EXAMINATION MARKING SCHEDULE

Exam Date: 7 June 2010 (am)

Subject F103 — General Insurance Specialist Technical

Time allowed: Three hours

Generally, one half-mark awarded per tick given. Valid points not included on the marking schedule will be awarded marks.

Time proved to be an issue for most students and as a result exam technique played a particularly crucial role. The students who attempted the big-ticket questions (7,8,9) earlier in the paper would have put themselves in a better position than those that attempted these questions later.

QUESTION 1

Risk Factors

- How good a driver are you or the other drivers on the policy?
- What is the likelihood of your car being stolen?
- What is the traffic density in the areas where you drive your car most often?
- If your car is in an accident, how easy or difficult would it be to fix? What is the ease with which it gets damaged.
- Number of miles driven
- Speed with which vehicle is driven as well as general performance
- Type of cover

Key Challenges:

- How do you get information on these factors?
- Without any historical data, it may be difficult to determine the impact of the risk factors on the level of exposure e.g.
- You may omit an important risk factor and as such expose yourself to selection risk
- Transition between conventional and new product? Do you still offer the old product and expose yourself to selection there?
- Is it an easy thing for the market and distribution channel to understand? Can it be explained easily?
- Who else is offering this product – are you going to be a lone voice trying to educate the market. This adds to the expense?
- If it is the only such product in the market, how is the regulator likely to react to it?
- How will you collect premium – in advance or in arrears (e.g. you get information on how well the client drove over a certain period say, after the fact)? What is the risk of people not being able to pay if you collect in arrears?
- The young driver market is a risky one. Underwriting and pricing will therefore have to be extremely fine-tuned so as not to incur losses.
- By differentiating better than the market, the insurer is likely to attract more of the lower risks and its competitors more of the higher risks. This is good for the insurer. However, the higher risk applicants may get frustrated at the actions of this insurer and brokers consequently boycott it
- How is the product being launched and marketed? Direct marketing may be better than through traditional brokers in this case.
- Because it is a new product claims experience monitoring versus pricing assumptions must be done quickly and intensely

QUESTION 2

Financial assistance and Financial Reinsurance

Reinsurance funds are available to assist direct insurers financially with particular business propositions in enhancing capital positions of insurers. This takes place essentially through two mechanisms: either using the reinsurer to transfer some of the existing liabilities of the insurer to the reinsurer at a smaller (reinsurance) premium than for what it is shown in the direct insurer's balance sheet or future business flow is transferred to the reinsurer in exchange for immediate compensation from the reinsurer**√√√√**. Where a particular distribution strategy would involve substantially more cash outflow in the initial stages than premium income, reinsurance commission may be available to factor future surplus streams i.e. lend now against the predicted future flows of I less E**√**. The Utopian reinsurers may be able to provide more favourable commission terms due to the lower taxes they have to pay i.e. they can generate higher margins**√**. The higher the commission paid to the company, the higher its retained income which can be used to improve its solvency position**√**. These commission amounts are effectively loans disguised as reinsurance commission payments. The insurer repays the loan out of profits made on underlying business**√**. Will this be acceptable to local regulator? **√**

Occasionally, where the reinsurer can identify a block of renewing business which is producing regular profits, capital can be found for the insurer to bolster the free asset position by reinsuring this portfolio of profitable business. **√** The reinsurer would pay an initial commission after which the reinsurer would be entitled to the future surplus of premiums over claims for as long as the arrangement is in place. **√**

The free asset position improves because the insurer only repays the loan out of future profits. **√** Hence its assets grow without a corresponding increase in liabilities because they do not need to reserve for the future "loan" payments. **√**

Another avenue available is a financing arrangement where, in return for an initial upfront reinsurance premium, the cedant receives an annual annuity of some pre-determined amount designed to improve its accounting position, provided that the regulator accepts that this is a reinsurance arrangement and allows the future reinsurance recoveries to be shown at face value and not discounted**√√**.

