

**INSTITUTE OF ACTUARIES OF INDIA**

**SUBJECT CA1 –Paper II**

**May 2010 EXAMINATION**

**INDICATIVE SOLUTION**

Q1. Solution:

Reasons why a general insurance company may make a loss while writing profitable business:

- Liabilities earlier considered as contingent liabilities and not provided in books of accounts resulting into actual claims eg. Loss in a court case, claims from tax authorities earlier under contention etc
- deterioration in claims experience of previous years business and experience worse than provisions mad
- supervisory provisions too cautious this could be due to changes in legislation in respect of old block of business leading to increase in provisions
- reinsurer failure/default
- asset values fall - if fall in asset values fall requiring recognition in Profit and loss account (impairment of asset values)
- fraud, which leads to significant loss
- Change in legislation or tax eg contribute to industry compensation schemes or compliance costs.
- Regulatory fines.

[4]

Q2. Solution:

(i) Options that could be offered are:

(a) Household contents insurance

- a. Option to protect no claims discount
- b. Option for covering – building, garden, personal money, etc
- c. Option for covering high value items (eg sports equipments)
- d. Option to have longer period cover at a higher but fixed premium

(b) Defined benefit pension scheme

- a. Optional tax free lumpsum on retirement
- b. Option to transfer value to another arrangement
- c. Option to pay extra voluntary contributions

(ii) Risks to the provider

a. Selection

From the customers taking the base policy, only those who perceive themselves to be higher risks would select for the option. This effect of selection is difficult to measure and hence price accurately.

b. Failure to cost the options correctly

If the option is under-priced, then all the bad lives are going to take the option and exercise it too. This will worsen the selection effect mentioned above.

c. If the options are at guaranteed terms

[5]

## Q3. Solution:

Analysis of surplus is performed in order to:

- i. Assess if the actual experience has been better or worse than expected and the financial impact of that variation
- ii. Show the financial effect of writing new business
- iii. Validate the calculations and assumptions used
- iv. Provide a check on the valuation data and process, if carried out independently
- v. Identify non-recurring components of surplus thus enabling appropriate decisions to be made about the distribution of surplus
- vi. Reconcile the values for successive years
- vii. Provide management information
- viii. Provide data for use in executive remuneration schemes
- ix. Provide detailed information for publication in the provider's accounts
- x. Demonstrate that the variance in the financial effect of the individual levers is a complete description of the variance in the total financial effect
- xi. Give information on trends in the experience of the provider to feed back into the actuarial control cycle

[5]

## Q4. Solution:

(a) The four main accounting concepts are:

- i. **The going concern concept:** The enterprise will continue in operational existence for the foreseeable future
- ii. **The accruals concept:** revenue and costs are recognized as they are earned or incurred, not as the money is received or paid
- iii. **The consistency concept:** there is consistency of accounting treatment of like items with each accounting period and from one period to the next
- iv. **The concept of prudence:** revenue and profits are not anticipated and provision is made for all known liabilities, whether the amount of these is known with certainty or is a best estimate in the light of the information available.

Two examples of possible conflicts:

- i. **Consistency Vs prudence** – It is prudent to follow legislation and if the legislation changes then the approach isn't strictly consistent. Or changing economic circumstances may lead to changes in allowing for surrender values or claims experience, this prudent but not consistent.

- ii. **prudence and accruals** – according to accrual concept we can take credit for premium income from a customer (if it is due) even though it has not yet been received, this is again against the principle of prudence.

