EXAMINERS' REPORT

May 2020 examinations

Subject F102 — *Life 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. Matching investments:

- Fixed interest stocks are the most suitable matching assets for the benefits:
  - The returns are fixed in monetary terms and this matches the level benefit payments.
  - The payments are in local currency and hence fixed interest stocks should be local.
  - Expected benefit payments and asset returns should be matched by the term and amount, however this might be difficult in practice:
    - Exact cashflow matching can be difficult and costly to achieve (even when death rates are predictable) and hence matching by average duration can be adopted to achieve approximate matching.
    - The insurer faces reinvestment risk on coupons received during the deferred period (unless zero-coupon bonds are available to match annuity cashflows).
    - The liabilities are likely to be very long term and it is unlikely that stocks of sufficiently long term exist (especially as this is a developing country), creating further reinvestment risk.
- Government-issued stocks are preferable in reducing risk, however high-quality corporate fixed interest stocks may be appropriate for enhancing returns if the insurer is willing to accept default risk.
  - If the insurer will not need to realise the assets prior to maturity illiquidity risk will not be a concern.
- As this is a developing country, there may not be a sufficient supply of marketable fixed interest stocks (and of sufficient term) to achieve a matched position, in which case the insurer will need to:
  - Consider the next best (low risk) strategy e.g. purchase foreign fixed interest stocks with a currency hedge if available, however, this is unlikely to provide a suitable matching asset.
  - Consider investing in a variable-rate instrument while utilising a swap to receive a fixed rate in exchange for floating, however, this is unlikely to be available for long investment terms and counterparty risk may be high.
  - Should (or may be required to) hold a mismatch reserve.
- For matching the expenses of the life office, the most suitable assets are those that can provide a real return:
  - Index-linked securities (if available) and equities (or a combination of these) may provide returns that are approximately matched to the expense liability.
- Some cash would be held as working capital and for meeting short term obligations.

ii. Costing the option:

- The main elements of the cost comprise mortality, expenses, investment returns and take up rates.
- The insurer could use simulation methods that incorporate the above elements to compare the conversion rate (R10) to actual annuity rates based on expected

interest rates at the time of exercise and actual mortality of those choosing to exercise the option.

- Simulations could include deterministic mortality assumptions.
- Expenses and interest rates could be stochastic variables.
- Expected cost is based on a sum of the discounted values of probability-weighted excess annuity rates (of conversion rate less market rate) × annuity income sacrificed.

Take up rates:

- This depends on how generous the R10 conversion rate is relative to current annuity rates.
- If overly generous then all annuitants will likely choose to take up the option with the insurer.

Mortality:

- The cost to the insurer is based on the value of the difference between the conversion rate and the annuity rate implied by actual mortality rates of those exercising the option.
- There will be a cost to the insurer if the health of annuitants exercising the option is poorer (lower expected longevity) than the average health assumed/implied in the conversion rate.
- The link between take up rates and the mortality assumption for those taking up the option must be estimated since there is an anti-selective effect of those with higher mortality taking up the option.
- The higher the take-up rate, the smaller the anti-selection effect.

Expenses:

- Additional expenses of administering the option must be estimated.
- Future expense inflation could be linked to simulated interest rates used in determining the cost of the investment element of the option.

Bond yields:

- The insurer will probably have used fixed-interest bonds to match regular annuity payments. There is a cost to the insurer if it is forced to sell these bonds earlier than expected on unfavourable terms.
- The cost to the insurer is based on the difference between the conversion rate and the annuity rate implied by bond yields at the date of exercise.
  - The probability and extent to which bond yields rise above those implied by the conversion rate at exercise can be assessed by stochastic modelling of interest rates.
- Alternatively the expected cost can be assessed from market prices of derivatives:
  - Put options on bond prices;
  - Call options on interest rates;

- Swaptions (option to swap paying a fixed rate for receipt of a floating rate);
- However, it is very unlikely that sufficiently long-dated derivatives will be available.

Part (i) was reasonably well answered, however, it was disappointing to see the number of candidates that did not read the question properly and wrote about free assets, risk tolerance and other factors allowing a deviation from a matched position. Some even suggested using index-linked bonds, equity and property to match the guaranteed level annuity payments, and in some cases, index-linked annuities.

Part (ii) was answered less well. Few candidates demonstrated a proper appreciation of the risks faced by the insurer and how to cost for the guarantee. Most answers were far too superficial, and when some detail was provided it usually revealed a lack of understanding. Many provided a generic answer about a stochastic process to produce a distribution of cost, without defining precisely what "cost" represented in this case, and therefore got little credit. Those that mentioned using market prices of options mostly did not specify, or correctly specify, the underlying assets/market variables that the options would be based on.

