INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

September 2011 examinations

Subject SA1 — Health & Care Specialist Applications

Purpose of Examiners' Reports

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 who are 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. Although Examiners have access to the Core Reading, which is designed to interpret the syllabus, the Examiners are not required to examine the content of Core Reading. Notwithstanding that, the questions set, and the following comments, will generally be based on Core Reading.

For numerical questions the Examiners' preferred approach to the solution is reproduced in this report. Other valid approaches are always given appropriate credit; where there is a commonly used alternative approach, this is also noted in the report. For essay-style questions, and particularly the open-ended questions in the later subjects, this report contains all the points for which the Examiners awarded marks. This is much more than a model solution – it would be impossible to write down all the points in the report in the time allowed for the question.

T J Birse
Chairman of the Board of Examiners

December 2011

General comments on Subject SA1

Candidates who approach the questions, especially the more substantial elements of each question, in a methodical and detailed manner are far more likely to pass the subject. Candidates will gain few marks if they do not address the question asked but merely write around the topic of the question. 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. In general each valid point in the answer would normally attract 0.5 marks with the more basic elements e.g. details in a pricing basis such as age and sex, attracting 0.25 marks, and key points gaining 1 mark.

It is often helpful to use subheadings when answering long part questions.

Comments on the September 2011 paper

The general performance was better than in April 2011 and well-prepared candidates scored well across most of the whole paper. As in previous diets, questions that required an element of analysis or application of knowledge were less well answered than those that just involved repeating bookwork. 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.

1 (i) The premium charged will certainly depend on the number of current account customers. It is unlikely that the premium will be based on actual age and sex characteristics. It is therefore likely to be based on an expected average age and sex split, e.g. from looking at existing current account holders, or it may be based on average values for the population of all bank account holders
As this introduces a large risk for the insurer, they may choose to share the risk by having a profit sharing element to the premium.
There may be a standard premium charged for all customers falling within certain parameters, and for other customers, a specific premium might be calculated (akin to having a free cover limit) - for example, customers under the age of 50 may be charged at a standard rate, but the insurer may charge more for customers age 50 and over.
The premium would be reviewed regularly – at least annually.
If the insurer had incorporated PEC exclusions or moratorium clauses then this would also affect the premium.
The frequency of premium payment would be considered.

(ii) PMI is a high premium product, and so the bank is unlikely to be willing or able to fund for all its customers. It is therefore likely that at least some of the premium will be charged to customers. This may be in the form of an explicit premium, or it may be part of an overall fee for the bank account. So the bank may effectively earn commission on the business. Alternatively, it may make a loss on the product, if this is offset by profits from a higher level of account business attracted by the benefit.
The amount charged to the customer is likely to be a flat amount per customer (i.e. no "rating" factors). Carry out research into what level of charge would be tolerated by customers and/or look at the competition.
Compare with the PMI premium the company charges for individual PMI.

(iii) Morbidity experience would differ. It may be heavier for the product offered by the bank.
If the premium charged does not depend on the actual risk factors of the insured lives then there is a risk that the insured lives are a higher risk mix than assumed – e.g. that they are older.
There is a risk that even for the same age and sex of individual, the experience would be worse on this book of business because they have not been underwritten.
The insured lives may come from a lower average socio-economic group, as they are only being selected based on eligibility for a bank account, rather than having a financial adviser.
There may be different conditions/benefit scope which will impact morbidity experience.
Anti-selection risk: as there is no underwriting, individuals who are sick may take out the bank account just to get the PMI cover. This may be offset by the effect of a proportion of the people taking out the bank account having no interest in the PMI.
There is also the possibility of a concentration (or aggregation) of risk because this could be a very large block of business and the bank's customers may have certain risk factors in common, due to its marketing (e.g. geographical location, or age) – this could lead to periods of heavy experience.