[6]

Q5. Solution:

The key factors affecting the choice of assumptions are:

- i. purpose of the investigation
- Is it to price a contract or for calculation of the reserve
  - Within reserving say, if it is for statutory purpose or for internal purpose
  - Purpose will decide the nature and level of margins to be built in the assumptions. i.e. do you want prudent or realistic assumptions
- ii. financial significance of the assumptions
- Not all assumptions are equally important in a certain work
  - Say, interest rate assumption in term assurance contract
- iii. consistency between assumptions
- The value of individual assumptions may not be as significant as the relative value with another assumption
  - For eg. Relative assumptions of discount rate and salary inflation may be more important than the individual values in valuing pension benefits
- iv. legislative and regulatory requirements
- There would be minimum standards set by the regulations
- v. the needs of the client
- level of detail as required by the client
  - does the client need a broad brush results or detailed results using a series of assumptions

[6]

Q6. Solution:

a) Criteria for grouping data:

- i. It has to be a trade-off between lots of groups for accuracy and small number of groups for credibilit

- ii. It should be grouped so that the whole data is reduced to manageable number of relatively homogeneous groups
  - iii. This also depends on the volume of data available. Very scant data will have to be grouped together to create some credibility.
  - iv. With a large volume of data, it may be good to divide it into many categories (to create better homogeneity within the group). Also good to use for better risk classification
  - v. grouping should be such that each policy in a group is expected to produce similar results when the model is run
  - vi. it should capture the most important characteristics of the group of policies it represents.
  - vii. Grouping is possible only if enough risk categories are captured at the first place.
  - viii. It also depends on the purpose of the investigation. If it is for a rough estimate, then they could be all clubbed under only a few groups.
- b) The number of model points will depend on
- i. The sensitivity of the results to different choices of model points
  - ii. The purpose of the exercise; need of the client eg is the results expected to be accurate or broad brush. Also the ease of explaining or interpreting the results.
  - iii. Number of model points that can be handled by the model. i.e. computing constraints
  - iv. Time constraints
  - v. Any cost constraints.

[6]

Q7. Solution:

Benefits to the State

- Use of medical services can be expected to be higher over age 60 putting strain on available resources(especially in an ageing population)
- Encouraging these people to provide their own care may relieve some of the demand on the State services,
- This will be of positive benefit to the State system if there is currently excess demand for medical treatment leading to poor service, queues and general discontentment with state services.
- Alternatively, the change may allow the state to reduce the scope of its coverage ie to provide a more basic and cheaper service

The tax change is effectively a State subsidy on premiums. The cost of this subsidy may be less than the cost of treatment, maintenance of infrastructure and medical network of hospitals etc.that would otherwise have been borne by the State

- The premium subsidy may result in those over age 60 becoming more aware of their health, and taking better care of themselves. This will have the effect of reducing the long-term costs of medical treatment.
- It will be popular with taxpayers over age 60 especially if this means faster and better levels of service.

***Potential problems***

- If there are limited medical resources, particularly medical staff, this may have the effect of increasing funding for the private sector and attracting staff away from the public sector. It may force up wage levels and cost of medical care across the board.
- If the state system is good, then the incentive may not reduce the burden on the state as people may choose to continue with the free state service. Also there may be a lack of trust over private sector providers.
- It will not be an incentive for all those aged over 60 because not all these people will pay tax.
- Those who pay tax will be the more affluent, and so the subsidy favors the better off at the expense of the poor.
- Those under age 60 may complain or lobby for the subsidy to be extended to them.
- There are administrative costs of organizing the subsidy.

[8]

Q.8 Solution:

(a) The main factors to consider are:

- i. Customer need that needs to be addressed in the product design
- ii. Level and form of the benefit
- iii. Options or guarantees
- iv. Discretionary benefits
- v. Benefits taken early ( discontinuance benefits)
- vi. Profitability
- vii. Marketability
- viii. Competition
- ix. Regulatory requirements
- x. Financing & accounting requirements
- xi. Premium levels and volumes
- xii. Charges Vs expenses
- xiii. Extent of cross subsidies
- xiv. Administration systems

These factors are neither independent nor mutually exclusive; they could be conflicting with each other.

(b) The main variations could be

i. The amount/ level of sum assured

Based on ones earning capacity, liabilities to take coverage for, number of dependents, etc could be various circumstances which would decide how much sum assured should a customer take.

ii. Sum assured being flat or decreasing

Customers taking a loan under the principal and interest repayment method would prefer to go for a decreasing cover, whereas one taken loan under interest only method would want his cover to stay level.

