

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

April 2017

Subject ST1 – Health and Care Specialist Technical

Introduction

The Examiners' Report is written by the Principal Examiner with the aim of helping candidates, both those who are sitting the examination for the first time and using past papers as a revision aid and also those who have previously failed the subject.

The Examiners are charged by Council with examining the published syllabus. The Examiners have access to the Core Reading, which is designed to interpret the syllabus, and will generally base questions around it but are not required to examine the content of Core Reading specifically or exclusively.

For numerical questions the Examiners' preferred approach to the solution is reproduced in this report; other valid approaches are given appropriate credit. For essay-style questions, particularly the open-ended questions in the later subjects, the report may contain more points than the Examiners will expect from a solution that scores full marks.

The report is written based on the legislative and regulatory context pertaining to the date that the examination was set. Candidates should take into account the possibility that circumstances may have changed if using these reports for revision.

Luke Hatter
Chair of the Board of Examiners
July 2017

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

1. The aim of the Health and Care Specialist Technical subject is to instil in successful candidates the ability to apply, in simple situations, the principles of actuarial planning and control needed in health and care matters on sound financial lines.
2. Candidates who approached the questions, especially the more substantial elements of each question, in a methodical and detailed manner were far more likely to satisfy the examiners and receive a pass in the subject. Candidates will gain few marks if they do not address the question asked. The mark allocation for each question part gives an indication of the relative length of answer or number of points to be made to gain full marks.
3. It is often helpful to use subheadings when answering long part questions.
4. Candidates who give well-reasoned points, not in the marking schedule, are awarded marks for doing so.

B. General comments on *student performance in this diet of the examination*

1. This paper was more challenging than ST1 papers in recent diets and so an adjustment was applied to every candidate's marks to allow for this.
2. Questions that focussed on knowledge of the Core Reading were well answered by those who had prepared thoroughly. However, the paper included several part questions requiring wider thinking or application of core reading to specific circumstances, such as questions 3, 5(iii) and 6 and these were often less well answered. Students should recognise that these are generally the questions which differentiate those students with a good grasp and understanding of the subject. The comments that follow the questions concentrate on areas where candidates could have improved their performance. Candidates approaching the subject for the first time are advised to concentrate their revision in these areas.

C. Pass Mark

The Pass Mark for this exam was 55.

Solutions

- Q1** (i) Critical illness contracts provide benefits on the diagnosis of a “critical illness” or the specific illnesses covered under such contracts. [½]
The benefit payable is typically a pre-specified lump sum that is payable if the policyholder suffers one of the defined conditions. [½]
The main types of illness covered are Cancer, Heart Attack, Stroke [½]
The lump sum may be paid in instalments, with any outstanding amount payable on death, if applicable. [½]

The level of payment may be linked to the severity of the disease, providing a proportion of the total sum insured depending on the progress or extent of the illness at the time the claim is made. [½]

The premiums for critical illness may be guaranteed or variable. [½]

Accelerated critical illness pays out upon death or diagnosis of a critical illness, whichever occurs first. [½]

If the life insured suffers a critical illness then the sum insured is paid and the policy is terminated. [½]

Most policies accelerate 100% of the sum insured, but some accelerate a portion with the balance paid upon subsequent death. [½]

Stand-alone critical illness policies only provide cover against critical illness and do not provide any benefit in the event of death. [½]

Occasionally such policies may offer a nominal sum in the event of death before a critical illness is suffered. [½]

Usually there is a survival period requirement. [½]

Benefits are only paid if the insured event happens within the contract term. [½]

[Max 4]

- (ii) An assessment period is the period during which the insurer will assess a condition before making a decision on whether or not to accept the critical illness claim. [1]

The assessment period will not normally be longer than 12 months, as long as all the evidence needed has been provided. [½]

[Max 1]

- (iii) The nature of CI means that once the benefit has been paid it cannot be reclaimed by the insurer, even if the policyholder recovers. [1]

It is difficult to define 'permanent' and an insurer's interpretation doesn't always match that of the policyholder's understanding or expectation. [½]

The assessment period gives the insurer time to gather evidence about the severity of the disability [½]

And to organise reports from specialist doctors [½]

To ensure the disability is certain to be permanent. [½]

If the cover allows the insurer to pay different levels of benefit the assessment period can be used to consider what level of payment is appropriate. [½]

It can be used to check if pre-existing conditions should exclude the claim. [½]

It can be used to avoid windfall payments. [½]

It can be used to manage policyholder's expectations around the time it may take to settle a claim and reduce policyholder dissatisfaction. [½]

It may be needed to comply with TCF rules or regulations. [½]

The assessment period is more likely apply to claims for the conditions that must be permanent for cover to apply [½]

E.g. paralysis/paraplegia, terminal illness.

[½]

[Max 3]

[Total Max 8]

This question tested bookwork.

Parts (i) and (ii) were generally very well answered; however, several candidates confused assessment period with waiting period – the time before a claim can be made.

Part (iii) was less well answered with many candidates not mentioning the potential use of the assessment period to check against pre-existing exclusions, to avoid windfall payments or to manage policyholder's expectations or made the point that the benefit, once paid, cannot be reclaimed, even if the policyholder recovers.