The extent to which the bank account customers pay for the product will also affect the experience. The more that is paid by the customer, the greater the selection risk and it is more likely that people taking out the product are already sick.
The propensity to claim would also be affected. If customers do not pay (or pay very little) for the product, they may not value it highly, and may not even really realise they have it – propensity to claim would be low. If customers do pay a material proportion of the premium for the product, this would increase the propensity to claim, and hence mean that morbidity experience would be heavier. The degree of selective lapsing may also differ.
Also note that banks have more self-employed customers, which affects the morbidity experience.
The bank may be able to put more pressure on the company to accept claims that are in dispute.

(iv) Risks would differ:
Reputation risk – the insurer is dependent on the bank's staff to explain the product, and customers may not understand what they are getting.
Expense risk – this is a new sales channel and so there is a greater risk that the expenses are different from estimated.
New business risk – in some ways, volume risk may be lower as the insurer will be certain of getting a good chunk of business but if the bank moves to another provider then all the business will be lost in one go. There is also increased volume risk if more customers take out the account than expected – because the quantity of sales becomes outside the insurer's control.
Competition risk – if another insurer decides to compete in this market, prices, and hence profit margins, may come under pressure – if only one bank is taking on this product, this becomes an acute risk.
Reinsurance risk – reinsurance may not be available for this style of business, or may be available only on individual terms.
Lapse and re-entry risk – this new product could lead to the existing portfolio of customers lapsing and taking out this account instead. Profit margins may well be lower.
Assumption risk – there is a greater risk of incorrect pricing leading to loss-making business, as this seems to be a new market.
Data risk – there is a risk that it is difficult to get adequate data from the bank, in order to set accurate reserves.
Regulatory risk – there may be a greater risk that such arrangements become prohibited by regulators or subject to heavier constraints.
Counterparty risk – the company may be exposed to greater risk of serious default on premium payments from the bank since this is concentrated in one counterparty, rather than through a large number of different intermediaries.
Lapse risk – will have different (possibly lower) lapse rates compared to intermediary business because it will be based on decisions to move the bank account rather than to lapse the insurance policy.

Part (i) asks specifically about how the premium could be structured, including rating factors. Some candidates discussed how to price the product which was not answering the question. Answers also did not always sufficiently well reflect the given scenario, particularly the group nature of the proposal.

Parts (ii) and (iii) were generally well answered.
Part (iv) asks about how the risks will differ, not how the experience will differ – some candidates tended to discuss the latter (for example, expenses being higher rather than expenses being more uncertain). It is also asking about other risks the insurer might face, i.e. not morbidity risks.

2 (i)

Quantitative reporting forms
Some templates may need to be separate for long term and short term business
Statement of solvency showing capital resources, capital requirement and statutory free assets
Components of capital resources
Calculation of capital requirements
Total value of assets
Analysis of assets by types of investment
- Land and buildings
- Equity
- Intra group investments
- Fixed interest securities
- Variable interest securities
- Participation in investment pools
- Mortgages and loans
- Bank deposits / cash
- Derivatives
- Reinsurers' share of technical provisions
- Debtors
- Deferred acquisition costs

Analysis of bonds by credit rating
Information on asset yields
Information on how assets are valued if no market value available
Total insurance business liabilities
- Mathematical/Policy reserves
- Different types of unexpired premium reserves
- Different types of unexpired risk reserves
- Claims outstanding
- Creditors
- Accruals and deferred income
- Tax liabilities

Total shareholder liabilities

Revenue account
Income
- Premiums
- Investment income

Expenditure
- Claims
- Expenses
- Taxation

Profit and loss account
- Transfer from revenue account
- Investment income
- Tax
- Dividends

Analysis of premiums
Analysis of claims
Analysis of expenses
Analysis of new business by product types
Analysis of mathematical reserves – gross of reinsurance, by product
- Number of policyholders/contracts
- Amount of benefits
- Amount of annualised premiums
- Amount of mathematical reserves