Also if the purpose of taking cover is to provide the dependents with financial compensation of the loss of future earnings, the cover should be level or even increasing.

iii. Addition of any rider benefit; like Critical illness rider

It might be cheaper to get critical illness cover as a rider than take a stand alone benefit.

Accelerated critical illness rider on a loan coverage assists in covering the loan even in case of a critical illness and relieve the family/ dependents of the liability. The rider premium incase of accelerated benefits is quite cheap.

iv. Waiver of premium, on sickness, unemployment or accident, etc

During sickness or unemployment, there is a temporary loss of income, you don't want your term assurance to lapse because you can't pay your premiums.

v. Whether or not premiums can be reviewed

Risk averse customers would prefer to have a guaranteed premium rate for the term of the contract, whereas others may prefer a non-guaranteed rates as they expect future improvements in mortality rate may make the rates go down and that guarantee comes with a cost.

vi. Continuation option at maturity, without further underwriting

At a small additional cost, one can get cover at a future date (when one is not sure of future health condition).

Expect the student to give atleast 5 variations and description in that.

Any other valid variations with appropriate justification is also fine.

[14]

Q9. The main concerns of the pension regulator are-

- Protection of interests of members of the pension schemes and the stability of the sector.
- To prevent the government or other schemes from having to bail out badly managed ones
- To ensure that Employers are not using the scheme to subsidize the company

The individual areas may cause problems because mis-management in any of the 4 areas mentioned above could adversely impact the solvency of a pension scheme.

- Diversity is good in principle and excessive exposure to a specific sector of the economy/industrial group could expose the scheme to systemic failure in the sector
- Investments in sponsoring employer controlled could be abused to direct ‘cheap credit’ to entities owned by employer and impact return on investments and security of the benefits of the members
- With self-investment, there is the issue that if the company goes under, individuals lose their jobs and their pensions as well.
- Companies listed in exchange are more likely to have better corporate governance structure , more stringent norms relating to disclosures than un quoted companies. Likelihood of failure of the company and hence default in investments are more in case of un quoted companies.
- Unquoted companies are less marketable and harder to value so increasing the risks of default etc.
- Employer Contribution holidays might imply cut in expenses when it’s not justified by the state of the scheme’s finances.

b)

- i) Limits on exposure to investments in any business/industrial sector/industrial group

The regulation should ideally specify

- Maximum exposure to any specific sector expressed as % of total scheme investments
- In addition to ensure there is no excessive exposure to any one company within a it could also specify limits on total exposure expressed as % of investee company’s total value for eg., Note more than (10% of Outstanding Shares (Face Value) or 10% of the value of Pension Fund assets, whichever is lower, can be invested in Equity Shares of Investee Company) or that no more than say 20% of each sector’s allocation can be in one company (or linked companies).

- ii) Limits on exposure to investments in sponsoring employer owned or controlled entities

The regulation should

- Clearly define employer controlled entities(for eg., in terms of percentage shareholding, board representation, management control etc.)
- Prescribe limits on maximum exposure to other employer controlled entities.
- Prescribe that all such investments need to be at “arms length basis”, I,e, transactions happen on market consistent terms
- It should prescribe norms for disclosure of such investments to the regulatory body and to members of the scheme

Disclosures and trades are independently verified or audited.

- iii) Norms relating to Investments in unquoted domestic companies

The regulation should



- Specify a minimum capitalization threshold to avoid small firms, or specify minimum number of years that a firm have been established or bar from investments in firms that are controlled by a small number of shareholders to avoid especially risky situations.
- Specify limits on exposure to non-listed entities and non-listed investments
- Prescribe norms for valuations for such investments
- It should prescribe norms for disclosure of such investments to the regulatory body and to members of the scheme
- Disclosures and trades are independently verified or audited

iv) Contribution holidays

The regulations should specify circumstances under which contribution holidays can be availed-