QUESTION 2

i. Reasons for monitoring experience:

- Develop earned asset shares
- Update assumptions as to future experience
- Monitor any adverse trends in experience so as to take corrective actions
- Provide management information

ii. Conducting an expense analysis:

- The expense analysis can be conducted by classifying expenses into the following categories:
  - Initial expenses, incurred at the inception of a policy;
  - Renewal expenses, which relate to the ongoing nature of the policy throughout its term;
  - Termination expenses, which arise at the end of a policy; and
  - Investment expenses, which relate to the management of Forsure's assets.
- Investment expenses will be allowed for by means of a reduction in the yield on the assets, and thus do not constitute part of the per policy expense.
- Commission is determined by means of a known formula and will be excluded from the expense experience analysis.
- Each expense should be considered in terms of whether it directly relates to a specific product type, such as assurances, or whether it spans across all product ranges.
- In order to allocate expenses across products, they can be considered in terms of whether they relate to:
  - The number of policies written or in-force over a period;

  - The amount of premium written or in force over a period; or
  - The amount of benefit written or in force over the period.
- The main items of expense for Forsure will be:
  - Salaries and salary-related expenses;
  - Property Costs, and
  - Costs related to the administration systems and administration of policies.
- Salary costs for the Longevitown office can be allocated entirely to the annuity business.
- Salaries for the groupwide functions should be deducted from the total Mortalitown office salary bill, and the remainder can be allocated entirely to the assurance business.
- The executive salaries can be split according to the total premiums in force for each product type and allocated accordingly.
- For groupwide functions, the salaries can be split according to time spent on each product type, according to time-sheets, and allocated accordingly.
- The entire property cost for the Longevitown office should be allocated to the annuity business.
- For the Mortalitown office, the property expenses should be split according to the floor space used by the assurance business or the group-wide functions.
- The property costs attributable to the assurance business should be allocated to the assurance product.
- For the group-wide functions, property costs can be allocated according to the premium income attributable to each product type, or in accordance with the cumulative time spent working by the staff within the function on each of the products.
- An exception within the group wide function is the marketing function, where costs should be apportioned across products in terms of the number of new policies sold during the period of the analysis.
- The cost of the joint administration should be split according to costs associated with new business and costs associated with in force business.
- If there is no clear delineation between new and in force administration expenses, then the total expenses associated with the administration system can be split according to the benefit amount for new and in force policies, and proportional to the premium income for each product type.
- The cost of each claims administration system can be wholly allocated to the product to which it applies.
- However, an adjustment needs to be made for the costs associated with the implementation of the annuity payments system – which need to be amortised over the expected lifetime of the system.
- The per policy costs for each product are determined as the sum of:
  - Initial expenses divided by the amount of new business;
  - Renewal expenses divided by the amount of existing business;
  - Termination expenses divided by the number of terminations; and
  - Appropriate allowance for overheads.
- In order to analyse the company-wide per policy cost, the per policy cost for each product type can be weighted according to the percentage of policies in force for each product type.

Part (i) was bookwork and was well answered, with most candidates getting full marks.

Part (ii) was reasonably well answered. However, candidates lost marks by only providing general theory and not applying the details of an expense analysis to the specific circumstances of Foresure as set out in the question.

QUESTION 3

i. Needs met by a critical illness product:

- Income can be provided from the lump sum via an annuity when the individual cannot work as a result of his critical illness.
- The benefit can be designed to repay a mortgage or other loan when the policyholder's health is in question following diagnosis of a critical illness.
- Medical costs can be funded when the critical illness requires surgery or other expensive treatment.
- A change of lifestyle can be funded where necessary to improve the claimant's health; for example, moving to a less stressful (and lower-paid) job following a heart attack.
- The benefit could be used to improve the quality of life following diagnosis of a critical illness, e.g. paying for a holiday for the insured and his family.
- The benefit can be used against future un-insurability after a critical illness event.
- Other needs suggested include recuperation after illness, taxation planning, medical aids (for example, the installation of specialist equipment in the home to enable the claimant to remain in his/her house).

ii. Why needs may not be met:

