

EXAMINERS' REPORT

June 2026 examinations

Subject F102 — *Life Insurance* Fellowship Principles

INTRODUCTION

The attached report has been prepared by the subject's Principal 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. Risks could include:

Mortality risk

- A whole life policy guarantees payment on death, so more deaths than expected will pose a risk. The risk of not estimating mortality correctly has increased, since the insurer doesn't have experience with whole life policies.
- This is of particular concern here due to:
 - The new policies can have a much longer term.
 - The insurer does not have experience of the new target market and distribution channel.

Anti-selection

- The risk of anti-selection has increased due to selling through independent intermediaries.
- Intermediaries will act in the best interest of their clients and will encourage anti-selection if company's systems or processes have flaws.

Pricing guarantee risk

- Premiums are fixed for the lifetime of the policy. If future claim costs or expense inflation exceed assumptions, the level-premium will be insufficient to fund benefits, resulting in losses.
- This risk has increased due to the longer term of the cover and the uncertainty of assumptions for this new product.

Investment risk

- Liabilities endure potentially for decades. Poorer than expected investment returns or an asset-liability mismatch (e.g. investing in short-dated fixed interest for a long-dated book) will erode surplus and may render the product unprofitable.
- This risk has increased due to the higher reserves on whole life policies.
- There is a reinvestment risk if the insurer can't find matching assets to meet the longer-term whole life liabilities.

Expense risk

- There is a risk that ongoing administration and servicing costs exceed pricing assumptions. This risk has increased due to the longer term of the product.
- The whole life product may require new systems for fund accounting, policy tracking and statutory reporting, all of which carry implementation and maintenance costs – which may be difficult to estimate

- There is also a risk of underestimating the one-off setup costs (system development, staff training, reinsurance negotiations) required to launch a long-duration product.

Data risk

- There is a risk of getting the assumptions wrong since this is a new product, small company and new distribution channel.
- May need to use industry, population- or reinsurer's data to help with setting assumptions for the new product, but these may not be good measure of likely experience.

Business volumes

- Business volumes lower than anticipated is a risk and could lead to expenses not being recouped. This is an increased risk as the insurer is selling through a new distribution channel, and one which requires a competitive product.
- Volumes could also be lower than expected due to insurer pricing in higher margins due to the uncertain experience with the new type of product.

Withdrawal risk

- If more policyholders than expected withdraw in large numbers—particularly in the early years—the insurer may not recoup high initial acquisition and system-setup expenses, causing losses on those policies.
- Since surrender values are not normally offered on term assurance, there is an increased risk of withdrawals (at times when the surrender value exceeds the asset share) because surrender values are normally offered on whole life products.
- There is a higher risk of more withdrawals than expected if the new distribution channel is chasing sales to get commission and they could be selling a product that customers don't want or need.

Distribution / conduct risk

- Distribution costs, other than commission, would need to be covered by the pricing margin. There is the risk of these being higher than expected, for example through mix of business by distribution channel not being as expected.
- The new distributor may mis-sell or inadequately explain guarantees and exclusions, exposing the company to complaints, regulatory fines and reputational damage.

Operational & system risk

- Implementing new underwriting, administration and claims systems for a lifetime product can lead to delays, data errors or system outages.
- Such failures can result in incorrect reserve calculations, delayed benefit payments and increased manual intervention costs.

Reinsurance & counterparty risk

- The longer term increases the possibility that reinsurance rates differ significantly over time from what was included in the pricing which may leave the insurer with higher-than-expected liabilities.

Regulatory & capital risk

- Whole life policies attract materially higher risk-based capital requirements under solvency regimes.
- Any tightening of capital rules or consumer-protection regulations could further strain capital and restrict product features.
- The insurer might not hold sufficient free capital (especially seeing that it is a small company) to carry the resultant new business strain on whole life policies.
- As the proposed product will have a level premium, in early durations the premium will likely exceed expected claims costs by a healthy margin and the reverse at later durations.
- As a result, large reserves will build up during initial years increasing the risk of appropriately investing these reserves given its financial significance.

Strategic & concentration risk

- If a few bargaining power intermediaries account for the bulk of sales, the insurer becomes vulnerable to their loss or (concentration risk).

Policy options & guarantees risk

- If the product includes guaranteed surrender values or paid-up options, adverse changes in interest rates or longevity experience will make these options more valuable than priced for, leading to reserve shortfalls. These would not be available on term assurances.
- Guarantees also increase modelling complexity and require sophisticated stochastic valuation capabilities also increasing capital requirements.

Fraud risk

- The new independent intermediaries may engage in falsification of underwriting information, resulting in elevated claims losses.