- Contributions holidays can arise if there is a large surplus in a scheme. The pension regulator needs to review the method and assumptions used for funding the scheme. The assumptions need to be credible and internally consistent. Instead of regulatory review of the valuation , the regulations could prescribe an independent review of the scheme positions, the valuation methods and assumptions.
- The regulations could specify certain “stress tests” which the scheme needs “pass’ to ensure solvency of the scheme
- Different norms need to be prescribed for contributory and non contributory schemes. For eg., if an employer avails a contribution holiday the employees should also get a saving (or a boost in benefits) if the employer does.
- there should be annual reviews to ensure that the holiday is still appropriate (if inter-valuation periods are longer than 1 year, say).
- A proviso could be that any deficit that arises post contribution holiday should take precedence over any other employer commitments

[16]

Q10. Solution:

The major risks involved and ways to mitigate are as below:

S.No	Risks	Mitigation
1.	<p>Legal &amp; overseas regulation:</p> <p>(i) Does the current license permit the company to operate overseas</p> <p>(ii) what are the regulations under the overseas market? It is about being aware of all the relevant regulations as well as how we intend to comply to them. Building those expertise.</p> <p>(iii) there would also legal issues involved in how to</p>	Engage consultants who specialize in that market.

	<p>operate in that market. Do we need to set up a new company in that market?</p> <p>(iv) how would the profits generated treated, any repatriation issues, double taxation agreements, etc.</p>	
2	<p>Web security – policy holder information should be secure.</p> <p>This includes any credit card fraud</p>	Employ software firms to advise on suitable package
3	<p>Product Design &amp; pricing:</p> <p>Appropriateness of the product design in that market. Will it be appropriate to have the home market products to be sold in the overseas market?</p> <p>Does the product need to be consistent with the other products sold in the home market?</p> <p>How will we price it? Where do we get the data for demographic &amp; economic assumptions?</p> <p>There would be difference in the mortality and any potential selection issues?</p>	<p>Using thorough research, try to sell more generic products. And only if confident to generate certain minimum business volume.</p> <p>Take help of reinsurers or Actuarial consultants experienced in that market.</p> <p>To start with have less risky products? With low or no guarantees, higher savings element; reviewable rates</p> <p>Or Reinsurer most of your business till there is enough experience to increase your retention.</p>
4	<p>Competition – what are other e-retailers doing and how will it impact your business.</p> <p>We don't want to be thecheapest.</p>	Monitor rates being charged by other players
5	<p>Capital requirement – for the estimated business volume do we have adequate capital.</p>	As above, good market research will help to assess the expected NB volume
6	<p>Branding – how will the customers be attracted to the website and will they recognize the brand name?</p>	Advertise in those markets; use local company to promote the brand image;
7	<p>Investible assets:</p> <p>how will the premiums collected be invested? Would they</p>	Evaluate outsourcing model Vs in-house management. Cost Vs benefit.

	<p>be invested in that market or the home market?</p> <p>What do the regulations permit?</p> <p>Do we have the expertise to invest in those markets; cost involved in building those capabilities.</p> <p>Should we invest with local fund managers? The fund managers would have their own charges. Will it be more expensive than managing by the company itself?</p> <p>This will also determine the competitiveness of the product</p>	
8	<p>Logistics – will there be a need to have local services. Collection from home of some documents, medicals, delivery of policy contracts</p>	<p>Investigate companies offering third party delivery services and select the one which suits our requirements</p>
9	<p>Policy servicing requirements – how will the customers overseas get any changes done during the policy tenure.</p>	<p>Set up suitable internal system to monitor and manage such requests</p>
10	<p>Management resources available</p> <p>How much effort and money are the management willing to put?</p> <p>Whether to outsource certain activities and what should be the scale of operation would depend on this?</p> <p>What are the return expectation of the management? Both in terms of returns and how soon do they want to break-even.</p>	<p>Various business models will have to be presented to the board along with the associated cost.</p>
11	<p>Currency – will the movement in exchange rates affect the price/charges of the product. How will it affect the profitability of the company</p>	<p>It might be possible to hedge the currency risk</p>
12	<p>Language – should be able to have multi language promotional material, facility for the web page to be displayed in multiple language</p>	<p>Employ people who are experts in the specific language</p>

[30]

[Total Marks 100]

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