- It may not meet all ill-health needs because it is not comprehensive in the diseases covered.
- Because critical illness is a complicated product with complex definitions, the policyholder may not be able to claim as expected. For example, their doctor may say they have had a heart attack, but they may not meet the definition set by the insurer.
- Because the lump sum is predefined, the policyholder may discover that they are over or under insured when the event happens.
- The lump sum paid may be less, or more, than the value of the loan or mortgage.
- The medical costs may already be covered by medical insurance – leading to a windfall gain.
- The lump sum may have no link to the income lost, and in fact there may be no lost income as a result of the critical illness event.
- The policyholder may not easily be able to convert the lump sum into a suitable income.
- There may be exclusions on the policy.
- The policyholder may not have understood the contract.

iii. Setting risk rates for the tiered product:

- The actuary has experience data from the existing product. That is always the best place to start with the pricing.
- The actuary will have to derive the incidence rates for the less severe forms of the disease.
- The actuary will also need to consider the progression between severities and the impact this has on the timing of claims.
- It is possible that the company's existing claims data will have information of the timing of when a person goes through each severity of disease.
- It will be necessary to speak to medical experts to get assistance on these new incidence rates.
- The actuary needs to understand how the underwriting process will change, and how this will impact the pricing.
  - For example, if it is easy to pick up serious critical illness risks at underwriting stage, but not as easy to pick up risk of less severe events, there is more chance of anti-selection.
- The actuary needs to consider the impact of the new product on claims. There will be more claims, and it will often be less clear-cut when a claim is valid, so the actuary should allow a margin for this uncertainty.
- The actuary should consider seeking reinsurance support. Given the product has been sold in the market for a number of years, there should be reinsurance capacity and expertise.

iv. Reinsurance for the standard product:

- The insurer is large and established.
- It has been selling the existing product for many years.
- Thus:
  - There is little need for reinsurance on the existing product.
  - There may be a low level quota share, to provide ongoing technical support.
  - There may be surplus cover to protect against the largest claims.
  - Reinsurance for very large sums assured may be arranged on a facultative basis.

Reinsurance for the tiered product:

- The insurer could use a reinsurer's technical assistance
  - e.g. with design, pricing, underwriting, reserving and claims management.
- The insurer will also want to reduce claims volatility and protect against parameter risk.
- Thus:
  - Significant quota share is likely.
  - With additional surplus cover to protect against large claims.

Parts (i) and (ii) were reasonably well answered by many candidates. Some candidates, however, did not always provide the level of detail required.

Part (iii) was answered very poorly. Many candidates did not make enough points, and when they did they were generic points, or points that do not apply to risk rates. It is very concerning that candidates at this level do not seem to know the difference between "risk rates" and "office premiums". Most candidates wrote up to hundreds of words on items that have nothing to do with risk rates, e.g. expenses, profitability, target market, competitors' rates, etc., demonstrating very little in the way of higher order thinking.

Part (iv) was poorly answered. Most candidates did not even look at existing structures and how these could change. Many candidates did not even follow the basic instruction to "Discuss how….may differ", and failed to consider the strategy for both products. It was also disturbing to see that many candidates do not even know that increasing retentions means that the insurer will take on more risk, not less. Many candidates failed to even get the basic concept that the new product, with increased uncertainty, would need increased reinsurance compared to the current position for the large established insurer.

QUESTION 4

i. Reasons for deferring surplus distribution:

- Improve solvency position:
  - Deferring the distribution of profit improves the solvency position of the fund because once a regular bonus is declared, it increases the guarantees provided by the company.
  - Profit deferral therefore provides a cushion against which movements in volatile asset values can be absorbed without threatening the solvency of the insurer.
  - It will also provide a cushion to absorb worse than anticipated experience, for example worse than anticipated claims experience.
- Business objectives:
  - Deferring profit distribution leads to relatively higher free assets.
    - This provides the insurer with the investment freedom to invest in riskier asset classes, such as equities, to achieve higher investment returns.
    - Such higher returns can be passed on to policyholders by declaring attractive rates of bonus.
  - May have an impact on the insurer's competitive position. And may, in turn, attract more new business.
- As a source of funding:
  - Deferral of surplus distribution can also act as a source of funding for the insurer, by essentially borrowing from the policyholder, which can enable the insurer to:
    - Write more new business than would otherwise be possible.
    - This is because the insurer will have more free assets to absorb the new business strain.
    - Finance other business expenses such as new product development costs etc.