- Q2** (i) It will help the company quantify the credit or counterparty risk that it is exposed to. [½]
 The quantified risk can then be used to include or verify a more robust bad debt reserve. [1]
 A better assessment of counterparty risk could lead to lower overall capital requirements. [½]
 It reduces risk of counterparty default adversely impacting future profits of the company. [½]
 Analysing the credit exposure allows ABC Healthcare to decide exposure limits to an individual reinsurer and [½]
 To regularly monitor exposure limits and to manage its credit or counterparty risk. [½]
- Quantifying and monitoring credit and counterparty risks assists the Healthcare company to determine appropriate reinsurance terms to use. [½]
 Are ceded reserves collectible? [½]
 Does current reinsurance structure actually protect surplus? [½]
 How variable is the bad debt? [½]
 How could systematic risks affect ceded balances? [½]
 [Max 3]
- (ii) Any amounts owing as a result of claims settled with the XYZ Reinsurer but not yet paid will be impaired for ABC Healthcare, i.e. the value to ABC Healthcare reduced. [½]
 Amounts potentially owing in respect of claims incurred but not yet advised to ABC Healthcare are potentially not recoverable from XYZ Reinsurer. [½]
 Any future potential recoveries from XYZ Reinsurer in respect of policies in force are unlikely to be met in full. [½]
 ABC Healthcare may be required to purchase replacement cover to remain protected against claim events from the time of reinsurance default to the time the reinsurance contract would have expired. [½]

Premiums may have been paid to the reinsurer but no cover provided/may be paying twice for cover. [½]
 The insurer may also lose reinsurance commission. [½]
 There is a cost of resource/time in sorting out what can be recovered from the insolvent reinsurer [½]
 And finding replacement cover. [½]
 Any replacement reinsurance that is purchased could lead to higher premiums being paid than for original reinsurance. [½]
 There will be a cost to the insurer of increasing its reserves if alternative reinsurance cannot be put in place immediately. [½]
 There is an opportunity cost if the insurer is forced to self insure then potentially it could have used its capital elsewhere to potentially write more profitable business [½]
 There is a possible loss of expertise/support from the reinsurer – the insurer may need to source this expertise from elsewhere [½]
 At an additional cost. [½]
 The insurer may incur reputational damage e.g. if it takes longer to pay out large claims. [½]
 [Max 2]

- (iii) Diversify reinsurers; [½]
 This reduces the risk of one large default [½]

ABC Healthcare could reinsure less [½]
 Thereby reducing its credit or counterparty exposure. [½]
 Initially, there will be little impact on credit risk but as time passes the credit exposure would reduce from where it would otherwise be. [½]

Alternative which would gain marks here are:

The company could move to reinsure on Risk premium basis if it has not done so thereby passing less premium to reinsurer. [½]
 Thus the Credit risk builds up slower than otherwise. [½]
 If market would allow ABC Healthcare to write business on Reviewable rates rather than guaranteed rates [½]
 This would reduce credit exposure as less premium is passed to reinsurer. [½]
 ABC Healthcare could move from proportional to surplus reinsurance, to reduce the amount of business reinsured. [½]

Use higher rated reinsurers; [½]
 This reduces the probability of default and so the credit or counterparty risk reduces. [½]

Deposit back the reserves held for the reinsured business [½]
 so that in default ABC Healthcare has some protection [½]
 or otherwise seek additional security through a credit guarantee. [½]

Alternative which would gain the two half marks here are:

Include a Credit trigger in the reinsurance contracts [½]

So that when the reinsurer has a significant credit downgrading the ABC Healthcare can recapture the reinsured business thereby reducing the credit risk. [1/2]

The insurer could request that should XYZ Reinsurer get into financial difficult third party support is put in place, from the parent company or a Bank etc. [1/2]

This should reduce the risk of insolvency of XYZ Reinsurer. [1/2]

The insurer could request a letter of credit, which is a document from a bank guaranteeing that ABC Healthcare will receive payment (for example recovery of reserves in full) in the event of a default by XYZ Reinsurance. [1/2]

In the event that the XYZ Reinsurer is unable to make payment on the reinsured business, the bank will cover the outstanding amount. [1/2]

ABC Healthcare could buy credit default securities in respect of XYZ Reinsurance (Or a proxy company/index) [1/2]

So that in the event of default or downgrade the value of the security will compensate for the increased credit risk. [1/2]

ABC Healthcare could request increased reinsurance commission. [1/2]

This will increase the reinsurance premium but ABC Healthcare would receive more income initially and so the credit risk builds up more slowly. [1/2]

ABC Healthcare could request nil premium periods. [1/2]

The effect is similar to increased reinsurance commission. [1/2]

ABC Healthcare could use securitisation to sell the business to another company [1/2]

Thereby passing any reinsured risk to the other party. [1/2]

The company could look to Financing with the same reinsurer [1/2]

So that cash flows will be both to and from each party and they could look at netting off cash flows thereby reducing credit or counterparty risk. [1/2]

[Max 4]

- (iv) If the insurer immediately terminates the contract:
 For new business the insurer could retain all the business that would have been reassured to the reinsurer that has the downgrade until another reinsurer is in place [1/2]
 In which case the insurer may need to raise capital [1/2]
 And possibly reprice. [1/2]
 If it did this it could temporarily reduce its maximum benefit levels. [1/2]
 When a new reinsurer is found then the company could reassure business. [1/2]
 The insurer could use facultative reinsurance of individual policies [1/2]
 The insurer could change the product design to make it less risky. [1/2]

For existing business that has been reinsured, the insurer could recapture this business, [1/2]

Particularly if the reinsurer looks like it will go insolvent [1/2]

But the ease of doing this and the terms of recapture will depend on the reinsurance treaty. [1/2]

The insurer could seek to retrospectively reassure the retained business between termination of contract until new treaty concluded [1/2]

But there could be issues if there were large benefit cases. [1/2]