This sort of arrangement, where there is little or no transfer of risk from cedant to reinsurer is frowned upon by regulators in most developed nations but it is likely to fly in Utopia given the lax regulatory environment. **√√**

QUESTION 3

- Variability in claim size (over time and at one time) – the variability of claim sizes creates uncertainty about whether changes in claim costs from year to year are due to changes in underlying risk or some random variation
- Characteristics of policyholders, including anti-selection – has there been a change in the marketing or channel that has resulted in a shift in profile of clients insured or vehicles covered? Risk that lower premiums charged are inaccurate and attract poor risks that are not priced for correctly.
- Policyholder's attitudes to claiming (more awareness) – policyholders are maybe now more aware of the covers that they have due to big drives from banks and hence more prone to claim or banks are now more aware of policies covering their assets and they institute the claims.
- Crime rates (affecting extent to which cars are stolen) – theft rates show considerable variation from year to year creating uncertainty about whether increases are going to occur
- Economic conditions – poor conditions and high interest rates may affect the second hand car market artificially and result in a marked reduction in the value of cars. Ti may be difficult to predict the incidence of such events and hence to project depreciation of car values
- Judicial decisions – courts may make awards that inflate the amounts due on such policies and the admission of certain sorts of claims. Decision relating to imprecise policywordings can create new classes of claims. Courts awards etc are hard to predict
- Legislation – these can be fiscal (tax etc), removal of limit on compensation levels and changes restricting the use of certain factors in underwriting (e.g. income group, or financial institution). The first two are difficult to foresee and the third introduces anti-selection risk
- Accumulations of risk – aggregation of claims triggered by a single event e.g. insuring cars of employees of a company that live in a certain area that is hit by a flood or meteor
- Catastrophes - the extent to which the risk of these is mitigated
- Latent claims – catastrophes may result from sources that were unknown or for which legal liability was not expected at the time of writing the business. The cost of such claims cannot be allowed for with any accuracy in assessing the financial results of existing business or in calculating future premiums
- Currency risks – does the company have any international branches that sell this product?
- Reinsurance risks – inability to make reinsurance recoveries, failure to comprehend the true limits/coverage of a reinsurance arrangement
- Interpretation of wording – if it is worded imprecisely this may result in claims that were never intended to be covered arising e.g. the policy won't pay unless an underlying insurance policy pays. There will however be some residual uncertainty as to whether certain types of event may give rise to a legitimate claim
- Inflation and depreciation – rate of escalation of insurance claims related to an increase in general price of motor vehicles in the future
- Valuation of vehicles – dealt with earlier

- Claim exclusions might not have been applied or too leniently stipulated
- The differences will lie in the expected claims cost which in turn will be attributable to either frequency or severity. The latter two aspects need to be analysed in depth - separately
- Claims assessment costs are usually attributed to the claims costs and there may be differences here as well – loss adjusters charges and extent of recoveries for example different to what was expected
- Inadequate risk differentiation – a competitor doing better risk differentiation and attracting the better risk leaving our insurer attracting the poorer (poorly priced) risks

QUESTION 4

REINSURANCE STRATEGY

This company has for the last couple of years (excluding the most recent one) had quite a large portion of its business reinsured. This does not make sense given that they are a very large insurer and hence are not likely to need so much reinsurance (capital position should be sound – which it in fact was over the period in question and they have been making reasonably healthy profits so they were probably not uncomfortable with their underwriting practices). **√√** It may be that they have decided to go with such a strategy because they may be looking to make the best use of their capital e.g. they cede to a reinsurer that is part of their group of companies that operates in a tax friendly territory, hence by ceding their most profitable business to that reinsurer, they optimize their ability to extract profit for the group). **√** It may also be that there was regulation in place that made it mandatory for them to cede such high proportions to say "local reinsurers". **√**

The reinsurance proportion falls dramatically in the most recent year. This may be because:

