.
- Alternatively, one could model the outcome of the individual accounts using stochastic modelling approach.
- Carry out several thousand simulations and apply the product “rules” to the outcome.
  - Apply any deductibles and excess.
- For each simulation, one can apply different reinsurance arrangements to determine the cost of reinsurance for each scenario.
- The average outcome to the insurer in the simulations will give the expected loss cost to the insurer and reinsurer.
- This would also provide the range of possible claims experience scenarios which could assist in determining suitable reinsurance arrangements based on the prior claims experience.

iii. Factors:

- Size of the insurer.
- Insurers experience in the marketplace.
- Insurers available free assets.
- Size of the insurer’s portfolio.
- Insurer’s expertise in pricing the business.
- The range within which the business outcome (or profit) can be forecast with confidence.
- Cost of reinsurance.
- Credit rating of the reinsurer.
- Current market conditions.

*Parts (i) and (iii) were book work questions that most well-prepared candidates got full marks for.*

*In part (ii) many candidates did not follow the instruction to “outline briefly” and wasted time giving detailed descriptions of how to calculate risk premiums using a frequency-severity model, that gained no additional credit. Many candidates ignored the second part of this question regarding the other factors to consider when calculating the risk premium. Some candidates provided factors to consider for the office premium rather than the risk premium.*

## **QUESTION 7**

i. Professional indemnity, “E&O” and “D&O”:

- This insurance indemnifies the insured against legal liability for losses resulting from negligence in the provision of a service e.g. unsatisfactory medical treatment, incorrect actuarial or legal advice.

- The insured will be a professional person or a professional firm and cover may be a regulatory or professional requirement.
- “E&O” (errors and omissions”) cover is just another term for professional indemnity and the terms are used interchangeably.
- “D&O” (director’s and officers’ liability) is concerned with the performance and duties of management.
- D&O insurance indemnifies the insured against the legal liability to compensate third parties owing to any wrongful act of the insured in his or her capacity as a director or officer of a company.
- The insurance is personal to the director or officer, but is usually purchased for him/her by the company.

ii. Calculations:

Given the assumption that acquisition costs (as a proportion of written premium) remain constant,

$$\begin{aligned}
 X &= \text{UPR at 31.12.2021} \\
 &= \text{UPR (31.12.2020)/DAC (31.12.2020)} \times \text{DAC (31.12.2021)} \\
 &= \text{R}(100 / 8 \times 6) \text{ million} \\
 &= \text{R75 million}
 \end{aligned}$$

$$\begin{aligned}
 Y &= \text{P\&L account (31.12.2021)} \\
 &= \text{P\&L account (31.12.2020)} + \text{Retained profits (2021)} \\
 &= \text{R50 million} + \text{R}(175 - 149 - 12 - 2 + 3 - 4 - 2) \text{ million} \\
 &= \text{R 59 million}
 \end{aligned}$$

$$\begin{aligned}
 Z &= \text{Revaluation reserve (31.12.2021)} \\
 \text{Use: Change in Assets} &= \text{Change in Liabilities \& Shareholder Funds (SF)} \\
 \text{Change in Assets} &= \text{R235 (31.12.2021)} - \text{R250m (31.12.2020)} = -\text{R15m} \\
 \text{Change in Liabs \& SF} &= \text{R}(75 - 6 + 37 + 25 + 59 + Z)\text{m} \\
 &\quad - \text{R}(100 - 8 + 40 + 25 + 50 + 27)\text{m} \\
 &= \text{R}(190+Z)\text{m} - \text{R234m} = -\text{R44m} + Z
 \end{aligned}$$

Hence:  $-\text{R15m} = -\text{R44m} + Z$ , i.e.  $Z = \text{R29m}$

Alternatively :

Use:  $\text{Assets} = \text{Liabilities} + \text{Shareholder funds}$

Assume implied Share Premium = R16m for both years. This is not an unreasonable assumption as Share Capital remained the same.