If the treaty was split between several insurers then one of the other reinsurers' proportion could be increased to include the downgraded reinsurer's share [½]
 Provided credit risk to any party within company's limits. [½]
 The insurer's reinsurance systems and processes will require changing [½]

The insurer could give a notice period to the reinsurer and during the notice period seek a new reinsurer to replace the downgraded reinsurer. [½]
 The insurer could perhaps delay premiums to the reinsurer provided it does not invalidate treaty but this is likely to be countered with delay in claim payments. [½]
 The insurer should consider what would happen if other reinsurers are downgraded at same time. [½]
 This may limit insurer's options. [½]
 There may be an immediate impact on the insurer's pricing. [½]
 [Max 4]

- (v) The underwriting risk increases slightly [½]
 As there will be less scrutiny of underwriting processes, [½]
 Especially for larger cases. [½]
 The morbidity risk increases as more risks retained. [½]
 The mortality risk increases as more risks retained. [½]
 Operational risk reduces as one less counterparty [½]
 Although this may be offset as processes and systems will need to be altered. [½]
 Systems changes may take time so the ABC Healthcare company may have to introduce workarounds which will further increase the operational risk. [½]
 Credit or counterparty risk reduces as less business is reinsured. [½]
 [Max 2]
 [Total Max 15]

This question involved considering reinsurance from a more unusual angle, namely credit risk.

Part (i) was generally reasonably answered.

In part (ii) few candidates mentioned the possibility that the insurer may end up paying twice for reinsurance cover or could lose reinsurance commission.

Part (iii) was well answered with most candidates mentioning 3 or 4 methods in which total reinsurance credit or counterparty risk could be reduced, and giving reasons for their suggestions.

Part (iv) was not always well answered. Only the better candidates mentioned that recapturing the business would be subject to the terms in the reinsurance treaty, the possibility of designing its products to be less risky or, that if the treaty covered several reinsurers, increasing the reinsurance with one or more of these, provided the credit risk was acceptable.

Part (v) was poorly answered with few candidates considering which risks would be impacted and in what way.

- Q3** (i) **Advantages**
- Should reach a large number of potential policyholders [½]
 - Could increase diversification by reaching a new demographic of potential policyholders [½]
 - Or policyholders in different locations (i.e. outside the geographic range of the tied sales force [½]
 - There could be a significant increase in sales [½]
 - And increased profits (if business is profitable)' [½]
 - The insurer won't pay commission on these sales' [½]
 - Improve brand awareness' [½]
 - A television campaign allows the insurer to control the messages to potential policyholders and minimise reputational issues. [½]
- Disadvantages**
- May be more costly. [½]
 - May not generate as many sales as expected. [½]
 - May generate too much new business, leading to unexpected capital strain, processing issues etc. [½]
 - Business sold via campaign may be of low quality leading to high early lapses and low profitability. [½]
 - May upset the sales force. [½]
 - The mix of new policyholders will be different from the existing policyholders and could be higher risk. [½]
 - Existing policyholders may lapse and take out the new product. [½]
 - Need to set up a website. [½]
 - Need to change systems etc. to process the applications. [½]
 - The internet may be a less good sales channel for more complex critical insurance. [½]
- [Max 3]
- (ii) **Morbidity**
- Those applying from a TV ad are likely to be a different socio economic group [½]
 - They may have a less active lifestyle [½]
 - And therefore have higher morbidity [½]
 - Or may be younger. [½]
 - They are more likely to think the cover is good value i.e. more likely to think they may claim. [½]
 - There may be a higher risk of anti-selection for those applying from the TV ad compared to those that apply via tied agents [½]
 - And a higher risk of non-disclosure. [½]
- Expenses**
- The costs are likely to rise [½]
 - Due to the need to develop a new product/reprice the existing one. [½]

However, commission would be lower' [1/2]
The cost of the advertising will need to be factored into the TV premium. [1/2]
Greater underwriting may be needed due to potential for adverse selection. [1/2]
However, there is also a need for a quick application process via this channel. [1/2]
If more enquiries/applications are generated, more admin staff will need to be taken on. [1/2]
The insurer may need to set up an additional helpline to deal with IT related queries. [1/2]
If there is a shortage of skilled staff to deal with the website (admin or underwriting staff) salaries may rise, increasing costs. [1/2]
Changes to systems etc. may be needed. [1/2]
A website will need to be created. [1/2]

Pricing

The TV group are applying online so are more likely to check on a price comparison website before proceeding. [1/2]
The TV campaign premiums need to be competitive, [1/2]
This may require them to be lower than the existing product [1/2]
And lower than the true price for the expected claims and expenses. [1/2]
Commission may need to be increased in the non TV group to persuade the sales force to continue to sell policies. [1/2]
The TV group may still need financial advice. [1/2]
If more policies are sold there may be a need to recruit more staff. [1/2]
Also, they will be less experienced so more claims may be allowed through leading to an increase in claim and claim management costs. [1/2]

Volume

The campaign will impact the volume sold; the campaign should encourage higher volumes. [1/2]
New business volumes will depend on the expected attractiveness of the proposal and on how it compares with what is being offered by competitors. [1/2]
If more policies than expected are sold this may lead to capital strain [1/2]
And strain on the admin staff. [1/2]
More staff may need to be recruited leading to increased staff and recruitment costs. [1/2]
If fewer policies are sold than expected then the initial costs may not be recovered. [1/2]
There may be a reduction in the non TV sales as they are less likely to visit an advisor if they can purchase on line. [1/2]
There is less potential to cross sell any other products or to upsell. [1/2]
There may be a greater potential for mis-selling claims. [1/2]
The volume of sales via the TV ad will depend crucially on the price charged. [1/2]
If the price needs to increase to take into account the increased advertising costs this will reduce volumes. [1/2]
Assuming the product was profit-making, this will reduce total profit. [1/2]
Lower volumes will also increase per-policy expenses (due to spreading fixed costs over lower volume) so further reducing profit margin per policy. [1/2]