Analysis of mathematical reserves – reinsurance ceded
Distribution of surplus
Sum at risk
Include figures from previous years for comparison

Valuation report
The valuation date
The previous valuation date
The dates of any interim valuations carried out since the previous "valuation date"
Product range
Any significant changes in products during the financial year, including
- new products
- products withdrawn

Any changes to premiums on reviewable business
For each product affected, the range of the changes (x% to y%)
The amount of business affected by the change
The amount of business where a change was permitted but did not occur at this review date

Valuation methodology
The valuation methods used and the types of product to which each method applies, including a description of any non-standard method
Whether negative reserves are held
Whether the valuation has been carried out on a policy by policy basis or model points have been used
If model points have been used, the approach to determine these model points

Valuation assumptions
Interest rates used
Mortality bases used
Morbidity bases used
Inception and recovery rates for income protection business
Allowances made for future changes in morbidity
Inflation

Expense bases used
Persistency
The methods and bases used for the calculation of the reserves for options and guarantees
The methods and bases used for the calculation of miscellaneous reserves
- Cashflow mismatching reserves
- Currency mismatching
- Contingency reserves
- Expense overrun reserves
- Third party default reserves
- IBNR

Changes in valuation basis since previous year

Reinsurance
Names of the reinsurers
Nature and extent of the cover given under the treaty
Reinsurance premiums payable by the insurer
Amount deposited under any deposit back arrangement
Details of any financial reinsurance or "financing arrangement"
Whether the treaty is closed to new business
The retention by the insurer
Whether the reinsurer is a connected company of the insurer
A description of any material contingencies, such as credit risk or legal risk, to which the treaty is subject
Information on any major cedants to the insurer
Reinsurance premiums paid to the insurer
Reinsurance premiums ceded

Other
Details of company e.g. name, registered address
Directors' certificate
Auditors' report
Information on derivatives
Information on controllers
Outsourcing arrangements

(ii) **Policy reserves**
Amount of best estimate liabilities, split by line of business
Key best estimate assumptions used
Key methodologies used. e.g. stochastic approach to determine the value of options and guarantees
Explanation of differences to the original prudent valuation
Carry out for previous year end for comparison purposes

Capital requirements
Results of stress scenarios for each of the following risks:
Market risk
- Interest rate risk
- Equity/property risk
- Credit spread widening risk

- Concentration risk
- Currency risk

Counterparty default (or "credit") risk
- Reinsurance
- Corporate bonds
- Securitisations
- Derivatives
- Intermediaries
- Other credit exposures, e.g. service companies

Insurance risk
- Mortality risk
- Disability/Morbidity risk
- Lapse risk
- Expense risk
- Catastrophe risk

Operational risk
Risks relating to the company's pension scheme
Liquidity risk
Group risk
Aggregation (diversification effect)
Correlation factors used between risks
Any adjustments to assets from previous regime/admissibility of assets
Total combined capital requirements
Full solvency balance sheet under the proposed new approach

Part (i) was generally reasonably answered. No credit was given for points relating to embedded value or ICAs.
For part (ii) some candidates did not appear to have read (or understood) the scenario correctly, having apparently missed the important point that the capital requirements are set by stress tests which are prescribed by the regulator.

3 (i)

Full payment of GP costs
Full cost of hospital treatment
Full cost of accident and emergency
Free ambulance service
Full cost of medically necessary alternative therapies
Coinsurance on cost of prescriptions
Coinsurance on dental treatment
Coinsurance on optical treatment
Coinsurance on residential long term care
Attendance Allowance (AA) for disabled people aged 65+ needing help with personal care
Disability Living Allowance (DLA) for disabled people aged under 65 needing help with personal care
Carer's Allowance paid to persons looking after someone who is disabled
Employment and Support Allowance (ESA,) gives people of working age a replacement income if they have an illness or disability that affects their ability to work