Thus:

As at 31.12.2020, Assets (R250m) = Liabilities (R132) + SF (R118m)

As at 31.12.2021, Assets (R235m) = Liabilities (R106) + SF (R100m + Z)

Hence:  $Z = \text{R29m}$

iii. Calculations:

$$\begin{aligned}
 \text{Loss ratio} &= \text{claims incurred} / \text{premiums earned} \\
 &= \text{R149m} / \text{R175m} = 0.85
 \end{aligned}$$

$$\begin{aligned}\text{Written premium} &= \text{earned premium} - \text{UPR b/f} + \text{UPR c/f} \\ &= \text{R}(175 - 100 + 75) \text{ millions} = \text{R}150\text{m}\end{aligned}$$

$$\begin{aligned}\text{Expense ratio} &= \text{expenses paid} / \text{written premium} \\ &= \text{R}12\text{m} / \text{R}150\text{m} = 0.08 \text{ OR}\end{aligned}$$

$$\begin{aligned}\text{Expense ratio} &= (\text{expenses paid} + \text{change in DAC}) / \text{earned premium} \\ &= \text{R}14\text{m} / \text{R}175\text{m} = 0.08\end{aligned}$$

$$\begin{aligned}\text{Operating ratio} &= \text{loss ratio} + \text{expense ratio} \\ &= 0.85 + 0.08 = 0.93\end{aligned}$$

$$\begin{aligned}\text{Solvency ratio (SR)} &= \text{free reserves (31.12.2021)} / \text{written premiums (2021)} \\ \text{Free reserves (31.12.2021)} &= \text{Assets} - \text{Liabilities} = \text{R}235\text{m} - \text{R}(75 - 6 + 37)\text{m} = \text{R}129\text{m} \\ \text{Thus: SR} &= \text{R}129\text{m} / \text{R}150\text{m} = 0.86\end{aligned}$$

$$\begin{aligned}\text{Return on capital employed (ROCE)} &= \text{post-tax profit} / \text{free reserves (31.12.2020)} \\ \text{Free reserves (31.12.2020)} &= \text{Assets} - \text{Liabilities} = \text{R}250\text{m} - (100 - 8 + 40) = \text{R}118\text{m} \\ \text{Thus: ROCE} &= 11 / 118 = 0.093\end{aligned}$$

iv. Limitations:

- The competitor may have a different mix of business:
  - It may write other classes in addition to professional indemnity.
  - It may differ by target market (e.g. different types of professionals).
  - It may differ by size of business (and hence economies of scale) and different territories.
- The competitor could be using different distribution channels (impacting expenses and claims performance).
- The competitor may have a different reserving philosophy (e.g. more prudent)
- The competitor may value its assets differently.
- There could be differences in reinsurance arrangements (impacting net performance).
- There could be differences in investment strategy.
- The companies may differ in operational efficiency and expenses.
- One year is not sufficient to make a comparison of experience.

v. The suitability depends on a number of factors:

- Purpose of the investment – is it to support the liabilities or the free reserves;
- If used to support the liabilities, then this may not be suitable:
  - The investment matches the liabilities by nature (as claims will be real).
    - However, the index to which returns are linked is unlikely to be a good match (often CPI linkage).
  - The investment may be too long for the liabilities:
    - While some claims may take several years to settle, most should be settled after 3-5 years.

- The amount to be invested is R100m which exceeds the total outstanding claims reserve.
- If used to support the free assets, then this may be suitable.
  - The investment would however represent a large part of free reserves (R129m at the end of the year).
  - Suitability would depend on whether the asset may need to be sold before maturity (in which case the return earned may differ from the real yield at the time of purchase).
    - If unlikely to be sold, this asset may be acceptable for ensuring the free reserves maintain their real value with relatively little risk.
- Specific issues relating to the bond itself:
  - Credit quality – should be low risk if issued by the government, but this would depend on the specific government.
  - Liquidity – even if there is no intention to sell prior to maturity, this is an important factor due to the volatile nature of general insurance.
- Regulation and capital requirements:
  - There may be limits by asset class/holding which may be breached by this large investment.
  - Capital requirements may be impacted by this investment (e.g. due to credit risk and lack of diversification).
- Tax treatment of bond returns compared to other asset classes may make this investment less/more attractive.
- Existing portfolio and diversification issues:
  - This investment will probably reduce diversification in the portfolio.

*Overall performance was satisfactory.*

*In part (i) bookwork definitions were generally known, although several candidates were confused between the different liability types.*

*Parts (ii) and (iii) demonstrated that many candidates did not understand some of the basic fundamental accounting principles. A large number of candidates did not use the correct sign for DAC, many did not know that the revaluation reserve is a component of shareholder funds and many thought the P&L account on the balance sheet is equal to one year's retained profits.*

*In part (iii) many candidates matched expenses paid and premiums earned in deriving an expense ratio, not realising that these quantities are inconsistent – either expenses paid is matched to premiums paid, or expenses incurred is matched to premiums earned. Many thought share capital is the same as shareholder funds. Despite very lenient marking, performance on this part was generally poor.*

*Parts (iv) and (v) were generally well done.*

## QUESTION 8

- i. IBNR is a reserve to provide for claims in respect of claim events that have occurred before the accounting date but still to be reported to the insurer by that date.