Claim rates may increase, further reducing profit [½]
If more claims are declined this will damage the insurers reputation leading to increased lapses [½]
And lower future sales. [½]
There would be the potential for fines or regulator intervention. [½]
All of these reduce profits. [½]
However, if there is a change in the mortality of the TV group fewer may survive the survival period, thus reducing claims. [½]

Mix

The new business mix assumed in pricing work will need to be adjusted [½]
and the sums assured may differ for those applying via the TV ad and those applying via tied agents. [½]
There may need to be separate model points for the TV and non TV group [½]
This may eliminate cross-subsidies between model points and these should be minimised in pricing. [½]
However, it is likely that the prices offered to the 2 groups will not fully reflect the differences in cost and experience making it more difficult to accurately attribute profit between the groups [½]
And making overall profit dependent on the proportion buying through each channel [½]
And whether the mix differing from that which has been expected in the pricing model. [½]

Lapses

Lapse experience is expected to be higher for the TV group as this will be an impulse buy. [½]
This will reduce the profitability unless it is adequately allowed for in the pricing. [½]
There is a risk of lapse and re-entry if the TV cover is cheaper or has better options than the advisor sold version. [½]
If lapses occur outside the clawback period or the advisor has left commission may not be recovered. [½]
This will reduce the profitability of the existing business and the non TV sales. [½]

Reinsurer rates

If the reinsurers believe a different type of policyholder will be attracted they may change their rates. [½]
The impact will depend on the amount the rates change for the 2 groups and the mix of these. [½]

Other

Different levels of risk in estimating any of the assumptions, in particular morbidity, may feed through to any margin in the risk discount rate or to the technical provisions/reserves, changing the cost of capital. [1]
This could lead to impacts on the relative treatment of tax or investment. [½]
Profit margins may differ between the two channels e.g. due to different levels of competition. [½]

There is a risk of claim disputes increasing if the product isn't understood. [½]

[Max 18]

[Total Max 21]

Part (i) was generally very well answered.

Part (ii) was less well answered, with many candidates not providing a wide enough range of points to score highly. Few candidates mentioned points such as the potential need for the premiums for the TV campaign business to be competitive given the likelihood of potential purchasers looking at price comparison websites, the possible effects on the non-TV campaign group or factors that would affect profitability such as changes in the mix of business.

It was pleasing to see that many candidates provided their answers under subheadings, making them easier to follow and mark and also showing how they had applied their knowledge to the specific scenario described.

- Q4** The VaR approach measures risk-based capital requirement based on a minimum required confidence level (e.g. 99.5%) [1½]
Over a defined period (e.g. one year). [¾]
The target percentage VaR could be determined by regulation/risk appetite/or to achieve a particular credit rating from rating agencies. [¾]
The supervisory balance sheet would typically be on a market consistent basis for this type of approach. [¾]
The assets and liabilities are subject to stress tests (or “shocks”) on each of the identified risk factors, at the defined confidence level and over the defined period. [1½]
The (market consistent) surplus is then recalculated at the end of the period. [¾]
Applying stress tests to each different risk factor gives a capital requirement for each separate risk in isolation. [1½]
For a health insurance company, typical types of risk factor would include:
- Market risk [¼]
 - Interest rate risk [¼]
 - Credit risk [¼]
 - Persistency risk [¼]
 - Insurance risk (mortality) [¼]
 - Insurance risk (morbidity) [¼]
 - Catastrophe risk [¼]
 - Concentration risk [¼]
 - Risks attaching to firm's pension scheme [¼]
 - Liquidity risk [¼]
 - Reinsurance risk [¼]
 - Group risk [¼]
 - Operational risk [¼]
 - Expenses risk [¼]

In order to arrive at an aggregated capital requirement reflecting all risks, these need to be combined in a way which reflects any diversification benefits that exist between the various risks (i.e. the degree to which individual risks are correlated). [1½]
This may be done through the use of correlation matrices. [1½]

It should be noted that, under the extreme event conditions being tested, correlations may differ from those observed under “normal” conditions. [1½]

Alternatively, the aggregation approach may be done by copulas. [¾]

It should also be recognised that a combination of a certain subset of events happening at the same time, with an overall probability level of 1 in 200 (for example), may produce a higher capital requirement than combining all of the individual capital requirements for separate 1 in 200 events using a correlation matrix. [1½]

This is caused by the “non-linearity” of individual risks. [¾]

There could also be the “non-separability” of individual risks, which refers to the ways in which risk drivers interact with each other. [1½]

Separate allowance needs to be made in the capital requirement calculation for these effects. [¾]

Typically stochastic models are used to quantify the capital requirements in relation to economic risks. [¾]

The probability distribution used should properly reproduce the more extreme behaviour of the variable being modelled, both in the size of the tail of the distribution and, where appropriate, in the path taken during the simulation period. [1½]

For capital requirement projections, a “real world” asset model would typically be used and this should be arbitrage free. [¾]

It is generally appropriate to calibrate such models with reference to actual historic parameters. [¾]

However, advanced techniques may be required to ensure appropriate fit to the tail of a distribution, [¾]

To ensure that the distributions do not understate the frequency of more extreme outcomes. [¾]

Modelling techniques for short-term and for long-term business may be different [¾]
[Total 10]

This was a mainly bookwork question. However, even given the generous marking scheme this question was not well answered with many candidates not providing a sufficient number of points to score highly. For instance, only the better candidates tended to discuss the diversification and correlation of risks or the non-linearity or non-separability aspects.