- Meeting policyholders' expectations:
  - The policyholders may have wanted the insurer to smooth investment returns (that is why they bought this product).
  - This can only be achieved by deferring profit distribution in years when investment returns are very good and distributing more than earned during the years when returns are poor.

ii. Factors determining the bonus rates:

- Financial soundness of the fund:
  - The actual investment returns generated by the with-profits fund.
    - This is because the company will not wish to distribute more than it is earning on average.
  - The company will also consider the bonus earning capacity of the fund.
    - The regular bonus would be less than the total long term capacity of the fund.
  - Given the poor (below inflation) recent investment returns, bonus rates will need to be low to allow for this.
  - The bonus declared cannot be less than the guaranteed rate, which may be greater than 0%.

- Investment strategy:
  - A large proportion of the assets of the fund is invested in equity (local and foreign), which means the expected investment returns are expected to be higher in the long term, but will come with much higher volatility.
    - It is likely that a large proportion from this source of investment return will be distributed via a terminal bonus rather than the regular bonus.
  - The income yield from cash investments and the local and foreign bonds, is likely to be relatively stable.
    - This source of investment return is suited for distribution through the regular bonus.
  - If the fund actively trades in the bonds, then there may be capital gains and losses over time.
    - It is likely that a large proportion from this source of investment return is will not be distributed via a regular bonus.
  - If the fund has a significant exposure to foreign assets this introduces some additional currency risk.
    - However, it may also result in some diversification benefits and as a result more stable returns, which may allow a relatively higher regular bonus rate.

- Ability to deal with adverse experience:
  - The greater the fund's free assets, the less need it will have to boost those assets by holding back surplus.
  - The poor historic returns could mean that the free asset level may be relatively low, suggesting that a lower regular bonus rate may be needed

- Bonus philosophy:
  - The life company will have developed a particular approach to distributing surplus under its with-profits policies and will not want to depart from this without good reason.
  - In particular, the policy on the split between the regular bonus rate and terminal bonus on smoothing over time will need to be considered.
  - The recent returns have been poor and the company will need to consider the fairness of the bonus declaration across tranches of business.

- Policyholders' reasonable expectations:
  - These will have arisen from literature provided by the life company, both at the point of sale and subsequently, past practice and the levels generally available in the market.
  - Ideally the company would not want to change the regular bonus rate too frequently

- Competition:
  - The company will not wish to declare a bonus rate too far out of line with those of competitors.
  - If there is a significant difference, the company may experience lapses or poor new business sales.

Candidates that were well prepared did well on part (i) which was a bookwork question. Some candidates did not follow the instruction to outline four reasons, and just listed considerations.

Part (ii) required a discussion of the likely impact of the strategic asset allocation on the bonus rate declaration decision. Some candidates suggested changes to the strategic asset allocation and therefore did not answer the question asked.

QUESTION 5

i. Market consistent valuation of whole life assurance liabilities for the published accounts:

- Project the net liability cashflows for the portfolio.
- Cashflows should include all projected premiums, commissions, expenses and benefit payments (net of reinsurance).
- Take the expected mortality rates and lapse rates into account, based on the policyholder profile on a best estimate basis.
- A risk margin would be included in respect of these assumptions, due to the inherent uncertainty.
- By either including a margin in each assumption or using an overall reserving margin using a "cost of capital approach".
- Period of projection will be to the terminal age (e.g. 100 for the whole life policy).
- These cashflows would then be discounted at the current risk-free rate of return to find their market consistent value.

- The risk-free rate of return associated with each cashflow is taken as the current market redemption yield on a government-backed zero-coupon bond of the same term as the cashflow.
- Where the government bonds are not available at the exact term to maturity of the liability cashflows, a yield curve will need to be constructed using the market yields available for similar bonds traded at those terms to maturity.
- For any liabilities that may grow with inflation (e.g. expenses) a market consistent inflation assumption will need to be determined
  - as the difference between the nominal and real bond yields for various points on the yield curve.
  - Given that it is a developing economy, the inflation risk premium contained in the real bond yields may be significant and an adjustment may need to be made to the inflation assumption derived as described above.
- Alternatively create a replicating portfolio of assets made up of zero-coupon government bonds that would produce the same cashflows as the liabilities.
- The market value of this replicating portfolio is then the market-consistent valuation of the liabilities.
- Given that it is a developing economy, the market value of the replicating portfolio may have to be adjusted for any short-term anomalies in market values of assets.
- Given that we are dealing with a developing economy that may not have a large and liquid market…
- …credit may also be taken for any illiquidity premiums in the underlying government bonds, where it is certain that the assets will be held to maturity, if permitted by financial reporting standards.

ii. Impact on profitability:

- A net premium basis:
  - Makes implicit allowance for profit.
  - Allows profit to emerge in a more stable fashion.
  - Profits emerge in line with long term profit margins.
- A realistic gross premium valuation basis:
  - Immediately capitalises the difference between the pricing and valuation basis.
  - Will be a more dynamic basis, reviewed more frequently and aligned to changes in the mortality and expense experience, as well as the economic conditions.
- As the net premium basis is more prudent, a change to a realistic gross premium method will result in an immediate once-off release of reserves into profit.
- The longer term impact is that the change will likely introduce higher volatility into the emergence of profit.

iii. Potential areas of concern for the shareholders:

- Shareholders are concerned with dividend rates and share price levels.
- The once-off increase in profitability due to change in valuation basis may result in a higher declaration of dividends in the year the change in basis is implemented, and lower profits and lower dividends thereafter:

    - Some shareholders may not prefer a high immediate dividend (e.g. for tax reasons).
- Since dividends declared should not jeopardise the solvency position of the insurer the dividends declared are likely to be based on a more prudent basis than the realistic basis.
- Shareholders may be concerned that the change will cause future dividend volatility.
    - And in turn the price of the company's listed shares.
- The change in valuation approach may also lead the regulator to stipulate higher solvency requirements for this class of business.
    - This, for the same level of profitability, will reduce their return on investment in the company. However given that this is still a small portion of the company's total liability, the regulator and shareholders may be less concerned.

This should not have been a difficult question, but many candidates' answers demonstrated a lack of understanding of the underlying theory.

In part (i) the better prepared candidates performed well. Most candidates, however, did not provide the level of detail required to score well.

Part (ii) was poorly answered. A number of candidates focused on comparing the calculations used for a net and gross premium rather than focusing on the impact the change will have on profitability. A mistake made by a number of candidates was to assume that the same premium would be used for a net premium and gross premium valuation and incorrectly concluded that the change would result in a loss.

Part (iii) was generally well answered.

QUESTION 6

i. Assumptions for reinstatement:

Future mortality:

- Realistic mortality assumptions can be derived from the current internal experience.
- Ultimate mortality will be used for the increase in benefit if no additional underwriting is carried out on reinstatement (which is only probable if the increase in Sum Assured is not large).
- There is potential for anti-selection with those in worse health electing to increase the sum assured.
    - This will likely require a higher mortality assumption when calculating the prospective reserve for altered policies.

- The extent of the adjustment will be indicated by any historical mortality experience investigations comparing the mortality of policyholders that reinstate to premium paying status, with those that remain paid-up.

Discount rate:

- It is likely that the assumption will be the same because the investment strategy is likely to be the same (or similar).
  - There, however, may be some additional reinvestment risk post alteration because of the need to invest future premiums.
- If a market-related approach is used, then market related rates at the time of the alteration will be referenced to determine the discount rate.
- Alternatively, the future expected returns on the intended underlying asset mix can be used.

Withdrawal rates:

- This assumption can be derived from a recent investigation.
- The basis before alteration is likely to include a relatively low withdrawal rate assumption (assuming a surrender value is available), because no future premium is payable removing a main reason for withdrawing.
- The withdrawal rate, post alteration, could be higher than the pre-alteration assumption because the premium that is now payable could trigger affordability issues.
- Due to a lack of data, it will be difficult to calculate the differences in withdrawal assumptions

Renewal expenses, (potential) underwriting costs, claim expenses & alteration expenses:

- The expenses on a realistic basis can be determined from the expense analysis used to determine the expense basis for the current reserve calculation.
- The renewal expenses included in the prospective reserve for altered policies may be increased for the cost of collecting premiums again.
- There could be differences in claims expenses for the altered policies depending on whether the expense is dependent on the size of sum assured or a fixed amount.
  - For example, there may be an additional claim assessment cost for relatively large sums assured.