Statutory Sick Pay (SSP) is paid to employees who are unable to work because of sickness. SSP is paid by the employer for up to a maximum of 28 weeks
Industrial Injuries Disablement Benefit is extra benefit money if you are ill or disabled from an accident or disease caused by work
Some coinsurance and benefits may be means tested or age dependant or condition related

(ii) **PMI**

This could replace the State provision of free GP and hospital services for acute conditions on an indemnity basis. A version would be required which covered chronic conditions such as cancer.
Recuperative care – nursing and accommodation, home care
Dental costs or dental plan
Optical costs or optical plan
Additional cover for accident and emergency treatment

LTCI

Provides a cash lump sum or annuity to contribute towards the costs of care or (less commonly) could indemnify the cost of care throughout the remainder of life
Provides personal care and nursing care and associated domestic services
May be provided in own home, day centre or care home as required
Could be immediate needs or prefunded

Income Protection

Pays regular income during periods of incapacity which would cease on recovery or State retirement age
Income level is known at outset
Any occupation definition would be standard to replace State provision
Pay an additional regular income if incapacity was caused by an accident at work or a disease caused by work
IP could replace several components of State provision, including SSP and ESA.
Any of the products could be made available on an individual or a group basis

(iii) **State**

Protecting the nation's health – may improve productivity of workforce and GDP if faster and better treatment.
May encourage people to work to benefit from employer contribution or just to fund their own care.
Will need to ensure an appropriate range of treatments remain available.
Risk of inadequate provision or excessive cost.
Will need to ensure all employees and employers contribute.
Encouraging private providers should improve the available treatment and therefore population health.
Balancing the budget – would reduce the cost of healthcare to the State, though this will be possibly limited if the non working are still funded by the State. Need to factor in additional costs arising if need to fund or subsidise those who are not working. Any saving will be offset to some extent by a

possible reduction in tax revenues. Costs would be incurred (eg advertising) in educating people about the new system.
Will need to work out the percentages to be charged and need to manage or regulate the scheme on an ongoing basis.
Treatments currently defined as hospital treatment may start to be provided by GPs and clinics in order for them to still be paid for by the State.
State hospitals are in the majority so should make a profit charging for treatment.
Subsidising the poor – how will non-workers be funded.
Transitional issues as older workers will have less time to build up their personal fund. Older workers will think they have already paid for their care through National Insurance Contributions and tax.
May discourage working and lead to reliance on the State.
May not fit with social culture / political promises.
Issues will arise in regard to those who may be deemed "uninsurable" due to lifestyle or health considerations.

Taxpayers/Working individuals
Easier access to treatments and no limit on treatments, provided can afford it; however, may not be able to afford treatments.
Longer wait for GP appointments if they start to offer hospital treatments.
Will providers face sufficient competition to keep costs reasonable?
Taxes may fall, but this is unlikely to be by as much as the contributions; even if this happens, for most this will just result in a redistribution of payment.
May not like having to make compulsory payments.
There may be compulsion to pay for dependants and ex-spouses leading to disputes.
May feel fairer as don't subsidise others; may feel less fair as sickness or low earnings are not usually a deliberate choice.
If an employee loses his/her job, then treatment only continues until the fund is exhausted.
May result in over reliance on investment performance.
Depending on the future role of NHS hospitals, individuals who work for the NHS may find their jobs and/or remuneration structure changed or transferred to private sector.
Fixed percentages place a relatively high burden on higher paid employees, which they will not be happy about.

Employers
May improve staff productivity and minimise time off work. On the other hand, employees' health may worsen under the system if they choose not to have treatment in order to save costs or maintain their fund.
Need to be satisfied about availability of care.
Have to pay premiums to fund and may otherwise have to participate in aspects of administration of the scheme.
Taxation will fall but this is unlikely to be by as much as their contribution therefore increases production costs.
Premiums paid may exceed value of benefits – employer may be subsidising other employees or the State.