- Whatever loophole existed that enabled them to maximize their capital efficiency has been closed**√**
- There has been a sudden turn in the reinsurance cycle which has caused rates to harden and as such the company feels that the increased cost of sourcing reinsurance is not justifiable**√**

It is unlikely that the high levels of reinsurance observed can be attributed to the company wanting to reduce their strong solvency margin in the years from 2004 to 2007/8. **√**

- Drastic change in business mix from long-tail to short-tail business
- Mergers, acquisitions, sell-offs of subsidiaries
- Changes in UMAs
- Changes in accounting and/or regulatory standards, requirements or practices

DECLINING FINANCIAL STRENGTH AND CONSEQUENCES

The company's solvency margin has been steadily declining from high levels. It could be that the hurdle rate of return that the shareholder's required was not being met √ (despite the positive margins attained) and there has been a gradual move to return capital to shareholders in the form of (special) dividends. √ This probably doesn't explain the current low level of 38% though. √ The sudden drop in the solvency margin in the most recent year may be due to a sudden increase in the premium income√ of the business (solvency margin is expressed as a percentage of net premiums) due to a drive for expansion, a new channel or a new product. √ To the extent that the current level is close to the minimum solvency margin, the company may attract the attention of the regulatory authorities and hence put undue pressure on management. √ The low solvency margin will also have an impact on the company's investment strategy√ as well as its ability to sustain any massive expansion drives in the future. √ It is clear that the margins for the first four years were not the maximum that the company could have generated (judging by the last year's margin) and it may be that the decline in the solvency margin may abate or stop on the strength of the higher (potentially) retained profits. √

We are not sure whether the profit margin given in the question is net or gross but given their levels of reinsurance the company must be writing a very profitable line of business in order to generate the margins they have so far. They will obviously want to increase the volumes written but this will be constrained by the declining solvency position (depending on what the statutory minimum is). √

Also consider:

- Downturn in the insurance cycle
- Slackening of underwriting, and/or pricing and/or claims management
- Inadequate reserving
- Investment losses
- Expense overruns
- Reinsurance losses

QUESTION 5

Overstating the reserves could:

- Worsen the apparent results, leading to a loss of confidence by shareholders, brokers and/or the stock market**√**
- Reduce the apparent solvency margin, possibly causing problems with the regulators**√**
- Tie in assets that could be applied more usefully to other projects by the insurer**√**
- A weaker solvency position would restrict the company's investment freedom**√**

Understating the reserves could:

- Cause apparent profits to be prematurely distributed, leading to future problems meeting liabilities**√**
- Result in larger tax payments in the short term than would otherwise be the case**√**
- Present a more favourable balance sheet than is the real case – thereby misleading all stakeholders – in the extreme case trading a company that is actually insolvent which would be a criminal act

QUESTION 6

INCOMPLETE DATA

We need to allow for IBNR and the incomplete year. Assuming that risk is spread evenly over each year, **√** then there will be 1.5 months of claims missing from the latest year, 1 month of unexpired cover and 2 weeks of IBNR. **√** We can therefore estimate the final year's data as:

Number of claims: 440 * 12/10.5**√**

Cost of all claims: 902,260 * 12/10.5**√**

LARGE CLAIMS

Truncate the large claim of 1,750,000 in 2007-2008 to 250,000. **√** This results in a reduction in claims cost of 1,500,000 (to 1,281,330). We must add the 8.6% loadings for large claims to the premium later. **√**

INFLATION

We need to inflate the historic data to the same monetary terms. If we inflate to 2010-2011 then we will not need to allow for inflation later. We are told that inflation is 5% per annum.