Expense inflation:

- The inflation assumption should be consistent with:
  - the discount rate assumption; and
  - the difference between the returns on index-linked bonds and fixed interest bonds.
- Increases in expenses are dependent on the company's overall expense experience, and will therefore not be different before and after reinstatement

ii. Comments:

- The company should check that the alteration is supportable by the asset share at the alteration date in order to avoid making a loss.
- The difference between the asset share and the policy value before reinstatement (calculated on a realistic basis) represents the present value, both historic and future, of the expected profit on the original policy.
  - This assumes that the company did not extract profit from the asset share when the policy was made paid-up.
- Using realistic assumptions to determine the policy value after the reinstatement is generous to the policyholders because the company is not including any margins for future deviations from expected experience in the calculation of the premium.
  - This may be appropriate, because the company:
    - calculated the paid-up value based on realistic assumptions and therefore potentially extracted both past and future profits at the time (based on the original sum assured); and
    - the company equates the policy value (after reinstatement) to a policy value (before reinstatement) based on realistic assumptions, which is consistent.
- This approach is inconsistent with the pricing of new policies.
  - The policyholder has the option of buying a new policy with a sum assured equal to the difference between the original and paid-up values.
  - This alteration is likely to result in a premium that is smaller compared to this boundary condition, because the basis for new policies will include some margins and an allowance for initial expenses.
- The company should consider the risk of anti-selection by policyholders. For example, if no additional underwriting is required, policyholders taking up this option may select against the company.
  - To deal with this anti-selection risk, the company could, for example require a declaration of continuing good health
- Depending on how the surrender value is calculated, the premium, using the alteration basis, is likely to be less than the premium the policyholder would pay if he/she surrenders the paid-up policy.
- Using the same basis for the present values before and after the alteration will make the method stable, i.e. a small increase in sum assured, will result in a small increase in premium.
- Using the same methodology for all alterations creates consistency between different types of alterations.
  - For example, if the period between making the policy paid up and reinstating (full) cover is short, we can expect the premium for the reinstated cover to be close to the original premium.
- The company will have to consider alteration terms used by competitors, which may affect policyholders' reasonable expectations.
- The alteration basis is based on realistic assumptions, which could potentially change relatively often, and this could lead to inconsistent alteration values over time.
- The alteration basis:
  - Could change frequently together with economic circumstances, which could complicate administration.

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

- It is appropriate that the cost of alteration is allowed for in the calculations
- This should be permitted by regulation/professional guidance.

Part (i) was a standard question and most candidates obtained high marks on this part. The most common error was to not read the question carefully: some candidates spent considerable time on discussing margins (when the question clearly stated that a realistic basis is used). Some candidates spent too much time on a single assumption and should have been guided by the mark allocation as to the level of detail required.

Candidates typically find questions on alterations challenging and this was the case again in part (ii). Very few candidates could use the general conditions to critically evaluate the proposal. Some candidates wasted time by discussing the paid-up sum assured (or even surrender values) when the question clearly asked for comments on the reinstatement.

QUESTION 7

Suitability of the additional benefits:

Meeting customers' needs:

- Adding additional benefits increases the flexibility of the product and allows the product to cater for a wider range of customer needs.
- The partial withdrawal benefit gives the policyholder liquidity to pay for unforeseen expenses.
- The change in premium benefit allows the policyholder to reduce the premium and keep the policy in force in the event that affordability becomes an issue.
- Premiums could be increased to facilitate saving for the education of an additional child or for other purposes.
- The waiver of premium benefit allows the policyholder to continue to provide for tertiary education of dependants in the event of the unforeseen circumstances of permanent disability or redundancy.
- However, partial withdrawals, a reduction in premium and higher charges for the waiver of premium benefit will result in lower accumulated funds which may be insufficient to cover the costs of tertiary education resulting in the policy failing to meet the need for which it was originally purchased.

Marketability and competitiveness:

- Since the optional additional benefits are likely to cater for wider needs of the target market the introduction of these benefits should increase the marketability of the product.

- The optional nature of these benefits accommodates both customers who value the additional benefits and are prepared to pay for them as well as customers who are reluctant to pay additional fees and charges.
- Charges for the additional benefits need to be set at an affordable level, so as not to damage the marketability and competitiveness of the product.
- The change in product design increases the complexity of the product.
  - In particular, the terms and conditions relating to the redundancy benefit are likely to be complex.
  - Customers and sales-persons need to fully understand the additional benefits.
  - The marketability of these additional benefits will depend on training of sales-persons, on how well the benefits are explained to customers and ease of understanding of disclosures of terms and conditions relating to these benefits.
- The introduction of these benefits also allows the insurer to differentiate itself from the competition. This may:
  - Lead to an increase in new business sales.
  - Better persistency experience.
  - Enable the insurer to have a higher profit margin on this product.
- These advantages may be short lived if competitors follow the insurer in offering these benefits.