- Q5** (i) (a) This is the period of incapacity before any benefit is paid. [½]
In the UK, for example, the most common deferred periods in the market are 4, 13, 26 and 52 weeks. [½]
Other less common deferred periods are 0, 1, 8 and 104 weeks. 28 weeks is often found as a deferred period under group arrangements. [½]
Another possibility is a “split deferred” policy. [½]

An example of this is a policy that pays out a benefit of £250 per week after 13 weeks' sickness, increasing to £500 per week after 26 weeks' sickness. [½]

- (b) This refers, in the context of income protection insurance, to the ratio of net (in benefit) income to net pre-disability income. [½]

A value of less than one is desirable from the insurer's viewpoint, to provide a financial incentive for the claimant's return to work, especially given that expenses in disability may be less than those in normal (working) health. [½]

The level of replacement ratio is usually seen as a critical indicator of likely claim experience; the higher the replacement ratio, the lower the incentive to return to work and the worse the morbidity experience is likely to be. [½]

- (c) This IP benefit is payable when a claimant is no longer totally unable to follow his or her original occupation and returns to it in a reduced capacity. [½]

The amount of benefit is usually calculated in the same way as that for proportionate benefit. [½]

The reduction will relate to the ratio that the gross earnings following the return to work bears to those from the role against which disability was being claimed. [½]

Rehabilitation can also apply to the process of counselling, whereby disability counsellors assist disabled persons with advice on practical matters to do with the benefit and their disability, in order to aid a return to work. [½]

[Max 3]

- (ii) The main reasons for most contracts having a non-zero deferred period are:
To integrate with employer-supplied benefits [½]
To reduce the cost of claims to the insurer (and therefore the price) [½]
To reduce the insurer's administration costs (and therefore the price) [½]
To meet true customer needs (e.g. most policyholders would not want to submit a claim for a couple of days off with 'flu) [½]

[Max 2]

- (iii) (a) **Pricing and profitability**

As the product targets a very specific group of people, the insurer will need to investigate what morbidity assumptions to be used for pricing. [½]

Both claim inceptions and terminations will need to be considered. [½]

The work carried out by civil servants may cover many different types of tasks, [1]

The insurer will need to investigate the occupational split [½]

And the transitions between them. [½]

The insurer will need to consider the relevance of its own data, in particular the existing proportion of policyholders who are civil servants. [½]

If own data is unlikely to be sufficiently credible, then need to consider appropriate sources of external data. [½]

For example, is data available from the government on length of service of its staff. [½]

The insurer will need to consider the volumes of business expected to be sold [½]

And whether this is new business or a cannibalisation of the insurer's existing business. [½]

If this is actual new business, the insurer can spread its expenses over a larger number of policies. [½]

As the deferred period structure of the new product is significantly different from that of its existing product, this is likely to add further complications to setting morbidity assumptions. [1]

This will also complicate the pricing calculations as the deferred period for the new product is more complex. [1]

Claims will be higher earlier in the term due to the reduced deferred period and lower later as the deferred period increases. [½]

The impact on profits will depend on whether the increase in earlier claims outweighs the fall later. [½]

The insurer will need to carry out profit testing to determine a premium that meets its desired profit criterion and risk appetite. [1]

The insurer will need to investigate the expenses for the product – these can be high due to the more complex deferred period structure. [½]

Maintenance and claims handling expenses are likely to be higher than for the existing product. [½]

The insurer will need to estimate sales expenses, where sales method is likely to be different to that for the existing product due to the specific target market [½]

The insurer will need to investigate the total development costs e.g. the costs of research, pricing, policy documents, system build [½]

And assess whether the total development costs can be covered and over what time horizon. [½]

Given the new feature of this product as lack of data to price, the insurer may need to allow sufficient margins for prudence. [½]

The insurer will also need to allow fully for reserving, so it will need to investigate what would need to be held, including any capital requirements. [½]

The insurer would investigate what contribution to overheads would be required; for a product that targets a specific group, the overheads could be disproportionate. [½]

The insurer will also need to perform sensitivity and scenario testing and put the product into a full model office to see the full effect, e.g. on solvency. [½]

If there are no competitor products, the insurer could target a higher profit margin for this business than its standard business. [½]

(b) **Marketability and saleability**

The insurer would need to ensure the product will meet the needs of government employees. [1/2]

The insurer would need to investigate at what level of premium the new product would be saleable. [1/2]

The insurer would need to consider what distribution channels to use [1/2]
And what commission/incentive to offer. [1/2]

Intermediaries might need training to help appropriate customers so it may be easier to sell direct. [1/2]

It may be necessary to educate workers about this product so worksite marketing could be used. [1/2]

The insurer would need to assess if there is a market for this product, e.g. are there enough government workers in country A, and do they want the cover [1/2]

And are there other non-government employees to whom the policies might be sold? [1/2]

Options may be included in the product for government workers, e.g. when they leave government service. [1/2]

Would the product be sold as group or individual business e.g. it could be offered as group cover via the government. [1/2]

If the government provides some cover, this could lead to a more limited market. [1/2]

The insurer would consider the current proportion of civil servants within its own book. [1/2]

If the insurer already has a significant proportion of policyholders in the civil services on its book, it would need to justify whether there is any need for a new product design. [1/2]

If sold as individual business there might be anti-selection as those with long service and poorer health buy the existing policies. [1/2]