Liquidity risk

- At times of elevated surrenders, the assets backing long-duration liabilities (e.g. private debt, property) may be illiquid, forcing sales at depressed prices and locking in investment losses.

ii. Possible impacts:

General

- The impact will depend on how committed the government is to its target – if its past commitment and success has been very limited, then the change may not be significant.
- The impact will also depend on plan timing – if the plan is a gradual one over many years, the immediate impact of the change is limited.

Expenses

- A lower inflation target should lead to lower future inflation and hence expected future expense inflation being lower than original expectations.
- This could lead to expected future expenses for ongoing administration and claims-handling being lower than had been priced for.
- This in turn would result in greater future profitability of the product.
- The insurer could decide to re-price to offer more competitive premiums.
 - However, it may prefer to wait for better experience to materialise before re-pricing.

Investments

- To achieve a lower inflation target, the central bank is likely to maintain tighter monetary policy by keeping short-term interest rates high.
 - An expectation of lower future inflation will lead to lower yields on medium- and longer-term fixed interest bonds.
- Market prices (and yields) will adjust quickly once investors change their expectations about the future inflation.
- Benefit liabilities are likely to be matched by fixed-interest stocks and pricing is likely to reflect expected returns on these assets.
 - Hence any significant changes to yields offered by fixed-interest stocks will lead to a change in profitability.
- The insurer may decide to re-price its premium rates in light of changes to the yield curve.
- The change in interest rates may affect the risk discount rate assumption.

Capital

- Lower expected future inflation, and lower expected variability of future inflation, should lead to lower capital requirements for the expense risk.
- The impact on investment risk (and hence capital requirements) may be higher or lower, depending on how this is calculated.
- As capital requirements are unlikely to change much, changes in cost of capital are likely to be too small to warrant re-pricing for this reason alone.

New business volumes

- Tighter monetary policy could lead to slower economic growth and lower consumers' disposable income.
- This may weaken demand for this, and other, life insurance products.
- It may also lead to higher withdrawals.
- Future volumes being lower than expected impacts the insurer's ability to cover its fixed costs and hence the profitability of the product.
- It will be difficult to estimate the impact on expected future volumes, and hence it is unlikely to lead to any immediate re-pricing of premium rates.
- The insurer should consider what competitors are doing to remain aligned to the market since the product has to remain competitive.

For part (i), most candidates didn't give enough detail to explain why each risk is an increased or a new risk. They would mention the standard risks without stating why the risks for the Whole life contract are different from those of the Term assurance contract. Many candidates gave more than 8 risks, which were not marked. Many candidates mislabelled risks. It is good practice to mention the most important risks first.

For part (ii), many candidates didn't state the basic conclusion that as expected inflation lowers, expenses may be lower in future, hence profitability may be higher, and the company could consider repricing. Some candidates stated that if inflation targets are lowered, interest rates will lower, without specifying that this would happen in the long run, which led to marks being lost for not showing good understanding that interest rates will rise in the short term. Many candidates went into too much detail about one part without considering the other part too (i.e. expenses impact vs investment impact or vice versa)

QUESTION 2

i. Conditions:

- The full unit fund benefits must be contingent on death or on survival for a minimum period of years.
- There needs to be sufficient regular fund management charges available.
 - The limiting condition is that, after actuarial funding, prudently projected future net cashflows to the insurer remain positive.
- There must be a unit-related surrender penalty imposed, such that the unit reserve is not lower than the surrender value payable.
- Actuarial funding must be allowed by the local regulator.

ii. Change in net cashflows

- When the single premium is allocated, there is an increased net cashflow to the non-unit fund because the cost of allocation has been reduced.

- Net cashflows to the non-unit fund during each of the subsequent years will be reduced because:
 - Credit has already been taken upfront for a portion of the management charge, and this portion will not be deducted again.
 - The fund management charge is based on a smaller unit reserve.
- On death, an additional cost equal to the fund value less the funded value of units will be incurred as an outflow from the non-unit fund.
 - The expected amount of this cost in any year will be equal to this difference multiplied by the appropriate mortality rate.
- On surrender, a reduced net cashflow from the unit fund to the non-unit fund will be made, equal to the excess of the funded value of the units over the surrender value payable at the time of the surrender.
 - The expected surrender profit per policy then in force will be determined by multiplying this by the appropriate surrender probability.

iii. Impact on the non-unit reserve:

- As a result of actuarial funding:
 - The future inflows into the non-unit fund are smaller compared to a scenario where there is no funding as outlined in (ii); and
 - The projected outgo will increase slightly due to the larger death strain.
- This leads to a non-unit reserve, which is calculated as the expected present value of future outflows less the expected present value of future inflows, that is less negative (or possibly positive).

iv. Impact of actuarial funding:

- The company is exposed to investment risk as the only charge on this product is a fund management charge, which is dependent on potentially volatile asset values.
 - In addition, policyholders choose the underlying investment portfolios, which means that the insurance company does not have control over the investment risk from these portfolios.
- With actuarial funding, the investment risk is removed on the proportion of charges that has been funded.
 - The initial cashflow is now in the form of cash, which matches the initial expenses in terms of timing and nature.
 - Taking advance credit for some of the future fund management charges via actuarial funding, also does not introduce investment risk to the company because future management charges will, by design, be sufficient to ensure that the unit fund is adequate for expected benefit payments (e.g. on maturity).
- The company remains exposed to the investment risk on the fund management charge that is not actuarially funded
 - The source of income does not match on-going company expenses, such as salaries, which is not linked to investment returns.
- To the extent that non-unit reserves are positive, the company will decide how to invest the assets backing these reserves and therefore are able to manage the investment risk.

It was clear that many candidates do not understand actuarial funding.

Parts (i) and (ii) were bookwork questions and well-prepared candidates did well in these parts. Many candidates incorrectly suggested that the asset management charge needs to be increased before actuarial funding is possible. The only requirement is that there is a “sufficient” regular asset management charge, part of which is required to recover initial expenses. This was the case here, as the product was priced with an asset management charge only. Some candidates suggested that capital and accumulation units are required, which is not the case.

In part (ii) a common error was not describing the change in the cashflows (compared to the current practice) when actuarial funding is implemented. Many candidates just described actuarial funding in general terms.

Answers to part (iii) were surprisingly poor, with many candidates commenting on the cashflows at the start of the policy only, and forgetting that a unit reserve is calculated by considering the expected present value of future cashflows (as is covered in the course notes).

Candidates were either not able to answer part (iv) or did not provide enough detail for a question where the instruction was “Discuss”.

QUESTION 3

i. Customer needs met:

- It may be used to meet known likely obligations at some future date e.g.
 - Provide a lump sum to pay for a child’s tertiary education (if the benefit is payable on the child surviving).
 - Provide a lump sum benefit at retirement (its suitability may depend on adequate death benefits also being in place for dependents).
 - Provide a lump sum that may be needed to finance the future purchase of a new home or vehicle.
 - Provide a lump sum to pay off an interest-only mortgage.
- It provides access to investment expertise that should provide a real return on savings.
- It provides a savings vehicle in which to make regular savings.
- It may offer a tax advantageous form of investment.

ii. Factors influencing suitable asset classes:

- Liability characteristics in terms of nature, term and currency, as matching assets should share similar characteristics, for example:
 - Basic sum assured and declared reversionary bonuses are fixed in local monetary terms and are best matched by suitable term fixed interest stocks.
 - Future bonuses are discretionary and influenced by policyholder reasonable expectations.

- Investment freedom in this case is enhanced by an ability to delay most surplus distribution to maturity – this decreases the level of guaranteed benefits offered by the insurer which decreases the need for fixed-interest bonds.
- Life office expenses are real in nature and in local currency.
- Typical policy term-to-maturity may influence asset class choice due to the expected return-volatility relationship varying by term.
 - E.g. shares may be considered volatile over a 5-year term, but much less so over a 10-yr term.
- Policyholder expectations for both the level and stability of bonuses:
 - There is very likely to be an expectation for real returns, requiring holding assets that are expected to produce this.
 - A greater tolerance for volatility of terminal bonuses should lead to a greater holding of volatile growth assets (e.g. equity) which should yield higher expected returns while a low tolerance for volatility will require lower-volatility real assets, such as high-quality diversified equity and perhaps index-linked bonds.
- Competitor bonuses for comparable products will likely influence asset choice as the insurer will aim to declare comparable or higher bonuses.
- Availability and liquidity of asset classes and assets – as this is a developing country, this could be an issue for some assets if this is a large insurer.
- The need for working capital and meeting short-term obligations requires holding short-duration liquid assets for these such as money market instruments.
- Regulations may influence investment strategy (e.g. by limiting the proportion of funds in an asset class) and hence choice of suitable matching assets.
- Taxation of returns may influence the choice of suitable matching assets as the insurer is aiming to maximise after-tax returns.

iii. Possible implications:

- The significance of the changes will depend on how investment returns compare to 2% p.a. – in a high inflation and high nominal return scenario (possible in a developing country) the impact may not be significant.
- The insurer needs to decide how its bonus philosophy and investment strategy needs to change – no change may be needed if reversionary bonus levels exceed, and are expected to continue to exceed, 2% p.a.
- However, if reversionary bonuses are generally lower than 2% p.a. there will be an impact.
- The need to declare regular reversionary bonuses of at least 2% p.a. may require an adjustment to investment strategy to produce sufficient returns to support the annual cost of bonus with high probability:
 - It may require a mix of assets producing a more stable return than currently.
- Higher levels of vested reversionary bonuses may require that these increased guaranteed liabilities be matched by fixed interest bonds:
 - As the holding of fixed interest bonds is increased for higher level of guarantees, overall expected returns will be lower for policyholders.