Profitability:

- The charges for the additional benefits should cover the costs of the benefits and expenses (in most foreseeable circumstances) and cover the targeted profit margin of the insurer.
- The insurer will need to ensure that appropriate assumptions that allow for the risk and possible future changes in experience are used when setting the charges.
- Important assumptions relate to option take-up, disability and redundancy rates, changes in premium, partial withdrawals, investment returns and expenses (including development costs and a contribution to overhead expenses).
- Expenses related to changes to the administration for exercising the option will need to be considered in the alteration fees.
- If the additional benefits are attractive to policyholders this may lead to higher business volumes and consequently higher overall profit.
- The insurer should aim to minimise the sensitivity of profit to changes in experience in the design of the product.
- Profitability will be particularly dependent on:
  - Experience relating to the waiver of premium benefit compared to the pricing assumptions.
  - Reduction in the unit fund caused by partial surrenders and premium reductions will lead to reduced fund management charges being received.
  - Vice-versa for increases in premiums.
  - Lower overall surrenders should improve profitability.
  - Economic circumstances are likely to affect the experience of partial withdrawals and reductions in premiums.

Risk characteristics:

- Uncertainty relating to the take up of the waiver of premium benefit and experience relating to disability and redundancy benefits.
  - This is exacerbated by the lack of data which the insurer will have available to assist in pricing.
- The insurer is exposed to anti-selection for the waiver of premium benefit which can impact on profitability of the product.
  - This would be particularly so if some industries are experiencing high levels of redundancies.
  - This risk is exacerbated if it is possible to add the waiver of premium benefit to the policy at any time during the policy term.
- The insurer is exposed to the risk of claims fraud for the waiver of premium benefit.
- The insurer will need to introduce claims verification measures for waiver of premium benefit.
- The insurer will need to consider whether to introduce underwriting for the waiver of premium benefit.
  - The level of underwriting and claims verification needs to be selected carefully to avoid dramatically reducing the marketability of the product.
- Higher than expected partial surrenders or premium reductions may mean that the annual management charge may not cover ongoing expenses.
- The insurer may include higher margins in charges to protect itself against uncertain experience.
  - Charges may need to be reviewable.
  - Increases would be restricted by policyholder expectations and regulation.
  - Higher/reviewable charges will damage marketability.
- Reinsurance for the premium waiver benefit may assist in pricing and risk mitigation.
- Increased new business may cause higher than expected new business strain due to higher capital requirements on the premium waiver benefit.
- There could be a lapse and re-entry risk if the additional benefits are not offered to existing policyholders.
- The uncertainty around numbers of partial withdrawals and premium reductions will make charges less predictable.
- There is a reputational risk if the additional benefits are not properly understood and policyholders have insufficient funds at maturity owing to partial surrenders or premium reductions.
- The increased complexity of the benefits may cause an increase in operational risks.

Despite being a fairly straightforward question, this question was answered poorly by most candidates. Some of the most disappointing aspects of answers were:

- *Many candidates failed to read the question carefully enough, resulting in lost marks. For example:*
  - *The question clearly and explicitly asked for a discussion of the suitability "of the additional benefits". Many candidates ignored this and discussed the current*

benefits, which resulted in significant time-wasting and the blurring of points between the current and additional benefits.

- *It was clearly stated that the additional benefits were new in the market. A significant number of candidates, however, went on to comment on the impact of competitors offering similar benefit.*

Failing to carefully read and answer the question asked is bound to result in poor performance.

- *The fundamental distinction between premiums and charges was overlooked (or misunderstood) by many candidates.*
- *Some candidates were not even aware of standard terminology in life insurance, and made references to the "scheme" and "joining" a policy. A few seemed to think that a unit-linked policy was the same as a unit trust.*

QUESTION 8

i. Assumptions for pricing for individual districts:

Mortality:

- The mortality assumption should reflect the expected future mortality for the lives insured under the scheme.
- The insurer will only have access to NIS mortality experience data for the scheme covering urban cooperatives for recent years.
- The extent to which the insurer can rely on the mortality experience data of the urban cooperatives depends on the credibility of this data.
- The accuracy and the volume of data will be important in this case.
- The historical mortality experience for the scheme for urban cooperatives will need to be adjusted for any expected changes in the membership profile of the urban cooperatives (e.g. higher number of lives over the age of 60).
- Mortality assumptions will also need to be adjusted for the effects of the inclusion of rural cooperatives into the scheme.
- The assumption will depend on the assumed mix of business between urban and rural cooperatives.
  - It should be possible to get a good estimate of this figure, as cover is compulsory.
- Mortality tables for insured lives are not likely to be relevant since this target market has not been insured before.
- The insurer may consider using national mortality rates to set these mortality assumptions.
- Other information on mortality for members of cooperatives (e.g. prevalence of certain diseases in rural areas) may be useful in adjusting mortality rates.
- The mortality assumption for the expanded scheme is likely to be a combination of the national mortality rates and the experience of the scheme covering urban cooperatives with adjustments for expected changes in experience.