The insurer would investigate whether there are any competitor products; if not, then why not. [1/2]

If there are, is the premium competitive [1/2]

And is the market saturated? [1/2]

The insurer would consider the literature requirements and make sure that all the regulatory constraints could be met without excessive cost or without making the product look too unappealing. [1/2]

The insurer would consider if the level of cover is appropriate (compared with what a civil servants might earn, for example) and in line with the market. [1/2]

The likely impact on existing policyholders, in particular lapse and re-entry by existing policyholders in the civil services, would be investigated. [1/2]

The insurer would consider whether the product is in line with the company's brand and strategy. [1/2]

(c) **Operational and infrastructure**

There may need to be changes made to the application forms. [1/2]

The insurer would need to consider what systems are available and whether there are already some functionalities in existence for such a product. [½]

The insurer would investigate whether the existing systems could cope with the expected new business volumes [½]

Or would the insurer need to buy a new system, or could the existing one be built on. [½]

The costs and time involved would need to be investigated. [½]

If the insurer scales up to meet expected demand, the risks/implications if the levels of new business do not materialise would need to be considered. [½]

There may need to be checks on who the employer is as part of the underwriting. [½]

Staffing: investigate how many staff would be needed and whether the appropriate skills are available e.g. for pricing and marketing. [½]

The insurer would need to determine an appropriate claims management process given the more complex deferred period structure. [½]

The insurer would investigate whether there are any regulatory constraints; e.g. is it allowed to sell such a product (is it acceptable to only offer this product to government workers, or does it represent discrimination) [½]

The details of the product would need clarification. For example, what kind of government workers would this be open to (e.g. ministers, armed forces, fire services, health services etc.). [½]

The insurer would consider whether there alternative products/projects with a higher return on capital. [½]

Reinsurance would be desirable for the technical assistance it would bring if it were available. [½]

The cost of reinsurance would be assessed to determine whether the cost brings the profit down too much. [½]

The level of cross-subsidies needed to make the product marketable would be assessed [½]

e.g. the extra costs caused by the more complex deferred period structure might be offset by the additional volume of new business. [½]

[Max 15]

[Total Max 20]

Parts (i) and (ii) were based on bookwork.

Part (iii) was generally well answered, with many candidates providing a wide range of points relevant to the scenario described, particularly under the pricing and profitability, and marketability and saleability headings. However, only the better candidates discussed what proportion of current policyholders were government employees, the need to carry out sensitivity and scenario testing and competitors' products or the problems raised by the complex

system of deferred periods under the statutory sick pay scheme for government employees.

Fewer candidates made many points under the operational factors heading; for instance, few candidates mentioned the need to change the application forms, to carry out checks on who the employer is, any regulatory constraints, or whether alternative products/projects would provide a higher rate of return.

Q6 (i) Benefits for the targeted insured members

The insurer would want to meet the needs of the target market at an affordable cost. [½]

Private medical insurance (PMI) is normally an indemnity product – it pays the medical treatment costs actually incurred by the policyholder [½]
And in many cases the insurer settles with the provider of treatment directly. [½]

The insured event is the treatment rather than the diagnosis of an illness or condition. [½]

So the insurer should research the range of medical treatments available in Country B [½]

And their costs. [½]

The insurer should consider whether to provide cash under the plan. For example, health cash plans could be designed to provide cash when certain medical events take place (e.g. physiotherapy, new spectacles). [½]

There may also be a cap on the amounts paid by the insurer for certain procedures, meaning that the benefit is not full indemnity. [½]

This could be done for any treatments that cost significantly more in Country B than in Country A. [½]

As no State-funded healthcare is provided in Country B for these individuals, PMI should pay for all forms of healthcare needs on an indemnity basis. [½]

It should cover primary care (such as visiting the family doctor or nurse) and hospital care for all forms of chronic and acute illnesses [½]

And dental/optical cover. [½]

Private medical insurance is almost invariably a one-year product and as such is annually renewable [½]

But the insurer could consider giving a longer fixed term policy to match the term of the employment contract. [½]

The insurer would consider if it would offer group or individual policies, or both. [½]

Premium guarantees are very difficult to price effectively because of the indemnity nature of this product, [½]

Because of uncertainty over future trends [½]

And the lack of control over the costs charged by the suppliers of services in Country B. [½]

The insurer could follow the example of the UK where individual PMI and major medical expense products generally (but not always) give guaranteed renewability within the policy conditions, [½]
But normally not guaranteed premiums. [½]

The insurer would consider if the benefits provided under the domestic product are adequate for people working in mines and mineral extraction industries in Country B. [½]

The insurer would check if there is any interaction between state provisions and private health insurance in Country B. [½]

The insurer would consider the specific health risks of people working in mining and mineral extraction companies, e.g. they might be physically fit but exposed to high risk of mining accidents. [½]

The insurer would research if there are any particular health risks in Country B. E.g. tropical diseases such as Ebola virus [½]

And whether any vaccinations be recommended for insured members before they travel to country B. [½]

The policy might include an annual personal health review. [½]

The medical and health facilities available in Country B would be investigated [½]

And whether there would be any restriction on which ones can be used [½]

E.g. a single network of hospitals and doctors or access to any facility. [½]

Any legal requirements in Country B for residents to have health insurance would be checked. [½]

The policy may include the ability to return to Country A for medical consultations and treatments. [½]

The insurer would consider if costs of travel back to Country A should be included in the policy [½]

And whether cover might be provided for dependents. [½]

Any products provided by competitors would be investigated. [½]

[Max 6]

(ii) **Operational issues**

Any changes to the design from the domestic product would require changes to the company's administration systems. [½]

The marketing and policy documents would need to reflect the new international product. [½]

Claims handling processes and staff would need to be developed and trained for these new policyholders. [½]

A local telephone number in Country B for policyholders to contact when making a claim would be set up. [½]

The insurer would set up a local claims handling office in Country B with staff with knowledge of the local health and medical services available and how insured members can access them [1]

And provide help with any language barriers. [½]

The insurer would investigate setting up relationships with local providers. [½]

Claims would most likely be in the currency of Country B so the insurer must specify whether it will reimburse claims in currency of Country B or insist on

currency of Country A (which is likely to be the currency of the premium).