- There may be increased demand for fixed-interest rate bonds, and the extent to which prices may be affected depends on the size of the bond market relative to the demand by insurers.
 - There may not be sufficient stock of matching assets for all insurers in a developing country.
- Shareholders may require higher capital charges for the higher guarantees – these may be deducted from investment returns, which further reduces expected returns for policyholders.
- The changes need to be communicated to existing and new policyholders, which may lead to:
 - Higher costs for the insurer.
 - Lower or higher conventional with-profits new business, depending on what prospective policyholders value more.

Overall this question was reasonably well answered. A general comment is that in several instances statements were made by candidates that were incomprehensible due to extremely poor spelling and/or grammar, and these candidates might have fared better had they read (and corrected) their answers before submitting them.

Part (i) was straightforward, and most candidates did well. Some answers were limited to only listing possible uses of a cash lump sum and credit was limited.

Part (ii) was done well by those that answered the question asked, however a large number of candidates interpreted this question to be about an explanation of what assets are required to match the liabilities. Many candidates wrote about free assets and mismatching considerations which were not asked for, and many answers were too vague or imprecise e.g. referring to “guaranteed benefits” and implying that these can only be fixed in nature, or “reversionary bonuses” without specifying past/declared or future bonuses, and “bonds” without specifying their type (fixed interest/index-linked). Several provided factors without any explanation as instructed.

Part (iii) was reasonably well done by several candidates however many candidates did not consider the two possible scenarios that can arise or simply assumed one implicitly. A few candidates thought that the insurer can bypass the regulations by only declaring terminal bonuses, not realising that 0% p.a. is less than the required minimum of 2% p.a. Some thought that if reversionary bonuses are currently higher than the minimum, then the sensible thing is to reduce future bonuses to the minimum, ignoring policyholder expectations and competitors. Many candidates thought that any associated reduction in terminal bonuses would be counter to policyholder reasonable expectations (PRE) and reputational damage would ensue, ignoring the fact that PRE must adjust to reflect the regulations (otherwise they would not be reasonable). Several candidates made the point that the insurer would now have to consider equity between generations of policyholders, however this is something that would have been done before the change in any event.

QUESTION 4

i. Possible reasons to change:

- One of the aims of an insurance company is to make profits. This option makes it easier for clients to add additional cover, without incurring any additional underwriting costs or taking out a second policy, thus increasing premiums and expected profits.
- Adding a new feature could make the product more marketable and help the company to increase market share.
- The feature may be particularly attractive to younger lives who may face changing needs for insurance e.g. on birth of a child/marriage.
 - However, such individuals may not be able to afford to buy high levels of cover they don't need yet.
- The company could have identified a gap in the market, and this feature could meet a customer need – to add cover to a policy if risk protection needs of a policyholder increase.
- Competitive pressures might have also forced the company to add a new innovative feature to its existing product.
- This may enhance the company's standing with brokers and policyholders, thus helping them sell more business.

ii. Mortality cost and assumptions required:

- The mortality cost of the option is the value of the excess risk premium that should, in light of full underwriting information, have been charged for the additional cover (the "correct" risk premium) over the standard risk premium rate that is charged under the option (the "actual" risk premium).
- The average mortality of those who take up the option would be expected to be heavier than the select mortality at that age.
- Mortality options are normally valued using cashflow projections.
- The cost would be the discounted value of the difference between the projected "correct" and "actual" premiums.
- Required assumptions are:
 - Take-up rate
 - Timing of take-up (during the 5-year period)
 - Subsequent lapse rates of those taking up the option
 - Amount of additional cover purchased (within restriction)
 - Mortality rates of those taking up the option (for the "correct" premium)
 - Mortality rates for standard lives (for the "actual" premium)
- The company could consider a range of scenarios to determine a distribution of the cost.

iii. Managing the anti-selection risk:

- The risk faced is that policyholders in worse than average health would be incentivised to increase their cover the most.

Limiting the additional sum assured to not be greater than the original sum assured

- This provides a cap on the amount a policyholder can purchase.
- This cap would help managing the overall exposure to a single policyholder (e.g. someone in very poor health).