Expenses:

- The assumption for the expense loading for this product should make allowance for the initial costs (e.g. research for the pricing of the product), the on-going costs of administering the scheme and claims costs.
- The insurer should also make allowances for:
  - Recovering of the costs of pricing and setting up internal systems for this product.
  - Contribution to overhead costs relative to expected business volumes.
- The expense loading assumption will be based on recent experience of these costs for the current scheme covering urban cooperatives, as expenses are likely to be similar for the expanded scheme.
- There may need to be an adjustment to the expenses to allow for additional costs of paying claims in remote rural areas.
- Allowance needs to be made for the increase in expenses from the investigation period to the time when expenses are paid.
- All policies have the same sum insured therefore the expense loading can be expressed as a percentage of the premium quoted.

Both:

- The results of the experience analyses used for setting the assumptions will need to take the effects of unusual events into account.
- Include a margin for prudence based on the level of uncertainty in the parameter and financial effect of risk.

ii. Mortality risk:

- The main risk for this product is that actual mortality rates are higher than those assumed in the pricing.
- Inaccurate and limited data, especially relating to rural cooperatives, increases the risk.
- There will be significant cross-subsidies in the pricing (e.g. by age and gender). The profile of members of cooperatives may change over the year of cover invalidating assumptions.
- The insurer is exposed to the risk of aggregation of claims (e.g. from workplace accident or natural disaster) since groups of lives insured are working in the same industry and location.
- Anti-selection risk is mitigated through the government requirement that cover is compulsory for all members of the cooperative
  - and the fact that all benefits are the same.
- Mortality experience may be higher than expected due to claims fraud.

Expense risk:

- There is a risk that the expense loadings will be insufficient to cover the actual expenses (administration and claims management) incurred over the annual term of the policy.

- The insurer has no previous experience on expenses for rural policyholders on which to base costs, exacerbating the risk.
- The insurer may also incur significant costs in upgrading administration systems to accommodate the rural cooperative business and larger business volumes. Such costs will be difficult to estimate up front, and hence pose a risk.
- The accuracy of the per policy expense assumptions is dependent on estimated business volumes for this product.
- If the insurer is awarded a smaller number of districts than expected then:
  - Development and systems costs may not be recovered.
  - There will be a smaller portfolio over which to spread overhead costs.
- However, it can be argued that the insurer can reduce costs if business volumes are lower than expected.
  - For example, close branches and reduce staff and office space.
- But there is likely to be time and cost involved in implementing cost reduction strategies.
- Also the insurer needs to employ experienced staff not easy to retrench staff when business volumes are lower and re-employ when business volumes increase.

iii. Management of mortality risk:

- Reinsuring some of the business.
  - The reinsurer may also assist in pricing the product.
  - This passes profits onto the reinsurer and exposes the insurer to the risk of default of the reinsurer.
- Set up effective claims verification processes to manage claims fraud.
- Regular monitoring of mortality experience to allow the insurer to use more accurate mortality assumptions in its pricing over time.

Management of expense risk:

- The insurer needs to maintain strict control over expenses.
  - Particularly for servicing the business of rural cooperatives in remote areas.
- The insurer needs to monitor costs regularly and take action where necessary to reduce costs (for example automate the claim verification processes).
- Consider outsourcing the claims process, if this option is more cost effective
  - and claims fraud can still be adequately managed.

Both:

- Since the government awards business to insurers based on the premium quoted, the insurer needs to ensure that its premiums are competitive to get the business volumes it has targeted.
- For premiums to be competitive it is important that the insurer does not overestimate mortality or expense experience in its pricing.

Part (i) was generally well answered – most candidates got the main mortality and expense data sources correct. A number of candidates focussed on mortality improvements and expense

inflation which should not have a significant effect on the assumptions for this product as the pricing is for a one year contract. Many candidates did not generate enough points and often repeated points in different ways.

Part (ii) was generally poorly answered. Most candidates got the marks for mortality and expenses being higher than anticipated, however, most other points were missed.

Part (iii) was answered reasonably well. However, monitoring experience was, surprisingly, not mentioned very often.

In general candidates did not generate enough points for the question as a whole. This may have been related to poor time management.

END OF EXAMINERS' REPORT