[1/2]

Banking operations would need to be established to enable claims payments in foreign currency B to the insured members' bank accounts or directly billed to the medical provider (if direct billing was implemented).

[1/2]

The insurer would need to decide if insured members must pay himself/herself upfront or if direct billing from the medical provider can be implemented.

[1/2]

If reinsurance is used then the insurer may want to change retention limits / quota share for this expat business for the first few years until it gets a better understanding on the experience

[1/2]

[Max 3]

(iii) **Pricing Model**

Private medical insurance is priced on an incidence * average claim cost basis.

[1]

Risk premium (age, gender) = SUM (I(k) * AC (k))

[1/2]

where I (k) = incidence rate for benefit/procedure class k

[1/2]

AC (k) = average claim cost for benefit/procedure class k

[1/2]

I(k) and AC(k) are specific to each age and gender (if differentiation by these factors is permitted) and the summation is over all classes k. The formula will be adjusted for excesses

[1/2]

And the presence of a no claims discount (NCD) rating structure, if one exists.

[1/2]

The gender-specific premiums may be combined in the office premium calculation.

[1/2]

Depending on market practice, available information and risk aspects in particular territories, the risk premium determinants may be extended beyond age and gender, e.g. location, hospital band, smoker status, occupation.

[1/2]

However, in some territories there may be equality legislation that prevents or restricts differential pricing, even by age and/or gender.

[1/2]

Group products would be priced differently.

[1/2]

Pricing assumptions

To estimate values of I(k) and AC(k), the insurer should use its experience of its business in Country A and adjust for known differences in Country B.

[1/2]

If the ex-patriates are from a niche sub-population of Country A and take very specialised jobs in Country B (e.g. all in mining industry) the insurer may have insufficient existing credible data.

[1/2]

As it is a large insurer then it should have credible quantities of data with which to work.

[1/2]

The insurer could discuss with existing reinsurer how credible existing data likely to be

[1/2]

Or seek data from overseas insurers, consultants or country B statistics.

[1/2]

An appropriate exchange rate between the currencies of Country A and Country B should be used in the calculations.

[1/2]

The insurer would need to consider the tax regime

[1/2]

And if profits can be repatriated.

[1/2]

The risk profiles of individuals going to work abroad, compared to the insured members in Country A would be assessed: [½]

- Such individuals are likely to be in very good health already with no serious existing conditions i.e. they are fit and healthy enough to work and move abroad [½]
- But there may be specific health risks for mining professionals (e.g. work-related accidents). [½]
- Some occupations are more common than others (mining in this scenario). [½]
- The age profile of expatriates is likely to be different to the age profile of the domestic Country A insured members (i.e. all working age, unless their family members will move with them, but even so this is likely to represent a different age mix to the population of either Country A or Country B) [½]
- Adverse selection may be more common, especially if health services are better under the PMI policy in Country B than what is available in Country A [½]
- Moral hazard may be more common, especially if health services are better under the PMI policy in Country B than what is available in Country A [½]

The results from the analysis of existing domestic portfolio would be taken and considered how adequate that pricing would be for new international product. [½]

- Risk loadings or discounts would be added where different risk profiles exists. [½]
- Adjustments would be made for changes in benefits provided under domestic and international products. [½]
- Examples of risk loadings are:
- Country B may be exposed to high prevalence of a particular disease which requires expensive treatment. [½]
- Therefore a risk loading should be applied to allow for this. [½]
- The amount can be estimated by researching the cost of treatment of one case and multiplying this by the probability of getting the disease. [½]
- This amount should then be added to the risk premium. [½]

Alternatively, there could be exclusions applied to the policy for particular diseases. [½]

However, this could cause TCF, PRE or reputational issues if the insured members felt it should be covered (e.g. if it was on the list of conditions specified by an industry association such as the ABI (Association of British Insurers) guidance). [½]

On the other hand, covering conditions like this could be a strong selling point or marketing tool. [½]

The insurer would consider how medical costs differ in Country B compared to Country A [½]

E.g. Doctors and nurses may have relatively higher or lower salaries than in Country A and so similar treatments may have different costs. [½]

All risk loadings must be applied appropriately to all premium categories [½]

E.g. decide if percentage loading or an absolute amount should be applied to each age and gender group, if at all [1/2]
(e.g. risks relating to pregnancy should be added only to female premiums). [1/2]

The insurer would need to consider if there are any additional capital requirements required for this business to allow for additional uncertainties. [1/2]

The insurer could seek advice from reinsurers on the pricing assumptions. [1/2]

Loadings on top of the risk premium

Appropriate administration expense loadings would be applied. [1/2]

A profit margin would be set that is adequate for the shareholders required return for this business. [1/2]

Commission levels for this international business may be different to those for Country A domestic business. [1/2]

Loadings would be applied to cover the cost of reinsurance [1/2]

If there are margins for prudence in individual pricing assumptions, the insurer needs to consider whether the overall level of prudence is too high. [1/2]