Only allowing cover to be purchased within five years

- The policyholders would have been underwritten at outset.
- The longer the company gives policyholders to access the option, the more scope there would be for anti-selection.
- Limiting the term to five years, is therefore a useful way to prevent policyholders whose health deteriorates over a longer period from selecting against the company.

Only allowing the option to be exercised once

- Caps the extent of underwriting-free cover (if they can exercise multiple times, it effectively circumvents the sum assured limit).
- Once exercised (e.g. on birth of child), there is no further anti-selection risk from subsequent deterioration in health.

iv. Economic uncertainty impacts:

Mortality

- The company would need to determine how economic cycles are correlated to the mortality of the underlying class of lives.
- If the economy is performing poorly, this could result in increased fraudulent claims (which could result in a potential worse mortality experience if this is not identified).
- There could also be other impacts on mortality such as increased suicide rates.
- How the economy impacts on access to healthcare, could also impact on the mortality experience of the underlying population.

Surrenders and lapses

- If there is economic turmoil, there might also be increased lapses if policyholders battle with affordability.
- This would be dependent on the financial sophistication of the underlying lives.

Expenses and expense inflation

- The impact would be on how the uncertainty impacts expense inflation rates. It could be higher or lower (likely higher due to increased uncertainty and cost of doing business assuming interest rates increase).

- The company might also have increased overheads per policy (if there are more lapses).
- Overall, the company is likely to expect a higher cost base for its business.

Discount rates

- This is likely to increase to reflect the increase in the interest rate.

Cost of capital

- Greater economic uncertainty could lead to higher capital requirements for the insurer.
- This is likely to increase the cost of capital item in pricing.

Part (i) was reasonably well handled. A number of candidates referred to lapse and re-entry risk, but it is unlikely to be in the best interests of policyholders seeking additional cover to lapse their existing whole life policy.

Part (ii) was reasonably well answered by most candidates.

For part (iii) some candidates did not read the question carefully enough and so suggested additional restrictions irrelevant to the question. Many did not identify the fact that the option could only be exercised once as a restriction.

For part (iv) the depth and quality of attempts varied widely. A number of candidates missed that the focus of the question was on pricing (i.e. for new business).

QUESTION 5

i. a. Definition of incapacity:

- Consider any regulations or other guidance on the setting of claims definitions.
- The definition of incapacity determines the circumstances under which a claim is valid.
- The definition should be fair to policyholders in terms of meeting genuine needs, while remaining affordable to the insurer.
- Consider whether to use an occupational definition or one based on something else, such as ability to perform certain tasks.
 - E.g. own occupation (cannot perform current specific job), own or other occupation for which policyholder is trained, any occupation, inability to carry out a certain number of activities of daily living (ADLs), etc.
- A narrow definition (e.g. own occupation) would lead to higher claims frequencies and durations.
- A broader definition (e.g., any occupation) would result in reduced claims costs.
- The definition will need to be clear to avoid disputes and additional costs.

- “Own” or “any” occupation may be clear, but “other occupations for which the insured is suitably qualified” or “ADLs” may be less clear.
- Consider market practice for the chosen target market.
- The extent to which any reduced rehabilitation benefit would be payable on a partial return to work may be relevant.
- The insurer will need to bear in mind that it must be able to appropriately assess claims relative to the selected definition.

b. Replacement ratio:

- The replacement ratio is usually defined as the ratio of post-claim income to pre-claim income, net of income tax. (typically excluding any “waiver” benefit which might pay retirement fund contributions for example).
- The definition used needs to be easy to assess.
- A high replacement ratio may reduce motivation to recover or return to work, increasing claim duration and cost (moral hazard).
- A low ratio may result in underinsurance and failing to meet policyholder needs.
- Consider the tax treatment of benefits and income.
- Consider inflation protection to maintain real value over time.
- Consider the integration with other benefits, such as state or employer-provided income support during periods of incapacity.

ii. Individual IP underwriting:

- There is a significant risk of anti-selection, with individuals in substandard health being more likely to seek cover.
- Often requires full medical underwriting in each applicant, including health questionnaires, medical exams, and possibly financial documentation.
- Financial underwriting may become complex, especially for self-employed individuals or those with variable income (e.g., freelancers or doctors).

Group IP underwriting differs as follows:

- To a large extent, risk is assessed at a group level, based on factors such as industry or claims history (where available).
- By pooling many lives, the insurer can assume a degree of homogeneity and reduce the impact of individual risk variation.
- Compulsory membership ensures inclusion of both good and bad risks, mitigating anti-selection through cross subsidies.
- A minimum number of members is often required to ensure statistical credibility, reduce anti-selection and justify simplified underwriting.
- An actively at work clause will ensure that only currently healthy employees are covered without further underwriting. It is a cost-effective proxy for health status.
- Group schemes typically define benefits as a percentage of salary using a prescribed formula, preventing over- or under-insurance.