Non-working individuals
No cover for those who are unemployed so must rely on State aid, charity or spouses. Children and non working dependants are not covered. This may create an underclass.
Possibly more pressure to get work.
No apparent cover for those who are retired and who have not been able to build up an appropriate level of fund.

Private providers (hospitals)
More opportunities to make profit.
May cluster provision in affluent areas.
There may be increased competition between providers which could push treatment prices down.
Can they expand quickly enough to meet the increased demand?

Current providers (NHS hospitals)
In the short term State hospitals are in the majority so should make a profit charging for treatment. Their starting position of a near monopoly will reduce as private providers enter the market; hence will need to become more competitive. Their guaranteed funding is likely to reduce unless they are used to provide the safety net to ensure the underfunded are treated and/or to ensure a sufficient range of treatments are available.
They may have to reduce the range of treatments they offer, especially if the definition of hospital treatment changes so that clinics and GPs can offer them in order for them still to be paid for by the State. They may find themselves providing the less profitable treatments that private providers choose not to.
Will lose experienced staff to the private providers so there may be negative impacts on the quality of care.
They may have legacy issues e.g. will they still be expected to take the major role in training doctors and nurses and if so how will this be funded?
However, they may find opportunities to be innovative and make profits.
State hospitals may be closed and sold to private providers or their sites may be sold for development.

Distributors, e.g. brokers
More individuals may use brokers to choose the best provider of the personal healthcare plan. There may therefore be more opportunity to earn commission and fees.
May result in increased work for business consultants, advisers and actuaries.

(iv) Would need to define the product which the insurer is able to offer. Is it possible to offer part of the package, e.g. just sell the PMI policy or hospital reimbursement part or just invest the individual's fund and insist the policyholder takes a policy with another provider? Could the individual invest with one insurer but use some money to buy a policy from another?
Would this be a group or individual policy?
Will the non-working population have similar funds paid for by the State?
Any scope for employees to self insure or for individuals to opt out and agree to self fund only at the time treatment is required?

Need to decide what investment options to offer (if including the fund aspect).

Underwriting / claims management
Most likely to be unrestricted open enrolment.
Will normal underwriting be allowed? Can lives or claims be declined? Will all lives have to be accepted at standard rates? Will the level of standard rates be restricted?
Will there be limits on the additional premium which can be charged for more risky lives?
Will pre-existing condition exclusions, waiting periods etc. be allowed?

Withdrawals/lapses
If written on a group basis, would the individual move their fund on changing employer.
Ownership issues: need to keep individuals' funds segregated if part of a group policy.
Would the basis for calculating the surrender or transfer values be prescribed.
Consider the number and cost of exits due to fund exhaustion.

Admin
Significant volume of business – can the company cope? How much administration would employers carry out? Will system changes be required? Are there sufficient trained staff to cope with volumes of new business? Need to ensure sufficient trained staff to deal with the likely significant higher claims management burden.
Contributions may be small and employee and employer contributions may have to be processed separately.
Would the insurance company have an audit role e.g. be responsible for ensuring the correct percentage was paid?

Morbidity/Mortality
The company will have data on its insured population – will need data for the potential new market which has previously been uninsured. Will also need data in respect of conditions not previously covered by PMI products (particularly chronic conditions). Population statistics, and possible overseas data, would be most useful but will need to be adjusted for changes in underwriting standards, claim procedure etc. Need also to consider trends in experience, especially for morbidity.

Claim experience
Need clear definitions of what will be covered under hospital treatment.
Will upper limits be permitted e.g. per treatment or per year?
Need to estimate claims incepting, suitable claim payments for each inception rate.
Need to know anticipated future levels of charges by the hospitals.
Is there potential for insurer to make agreements with certain hospitals? May be able to exploit opportunities for arbitrage e.g. to pay hospitals the discounted amount but debit the fund with the full amount, income tax or VAT savings.

Since chronic conditions must now also be covered, may look at introducing disease management programmes.