Any competitor products would need to be considered. [1/2]

[Max 8]

(iv) **Assess the proposal**

The insurer should only implement this if doing so would help the insurer meet its strategic objectives. [1/2]

The business should be profitable on the most appropriate profit criterion for the insurer. [1/2]

Metrics such as NPV, IRR and DPP would be used on several scenarios of volume [1/2]

And mix of new business. [1/2]

The scenarios should include pessimistic and optimistic scenarios as well as realistic scenarios. [1/2]

Also, scenario test for the sensitivity of results to key pricing assumptions would be carried out [1/2]

Such as exchange rates, claim rates, age and gender profiles. [1/2]

The insurer would ensure it had sufficient capital to support writing the new business on both statutory and realistic bases. [1/2]

The strategic fit of this proposition compared to other areas of activity of the insurer would be considered [1/2]

E.g. is expanding to other countries a way to become a global market player; [1/2]

Would it support the generation of new business and retention of existing business in the domestic market [1/2]

Or provide diversification benefits e.g. with respect to capital requirements. [1/2]

Even if the projections do not demonstrate profitability then the insurer may still consider following the suggestion as it may open up other opportunities, [1/2]

Such as becoming a domestic insurance provider in Country B [1/2]

Or being a selling point for potential customers in Country A (i.e. a symbol of financial strength or market expertise). [1/2]

The insurer could offer continuation options so that individuals with the international cover could automatically qualify for the insurance cover in Country A when they return to their home country, and therefore maintain or increase business volumes. [1/2]

From the analysis of profitability of existing domestic PMI business, how profitable [1/2]

And whether this experience would or could be replicated with international product would be determined. [1/2]

The insurer would need to assess the minimum volumes required to meet the costs of this business [1/2]

And the implications if these are not met. [1/2]

Risks

Entering Country B for which the insurer has no specific experience and therefore no specific internal data on which to base analyses is a risk. [1/2]

Are suitable data available? [1/2]

Country B is a different country with different tax, [1/2]

Legal and regulatory regimes [1/2]

And health service providers. [1/2]

The insurer should hire lawyers, tax experts and consultants with direct knowledge of the market to assess the risks. [1/2]

Country B may change the provisions made by the state. [1/2]

There is an aggregation risk as the business is concentrated in a single industry. [1/2]

There is also a risk of a catastrophe. [1/2]

There is a risk of economic downturn in country B/reduction in demand for mining products [1/2]

Other risks include counterparty risks [1/2]

And fraud; staff, claimants, local providers etc. [1/2]

Currency risk

There will be a currency mismatch if premiums are received in currency of Country A but claims are paid in currency of Country B. [1/2]

To mitigate this risk, the insurer could implement a currency hedging programme [1/2]

Or hold liquid assets in currency B to ensure it can always pay claims in Currency B [1/2]

So that it does not make a currency loss due to adverse exchange rate movements from when the exchange rates assumptions used in pricing turn out to be different. [1/2]

The insurer will need to monitor tax, legal and regulatory changes in both Country A and Country B. [1/2]

Timing of claims

Claim reporting may take longer on average for international policyholders due to unfamiliarity with procedures in Country B [1/2]

And the claim administration processes in Country B. [1/2]

This should be reflected in the completion factors used in the pricing and reserving assumptions within the business planning projections. [1/2]

There could be more claims than expected e.g. due to anti-selection [1/2]

Or higher value claims, e.g. due to mis-estimation of costs or poor deals with local hospitals. [½]

Expenses

There would be additional expenses for staff to administer the new policies. [½]

There may be a need for policy administration staff and claims handling staff to have training in the specific features of the healthcare systems in Country B [½]

And there may be a requirement for foreign language skills for Country B. [½]
Product development or claim management costs may be higher than expected. [½]

Distribution channels

Review whether existing brokers and IFAs can help to promote the business in Country B or whether new partnerships will need to be organised. [½]

The insurer would consider other channels to market to target group such as through expatriate networks, international mining organisations [½]

Or international recruiters or work agencies. [½]

Or worksite marketing [½]

Reinsurance/Coinsurance

The insurer would consider if reinsurers could assist with forms of reinsurance that supported the insurer's capital balance sheet. [½]

Alternatively, whether it would be useful to seek a partnership with an existing insurer in Country B. [½]

Some of the risks could be reduced with the use of reinsurance but at the cost of ceding a share of the hopefully profitable business. [½]

The insurer could reinsure a significant proportion of the business initially until it has gained experience of the market, at which point the proportion of business reinsured could be reduced. [½]

[Max 9]

[Total Max 26]

This question required students to apply their knowledge to the development of a particular product and to consider some of the issues involved from the point of view of both the insurer and the insured. Most students provided a good range of relevant points on most of the part questions and hence generally performed well.

Part (i) was generally well answered; however, only the better candidates discussed whether there were particular health risks in Country B, whether any vaccinations might be recommended, the possibility of including an annual personal health review, any restrictions on the medical and health facilities available in Country B or the problems with guaranteed premiums and

whether policies might be offered to suit the likely term of employment in Country B.

Most candidates gave a good range of answers to part (ii).

Part (iii) was less well answered, with candidates not always providing a wide enough range of points to score highly.

In part (iv) whilst many candidates generally provided a good range of points on the various risks involved under the proposal, relatively few provided more than one or two points on assessing the proposal with only the better candidates mentioning such aspects as does the proposal help the insurer meet its strategic objectives, does the insurer want to expand its business into other countries, how profitable would the business be expected to be under a range of scenarios, does the insurer have sufficient capital to support writing the new business.

END OF EXAMINERS' REPORT