In the case of a reinsurer, the reserve also needs to provide for claims that, although already known to the cedant, have not yet been reported to the reinsurer as being liable to involve the reinsurer.

Need for a separate IBNR:

- When outstanding claims reserves are calculated using case estimates.
- When outstanding claims reserves are calculated using statistical methods with a reporting year cohort for grouping claims.
- For separate statutory returns and tax accounts where separate statement of the IBNR is required.
- For internal management accounts where a detailed breakdown of technical liabilities may help management in their decision-making process.
- When calculating diagnostics that require a separate IBNR as part of the process of reviewing the claims reserves, e.g. IBNR/case estimates.

- ii. Advantages:

- The calculation is quick to perform.
- The approach is easy to understand and can be carried out by non-actuaries.
- The approach works when there is minimal claims history available which may invalidate the use of traditional actuarial reserving methodologies.
- The approach should ensure that the IBNR is stable relative to exposure.
- The approach removes the risk of the impact of anomalies in the claims data which could distort the IBNR. The calculation is based on the net earned premium and thus allows for reinsurance.
- The percentages are validated each year by the actuarial team.
- The percentages are calculated at an insurance class level which allows for the different reporting delays between insurance classes.
- The approach can be used when claims data is sparse and where the IBNR percentages have been calibrated on a similar insurance class.
- Net earned premiums should be readily available.
- The approach assumes that the IBNR is proportionate to earned premium, which seems reasonable as higher premium volumes should imply more claims and thus a higher IBNR.

Disadvantages:

- Any errors in the calculation of the net earned premium will affect the validity of the IBNR.
- The approach may be inaccurate when non-proportional reinsurance is used.

- The approach could understate the IBNR for long tailed business where premium volumes are reducing.
- The approach is crude and likely not as accurate as traditional actuarial reserving methodologies.
- In particular the approach will fail to capture any internal or external changes during the year which could materially impact the IBNR calculated during the year.
- Since the IBNR percentages are set at the end of the calendar year, they may not accurately allow for any seasonal variations in claims experience throughout the current year.
- As the IBNR is calculated as a percentage of earned premium any changes in profit loading, which may not imply a change in claims experience and hence IBNR, will impact the calculated IBNR.
- The approach doesn't allow for diversification between insurance classes and accident years.
- The approach may not be appropriate when there is unusual claims experience, in the current year, due to large or catastrophic claims which may not be adequately captured by the IBNR percentages.

iii. Surplus calculations:

| Insurance class | IBNR  | Claims reserves | Surplus (deficit) | % Booked claims reserves |
|-----------------|-------|-----------------|-------------------|--------------------------|
| Motor           | 62.5  | 97.5            | 12.50             | 12.8%                    |
| Liability       | 35    | 55.0            | -5.00             | -9.1%                    |
|                 | Total | 152.5           | 7.50              | 4.9%                     |

The claims reserve for the motor book exceeds the 75<sup>th</sup> percentile by R12.5m or 12.8% of the booked, which is in-line with the company's reserving policy.

The claims reserve for the liability book is R5m or 9.1% lower than the 75<sup>th</sup> percentile, which is not in-line with the company's reserving policy. This may imply that the reserving percentage needs to be updated. However, this depends on the impact of discounting on the level of claims reserves.

iv. Impact of discounting by class:

- Discounting the actuarial claims reserves will result in lower reserves, which will increase the level of surplus.
- The reduction in the claims reserve, and hence increase in surplus, will be greater for longer tailed classes where discounting has a higher impact.
- The increase in surplus will thus be greater for the liability class, which is longer-tailed than the motor class.
- The impact of discounting will depend on the discount rate selected.

*In part (i) almost all candidates accurately defined the IBNR, however many were unable to list reasons why the IBNR may need to be calculated separately despite this being a bookwork question.*



*In part (ii) performance was mixed on this application question. Candidates who scored well were able to generate a wide range of points, which considered the practical implications of the selected methodology.*

*In part (iii) most candidates scored well on the calculation part, though fewer provided valid comments. Some candidates did not demonstrate an understanding of the components of a claims reserve (i.e. IBNR plus outstanding reported reserves) and incorrectly applied the surplus formula given in the question.*

*Candidates generally performed poorly on part (iv). Several candidates said that discounting would reduce the surplus, however, discounting was only applied to the actuarial claims reserves whilst the booked claims reserves were undiscounted. Applying the logic that discounting reduces reserves to the surplus formula given, implies that the surplus will increase.*

## **END OF EXAMINERS' REPORT**