Year of Cover	Cost of Claims	Inflation-adjusted
2005-2006	461,620.00	589,157.09
2006-2007	620,290.00	753,966.37
2007-2008	1,281,330.00	1,483,299.64
2008-2009	311,410.00	343,329.53
2009-2010	1031150	1,082,707.50
Totals	3,705,800.00	4,252,460.13

√√√√√

TRENDS

We need to check trends in both claim frequency and average cost per claim. We calculate the claim frequencies as shown in the table below. **√**

Year of Cover	Average no. of vehicles	Number of claims	Frequency (%)
2005-2006	540	300	56%
2006-2007	620	400	65%
2007-2008	690	390	57%
2008-2009	750	490	65%
2009-2010	840	500	60%

√√

*Need to use adjusted latest year claims.

There is no obvious trend in this data. **√** The claim amounts also display no obvious trend (quite volatile). **√** Hence, we can work with the accumulated data. **√**

We will need to assume that the outstanding reserve estimates are reasonable since we can do no better. **√** We know that they are estimates because of the roundness of the numbers.

The risk premium excluding large claims is therefore:

Total Claims Cost / Total Number of Vehicles = 4,252,460.13 / 3,440 = 1,236.18**√**

Large claims are 8.6% of the total claim cost and so the risk premium including large claims is:
1,236.18 / (1-0.086) = 1,352.50**√**

LOADINGS

Commission: 12.5% of OP
Expenses: 10%
Profit: 5% of OP (we are up against a competitor who is new in the market and probably selling at very competitive rates hence we are not going to load our full profit margin) **√√**
Contingencies: 5% of RP
Investment return: we can allow for investment return on 18 months' premiums and assuming that the rate earned is 10%, this gives a loading of approximately 15% of premium. Obviously students can assume any rate here but the key point is that they assume a rate of return in order to calculate the investment income loading. **√√**

The Office Premium (OP) per vehicle is therefore given by:

OP = RP + 0.125OP + 0.1OP + 0.05*RP + 0.05OP – 0.15OP
= (1,352.50 * 1.05) / (1-0.1-0.125-0.05+0.15)
= 1623**√√**

There will be an end-of-year exposure adjustment to reflect the actual number of vehicles insured. **√**

QUESTION 7

i. Report might include:

- Aim is to meet liabilities**√** and subject to this, maximize return**√**
- Consider nature, term, currency and amount of liabilities**√√**
- Split of insurance liabilities into PL (long tail/real) **√√** and IP (short/fixed) **√√**
- Split of total liabilities into insurance liabilities and shareholders' liabilities**√**
- No agents' balances therefore fewer zero-income assets**√**
- Term: PL like medium-term government bonds**√**, IP like short bonds/cash**√**
- Note uncertainty of outgo**√** and lack of suitable assets for perfect match**√**
- PL: Closest match is equities and index-linked government bonds**√**, but inflation link may not correspond exactly**√**
- Liquidity vital due to uncertainty and catastrophes**√**
- Mismatching may achieve better returns**√**, subject to sufficient shareholder funds and acceptable level of risk**√**. 30% may be reasonable to allow this**√**
- Currency should be rands for both assets and liabilities**√**
- Tracking indices is an option**√**
- ALM could be used to investigate strategies**√**
- Derivatives may be used**√**

POSSIBLE ASSET MIX

Insurance Liabilities		**Shareholder Funds**	
Cash	10-20%	Equities and I/Linked	20-30%
Other shorts	20-30%	Property	5-10%
Medium Government bonds	10-20%		
Equities and I/Linked	5-10%		
Total	70%	Total	30%

AWARD A MARK FOR ACTUALLY ATTEMPTING A DRAFT REPORT FORMAT

ii. Points in reply may include:

- Cashflow may not be positive in the future**√** due to changes in business mix, catastrophes, expense increases and loss ratio increases**√**, which may result in need for realising assets**√**
- Need for liquidity and protection against volatility in assets**√**
- Expertise is required – at a cost – to invest profitably in equities and property
- Property and equities have volatile market values**√**
- Consider technical solvency position**√**
- Exact matching or immunization of liabilities impossible**√**
- Statutory solvency measures are more stringent if assets are in equities in property