- Free cover limits allow cover without medical underwriting, with individuals seeking higher cover being underwritten., to streamline onboarding and cut costs.
- Financial underwriting is simplified as members are usually salaried employees with verifiable income (typically excluding variable amounts like commission).
- Reduced underwriting for groups should result in reduced administrative burden and cost.

iii. Advantages:

- The investment risk (related to unit price) is largely borne by the policyholder, reducing the insurer's risk exposure compared to without-profits IP products.
 - The insurer will still carry an investment risk, however, as the only charge on the policy is a fund-related management charge.
- The benefit guarantee becomes less onerous as the unit fund grows, which should result in reduced capital requirements.
- With fewer guarantees and reduced margins, the insurer will be able to price the product more competitively than without-profits.
- The potential for income growth may make the product attractive to the market, increasing sales.
- The presence of surrender and maturity values adds value even if no claim is made, improving marketability.
- The dual-purpose nature of the product (protection and investment) could attract a broader customer base (including those who might not otherwise consider IP insurance).

Disadvantages:

- There will be an increased moral hazard risk from policyholders who find it more attractive to receive IP benefits rather than working, if unit values grow significantly (outstripping salary growth).
 - This would be exacerbated if the replacement ratio is not suitably restricted.
- IP should ideally provide stable, predictable income during incapacity. Linking benefits to volatile investment performance may undermine this core purpose.
 - This may lead to dissatisfaction or reputational damage for the insurer if risks are not well understood by policyholders.
- The product (combining protection and savings) may be difficult for many consumers (and distribution channel) to understand, impacting sales.
- It will also require a higher premium for the same level of IP benefit required due to additional benefits which could impact affordability and hence sales.
- The presence of a surrender value increases the risk of withdrawals compared to without-profits contracts, where surrender values are not generally available.
 - Selective withdrawals, with respect to morbidity, would be an increased concern whereby policyholders who feel the IP benefit is less valuable for them exit early, leaving a riskier pool behind.
 - The extent of the risk will depend on the relationship between morbidity and mortality, as it relates to claim inception rates and claim durations.

- It could be expensive to make system changes, train staff on the product, etc., as the insurer has not written unit-linked IP before.
- There is a mismatch between charges and expenses, with delayed expense recoupment dependent on unit growth.
 - This exposes the insurer to losses on early surrender.

Part (i) was reasonably answered by the better prepared candidates. Some, however, simply outlined the various possible definitions of claim as opposed to the “considerations” which should be taken into account in determining the definition. Some weaker candidates failed to “outline briefly”, simply providing a cryptic list and therefore didn’t answer the question.

Part (ii) was reasonably well answered, with most candidates understanding the principles. However, some did not fully answer the question, which asked “how and why” there would be differences in the underwriting.

Part (iii) was generally very poorly answered. The scenario related to the proposal of launching a unit-linked income protection (IP) product (with a particular design) by an insurer that writes without-profits IP business. The advantages and disadvantages needed to focus on this scenario. Comments comparing the proposed product against other unit-linked designs (e.g. to one without a payment guarantee) thus gained no credit.

The IP guarantee offered under the proposed design is less onerous than the guarantee under a without-profits design). The surrender benefit (even with a surrender penalty) exposes the insurer to the risk of withdrawals (unlike on a without-profits policy where surrender, death or maturity benefits would not be offered – which several candidates failed to recognise). Answers were often very generic and included unsubstantiated statements such as unit-linked products being less capital intensive. Generic statements such as this, or those relating to the potential benefit of increased sales received no credit.

Some candidates demonstrated a poor grasp of language, making their answers impossible to understand in places. Likewise, spelling mistakes which were prolific in some scripts, often made answers undecipherable. Many candidates used undefined acronyms, e.g. U.W, PRE, ADL, FAT, FCL, etc. All acronyms need to be defined when first used.

QUESTION 6

i. Elements to allow for in model:

- The nature of cashflows, premiums, commission, expenses and benefits, and fees and charges, and tax, and their timing i.e. as and when the cashflows arise.
- The time horizon or term of the products to project the cashflows.
- It will need model points resembling the portfolio of expected business to be written.
- Any cashflows arising from supervisory requirements to hold reserves and maintain solvency.
- Allowance for reinsurance cash flows if applicable.