Investment returns
This should reflect the expected return on the underlying investments (net of expenses).
Investigate any further investment earning potential e.g. between premium payment and point at which claims begin.
Will individuals choose their investment type? Will there be investment guarantees?
Need to consider the impact of the fund becoming exhausted
Does the company have appropriate fund management expertise (if offering the fund aspect)? May decide to outsource the investment management (and/or other areas).

Expenses
Will the level of expense charges be restricted by the government? If so are they sufficient to cover anticipated costs allowing for changes in initial and claim underwriting costs, fee basis, etc.?
Need to allow for any specific one-off costs and any expected additional costs (e.g. product development, changes to the systems, training, underwriting).
Annual administration costs, regulation costs, claims acceptance, payment and monitoring.
Need to estimate the number of reimbursements expected and the cost of administering them.
Policy fee or fund related annual management charge.
Assumptions about new business volumes will be needed for spreading fixed costs. Similarly need assumptions about renewal rates.
Need to consider mix of PMI policies verses hospital reimbursement when estimating expenses.
Estimate volume of premium for future years and average premium size.
Estimate mix of lives by age and sex –this is likely to be the working population but allow for the treatment of the non-working population.

Fee basis
Need to allow for anticipated changes to the sales process and consider how the product will be distributed and any government imposed restrictions on fee basis or sales process.
Will the product be sold to employers or employees?
How strong is the company with this distribution channel?

Tax
Suitable assumptions will need to be made taking into account the company's current and future tax position. May also need to allow for employer's or individual's tax position including any tax breaks for the product.

Incentives
Will the government be offering incentives to individuals or subsidies to insurance companies?

Will preferred suppliers be selected? If so, will other companies still be allowed into the market?

Profit

What would the profit criteria be and the ability to set according to the company's requirements? Is there potential for sufficient profit allowing for any restrictions? The degree to which the company can incorporate margins into premiums/charges to reflect approximations/unknowns in earlier calculations, insurer's attitude to risk, any short term guarantees given would be relevant, as would the sensitivity of profit to key risks and variables, including claims costs, expenses and new business volumes.

Risks

Lack of existing experience of a large part of the potential market increases the risk of mis-pricing and of claims being higher than expected.
Underwriting restrictions could also increase such risks.
Being a completely new market, there is a high risk of new business (and renewal) volumes or mix differing materially from that expected.
There is a risk that the proposed legislative change is not actually implemented or is reversed after a short period by a new government.
There is a reputational risk if customers expect all services to be provided in private hospital type accommodation with no queues, and these expectations cannot realistically be met or if the insurance company is blamed for an individual's fund running out.

Other factors

This will be a very large market which will require a significant injection of new capital. Will need to investigate the capital required and its cost to the insurer including the Solvency II impact.
Will reinsurance be available and on what terms?
Reserving bases, significant new business may lead to new business strain.
Will the company have sufficient free assets?
Will the statutory reserving basis be changed for this business?
Does the company actually want to enter this market – does it fit with the brand? Is the expected market share sufficient?
What are key competitors expected to do?
How could the insurer differentiate itself in order to attract a high market share e.g. through quality service levels or investment choice?
Opportunities for innovation to create new options and products e.g. cover for accident and emergency.
Opportunities, brand awareness and advertising – could lead to cross-selling of its other products.
The insurer may need to offer this in order to negate the potential loss of existing PMI business once the new system is introduced.
The views of the shareholders.
Need to consider TCF requirements.
Are there alternative better uses of capital?

Part (i) which was bookwork and part (ii) were generally well answered. Not all candidates appreciated that the questions asked for an outline and spent too much time giving detailed descriptions.
In part (iii) many candidates picked out the right range of "affected parties".
Part (iv) was reasonably well tackled by the better candidates, who often set out the considerations under sub-headings, leading to a more structured answer. However, many candidates provided too few points to gain many marks.

END OF EXAMINERS' REPORT