QUESTION 8

FACTORS TO CONSIDER

- Consider each class of business separately, including the size of the class
- relative to the whole business
- purpose of the estimate (outstanding claims or IBNR)
- case estimate or stats method
- changes in the policy conditions
- size and variation of claim amounts
- number of claims/relative size of class
- length of time until claim is settled
- amount and quality of data available on each class
- experience of claims staff
- time/costs involved
- other factors affecting stability of claim costs
- If we choose a statistical method then which one?
- consider the data available
- examine data vis-à-vis assumptions in the method
- external assumptions required
- IBNR — any changes in claim settlement practice
- acceptability to supervisory bodies

ASSUMPTIONS MADE

- Claims are fully run off after 5 years
- Average amount of claim payment in real terms is consistent for each development year
- A constant proportion of total number of claims handled for each accident year is handled in each development year
- The definition of claims has been consistent

CALCULATION OF RESERVE

Incremental CLAIM AMOUNTS (R millions)					
	Development Year				
Accident Year	0	1	2	3	4
2005	306.00	78.00	36.00	16.00	6.00
2006	297.00	89.00	44.00	24.00	
2007	322.00	69.00	57.00		
2008	275.00	72.00			
2009	335.00				

√√

	Incremental CLAIM AMOUNTS (R millions)					
	Inflated to mid-09 amounts					
Accident Year	0	1	2	3	4	
2005	393.64	93.78	40.83	17.12	6.00	
2006	357.07	100.94	47.08	24.00		
2007	365.21	73.83	57.00			
2008	294.25	72.00				
2009	335.00					

√√√√

Incremental NUMBER OF CLAIMS					
	Development Year				
Accident Year	0	1	2	3	4
2005	435	92	40	18	3
2006	497	101	38	20	
2007	615	137	55		
2008	520	98			
2009	606				

√√

	Average Cost (Claims Cost/Claims Handled)					
	Development Year					
Accident Year	0	1	2	3	4	
2005	0.90	1.02	1.02	0.95	2.00	
2006	0.72	1.00	1.24	1.20		
2007	0.59	0.54	1.04			
2008	0.57	0.73				
2009	0.55					
Average by Dev Year	**0.667**	**0.823**	**1.099**	**1.076**	**2.000**	

√√√√

Use the basic chain ladder method to calculate the run-off of claims handled.

	Cumulative Claim Numbers				
Accident Year	0	1	2	3	4
2005	435	527.00	567.00	585.00	588.00
2006	497	598.00	636.00	656.00	659.36
2007	615	752.00	807.00	832.49	836.76
2008	520	618.00	661.79	682.69	686.20
2009	606	731.48	783.31	808.05	812.20
Development Factors		**1.207063**	**1.070858**	**1.0315877**	**1.005128**

√√√√

	0	1	2	3	4
Accident Year	Incremental Outstanding Claims Handled (yellow)				
2005	435	92.00	40.00	18.00	3.00
2006	497	101.00	38.00	20.00	3.36
2007	615	137.00	55.00	25.49	4.27
2008	520	98.00	43.79	20.90	3.50
2009	606	125.48	51.83	24.74	4.14

√√

MULTIPLYING THE CLAIMS HANDLED BY THE AVERAGE COST FOR THE APPROPRIATE DEVELOPMENT

	Outstanding claims in 2009 monetary terms				
	0	1	2	3	4
2005					
2006					6.73
2007				27.42	8.54
2008			48.11	22.48	7.00
2009		103.28	56.95	26.61	8.29

√√

Inflated to average date of payment	
Year 6 payments = (1.05*(103.28+48.11+27.42+6.73)	194.82
Year 7 payments = (1.05^(2)*(56.95+22.48+8.54)	96.99
Year 8 payments = (1.05^(3)*(26.61+7.00)	38.91
Year 9 payments = (1.05^(4)*8.29)	10.07

√√√√

Total **340.79**

QUESTION 9

i. Assumptions: No reinsurance, business is written uniformly throughout the year and risk is uniform throughout the year.