- Allowance for unit and non-unit modelling.
- Assumptions for:
 - Investment returns and discount rates.
 - Demographics such as mortality and lapses / surrenders / paid-ups.
 - Expenses and commission.
- The assumptions may be fixed or vary over the term.
- Interactions between the assumptions (e.g. interest and expense inflation).
- Any options or guarantees (e.g. minimum death benefits).
- Calculation of a profit criterion or criteria.
- Pragmatism: speed versus accuracy, complexity versus expense of calculation.

ii. How to estimate assumptions using past experience:

Decrements: Mortality and lapses/withdrawals

- The assumption should reflect expected future experience.
- If the company's own data is sufficient and relevant, it could use it and make adjustments to reflect expected future trends.
- If it is not suitable, look at assumptions used for other lines of business and make suitable adjustments.
- Take account of any changes since previous campaigns in terms of:
 - target market;
 - distribution channel;
 - underwriting basis;
 - mortality improvements;
 - special product features; and
 - economic changes.

Expenses

- Expense assumptions should be based on recent experience, with adjustments for known distortions over this period.
- Assumptions should be split by function and by whether the expenses are fixed or variable.
- Allow for any increase in expenses from the period of investigation to the present.

Commission

- This should be allowed for as paid.

Inflation

- Consider recent experience and compare with CPI and salary inflation, ensuring consistency with interest rate assumptions.
 - Past experience could provide guidance on a suitable adjustment to implied future CPI inflation obtained from nominal and real bond yields.

iii. Factors to consider when determining charges:

- Consider the types of charging structures the admin system can handle.
- Types of charges needed for matching the timing and size of the expenses:
 - Charges related to commission should be a percentage of premium or in allocation rate and bid/offer spread.
 - There could be a fixed up-front charge on single premiums to cover development costs.
 - There could be a regular policy fee increasing with inflation to cover renewal expenses.
 - There should be fund related charges to cover investment fees.
- The benefits of matching charges and expenses:
 - Immediate recovery of initial expenses reduces new business cashflow strain.
 - Matching the timing and nature of charges and expenses can reduce sensitivity to changes in experience, and it may therefore reduce capital requirements.
 - Matching also reduces exposure to the risk of early withdrawals.
- Consider whether charges should be guaranteed:
 - Charges that are not guaranteed means lower reserves, however, clients may find guaranteed charges more attractive although they will come at a cost.
- Customer needs:
 - The charging structure needs to be competitive/attractive to new customers – up front charges may be less attractive.
 - Depending on the sophistication of the target market, a simple charging structure may be preferable.
 - The company may not wish to have a charging structure that is too different from those of competitors.
- Cross-subsidy:
 - It may be important to be able to match charges and expenses exactly where possible to avoid cross-subsidy.
 - Consider the extent to which cross-subsidise between large and small products may be appropriate.
- Consider any regulatory restrictions on level and type of charges

Candidates performed unevenly, scoring on some parts while falling down on others.

A common failing was treating application questions as bookwork. In part (ii) many did not restrict their answers to where the company's own past experience was relevant, for example drawing on industry or reinsurance data, or trying to set the investment return assumption from past experience when it is better set from the expected future returns on the chosen assets.

Some candidates showed a weak grasp of the mechanics and drivers of unit-linked products. Others proposed stochastic modelling of mortality even though nothing in the product required it. Marks were also lost to repetition, either the same point such as "add a margin for prudence" made for every assumption, or the question simply restated, "use past experience to set the assumption", without further substance.

Stronger candidates stood out by tailoring their assumptions to the new market segment, allowing for differences in target market, distribution channel and underwriting.

QUESTION 7

i. Risk margin using a ‘cost of capital’ approach:

- This involves first projecting forward the future capital that the company is required to hold in respect of these risks, where this is determined at the end of each projection period (e.g. year) during the run-off of the business.
- The projected capital is determined according to the relevant regulatory basis, and is the amount required to be held in excess of the projected liabilities at each period.
- These projected capital amounts are then multiplied by a cost of capital rate.
 - This rate can be considered to represent the cost of raising incremental capital in excess of the risk-free rate,
 - or alternatively it represents the frictional cost to the company of locking in this capital to earn a risk-free rate rather than being able to invest it freely for higher reward.
 - The cost of capital rate may for example be determined as the excess of the weighted average cost of capital over the risk-free rate, and
 - hence may be term dependent.
 - Alternatively, it may be specified by the regulator as a fixed rate (e.g. 6% per annum).
- The product of the cost of capital rate and the capital requirement at each future projection point is then discounted, using risk-free discount rates, to give the overall risk margin:

$$\text{Risk margin} = \sum_t \frac{k_t \times C_t}{(1+r_t)^t}$$

Where:

- where k_t is the cost of capital “charge” for time t ,
- C_t is the required capital at time t , and
- r_t is the risk-free interest rate for maturity t .
- In this instance the projection of required capital is complicated because the calculation of required capital itself requires projections, stochastic modelling and/or application of correlation matrices (i.e. circularity in the approach).
- In such situations, a simplified approach could be used if permitted by the regulator:
 - This might involve selecting a driver (e.g. reserves or sum at risk) which has an approximately linear relationship with the required capital or its components.
 - The initial capital requirement can be expressed as a percentage of that driver, and the projected capital is then approximated as the same percentage of the projected values of the driver.

ii. Risk factors giving rise to an SCR:

- Interest rates – nominal
- Expenses
- Operational
- Interest rates – real (e.g. for inflation-linked annuities) [alternatively: inflation]
- Spread and default (if holding non-government bonds) [alternatively: credit]
- Equity or property (if held)
- Currency (if holding foreign assets)
- Concentration
- Illiquidity premium (if used in reserves)

iii. Effect of change of basis:

- The basis change would be to reduce the base rates and/or increase future mortality improvements.
- With higher expected future longevity, the reserves would increase as annuities and expenses are expected to be paid out for longer.
- The SCR should increase due to the higher reserves and longer time period leading to greater uncertainty.
- The risk margin should increase because of the higher SCR.

Overall, this was very poorly done despite being a relatively simple question.

Most candidates did not know the answer to part (i) despite this being bookwork.

Answers to part (ii) were fair although many did not apply to the given situation, for example referring to lapses which are not possible with immediate annuities.

Part (iii) was answered reasonably well overall although the reasoning was not always correct.

QUESTION 8

Suitability:

Affordability:

- The company should check that the alteration is supportable by the asset share to avoid making a loss.
 - The policy value calculated before the alteration should not exceed the asset share, less the costs of the alteration, on average (over all policies and over time).

Fairness between shareholders and policyholders and reasonable amount of profit:

- The difference between the asset share and the policy value before alteration (calculated on the original premium basis) represents the accumulated value of historic margins.

- This could be a reasonable amount of profit to extract for shareholders.
- It seems reasonable compared to the profit generated on policies that are not altered.
- Use of the revised premium basis to determine the policy value after the alteration means that:
 - The company should extract profit over the remaining term consistent with what is expected for current new business.
 - This may be reasonable, but the profit margin may be inconsistent with (more than or less than) the profit the company intended to make from the original policy at inception.
- The calculation of present value of policy after alteration should not include an allowance for initial expenses.
 - However, an allowance will be required if additional commission is payable due to the increase in sum assured.
- Similarly, alteration expenses should be deducted from the policy value before alteration (or added to the policy value after alteration).

Anti-selection risk:

- It is likely that policyholders in poor health, in particular, would like to increase sum assured.
- To deal with this anti-selection risk, the company could:
 - Require a declaration of continuing good health for small increases in the sum assured;
 - Restrict conditions on which this alteration can be performed
 - E. link it to life event such as birth of child; or
 - Underwrite alterations for significant increases in the sum assured and modify terms offered if necessary.

Policyholder reasonable expectations (PRE):

- Because the current pricing basis is used, the terms offered may not be consistent with the terms at policy inception.
- If pricing is now relatively more expensive, it may cause these terms to appear overly expensive.
- If pricing is now cheaper, it may cause the policyholder to query if they were originally treated fairly.
- There may be possible reputational repercussions or complaints to the ombudsman.
- The company will have to consider alteration terms used by competitors.

Consistency:

- Using the current pricing basis means that terms are consistent with the boundary condition of buying a new policy for the additional sum assured.
- Depending on the surrender value, if any, on the existing policy, the use of the current pricing basis for the policy value after alteration should avoid the lapse-and-re-entry risk.

Stability (including over time and duration):

- A small increase in the sum assured should not lead to a large increase in the premium charged.

- The use of different bases before and after alteration may cause the result to be unstable.
 - For example, a very large increase in premium for a small sum assured increase.

Note to marker:
Credit can be given only once in the answer for this example.
- The alteration basis will change each time the pricing basis is updated, creating inconsistency over time.

Ease of administration, calculation and documentation:

- The company will have to keep a record of the original premium basis in order to calculate the policy value before alteration, which could be administratively cumbersome and difficult to document over time.

Ease of explanation:

- Could be difficult to explain to policyholders, who are unlikely to be familiar with present value calculations.

Regulatory and professional compliance:

- The method should be allowed by regulation and professional guidance.

The better prepared candidates performed reasonably on this question. Those who performed well were able to apply the principles to the given scenario and argue why the principle would hold or be hard to execute in practice.

Many candidates understood the behavioural risks of anti-selection and lapse and re-entry and how these could be mitigated. General points regarding ease of explanation, administration and adherence to regulatory guidance were generally well explained.

However, many candidates struggled with explaining affordability as well as fairness between policyholders and shareholders.

END OF EXAMINERS' REPORT