	A	B	C
ASSETS			
Total Investments	100	1700	950
Current Assets	5	50	25
Deferred Acquisition Costs	3	50	15
Total Assets	**108**	**1800**	**990**
Liabilities			
O/s Claims Reserve	30	400	700
AURR	20	0	0
UPR	30	500	100
Current Liabilities	12	60	30
Free Reserves	16	840	160
Total Liabilities	**108**	**1800**	**990**

ii. Assumptions: No change in GWP from 2008, hence GEP = GWP for 2009. Also assume no AURR b/f for any of A, B or C.

a. Actual SM = Free reserves/Net Written Premium
A = 16/60 = 27%. B = 840/1000 = 84%. C = 160/200 = 80%.

b. Claim Ratio = Incurred Claims/Earned Premium
A = 60/60 = 100%. B = 500/1000 = 50%. C = 120/200 = 60%

c. Return on Capital Employed = Profit/Free Reserves
Profit = Earned Premium – Incurred Claims – Increase in AURR – Expenses + Investment Income
A = -26/16 = -162.5%. B = 425/840 = 50.6%. C = 50/160 = 31.3%.

iii. A has a much lower SM than B and C.
This would, other things being equal, imply that B and C are more strongly financed than A. **√**
However A may value its assets and liabilities more conservatively than B and C which reduces the value of the Free Reserves and hence the SM. **√**

Also, A may have suffered some poor claims experience recently which is implied by the higher claims ratio of 100%**√** compared to 50% and 60% for B and C, thus reducing its Free Reserves.
As none of the 3 companies have bought any reinsurance cover a large claim will clearly affect the results to a greater degree for the smallest company i.e. A. **√**
The outstanding claims reserve for A at the end of the year is 3 times higher than that at the start which leads to the high claim ratio. **√** A similar level would have given a claim ratio of 67% which would then not have been that much greater than C. **√**
This increase in the outstandings may be the result of a large claim not yet settled or of a strong reserving basis. **√**
The above mentioned factors have also led to the Return on Capital Employed for A being much worse than that for B and C. **√**
A further factor leading to the poor return is the setting up of an AURR at the end of 2009. **√**
This would indicate that either the premiums charged by A have been inadequate maybe through poor underwriting standards or latent claim effect, or, a catastrophe has occurred shortly after the end of 2009 affecting A only and thus an AURR has been set up. **√**

iv. Expense Ratios

Management expenses/written premium

Commission (if applicable)/written premium

These give an overall indication of the cost of writing the business.

Widely varying levels of one or both of these will indicate how the business is written and/or the classes of business written

Combined Ratio/Operating Ratio

Claim ratio plus Expense Ratio

This gives an indication of the overall insurance performance of the company

Reinsurance Ratios

NWP/GWP

Net Claims Incurred/Gross Claims Incurred

These give an indication of the dependence on reinsurance cover and the effect of reinsurance on the statutory solvency margin

Investment Return

Investment Income/Mean Asset Value

This gives an indication of the investment performance of the company

Asset Liability Ratio

Total Assets/Total Liabilities

This is probably a better indication of the solvency margin than that in part (ii) as this takes into account the effect of different lengths of run-off

Premium Ratio

Earned Premium/Written Premium

Indicates pattern of writing business in the year assuming that it is mainly annual type business i.e. showing a general growth or fall in volume

Claims Pattern Ratios

Paid Claims/Outstanding Claims Reserve

Indicates settlement pattern and thus possibly classes of business written

Profit Margin

Underwriting Profit/Written Premium

Insurance Profit/Written Premium

Total Profit/Written Premium

The first ratio is effectively the Combined Ratio

The second ratio includes investment income on the technical liabilities in the numerator. This will therefore give an overall indication of the performance including

investment return which may be considered to be better than the UW definition as due allowance is made for length of tail of business written

The third ratio includes investment income on Free Reserves. As this depends upon the level of free reserves it is of less use than the other two ratios for comparing insurance performance