Institute of Actuaries of India

Subject SA1 – Health and Care Insurance

November 2013 Examinations

INDICATIVE SOLUTIONS

Solution 1 :

i. a) **(1)** The terms available on renewal may be identical to those applicable to a new entrant, with the same risk characteristics.

(2) Alternatively the renewal premium will reflect the experience in the previous insured period(s), via full experience rating.

Life Insurance Companies - Three year guaranteed health insurance plans, and on renewal terms available to existing customers are those applicable to a new entrant.

General Insurance Companies - Annual renewable contracts, where experience of previous insured years are built in through experience rating or a specified % of loading.

(3 Marks)

b) The possible reasoning for the prescribed regulations could be:

- To give the policyholder the ability to buy valuable medical insurance at a reasonable price
- Greater confidence that review increases or decreases are calculated fairly
- Clearer explanations of what reviewability means and when will it have impacts on premiums charged to policyholder
- Continued availability of reviewable-rate products in the future

(2 Marks)

ii. For starting business outside India, the company needs to consider following issues in detail.

- The level and type of competition for health and care insurance in the territory being considered:
  - The level and type of competition will vary by country.
  - The competition may be from long established large domestic insurers, State quasi-monopolies and multi-national insurers, or from local third-party administrators, community.
  - Self-funding groups, or in some countries nothing at all.

  The actuary will need to be wary of countries where there is no public or private pre-funded health and care provision; local circumstances with research will reveal the reasons for this.

- Details of the State provision of healthcare in that territory, as this varies widely.

- In developed countries, the State may play an important role in some forms of health provision giving anything between a wide scope or no scope at all for privately funded insurance.
- In all countries, especially the developing countries, the public health facilities may be worse than the private facilities giving rise to a demand for insurance.
- In some countries, the situation is the reverse; private facilities are of lower quality than public.
- In the under developed countries, State provision is at a low level, only the wealthy and the expatriate can afford private healthcare paid out of current income.

- The potential for niche opportunities which the Indian insurer can take advantage of:
  - Contracts where the insurer has specialist knowledge.
  - Contracts where the insurer can provide a superior claim control system to the current local competitors.
  - Local competitors may be small and inefficiently run, whereas larger Indian companies may be able to afford much greater IT investment.
  - Links with a key distributor of the insurer's health and care products.

- The distribution channels available, as availability will vary from country to country:
  - The insurer will need to understand the local market and its requirements in terms of sales remuneration and regulation, if any.
  - Full sales training and tight control of sales is often very necessary.

- The need for local representation and assistance, any insurer is inviting disaster if they do not have a local presence. It is advisable to seek local assistance, as all literature will need to be translated into the local languages.
  - A joint venture with a local insurer may need to be considered.
  - Important local contacts may include hospitals and doctors/consultants. A reinsurer or consultancy firm may be able to facilitate many of these introductions.
  - The insurer will benefit from the knowledge and help of people experienced in the territory.
  - If a joint venture is not possible, the insurer may consider the takeover of a local insurance company or rely on reinsurers to provide assistance.

- The local culture
  - The local culture will be a determining factor in the provision of healthcare and health insurance.
  - Religious views may be a considerable factor in how healthcare is organised and delivered locally.
  - Insurers need to be wary of linking the admission of health and care claims to that of the State or State sponsored scheme.
  - Typically, the requirements for admission of the claim in a public healthcare system are far less rigorous than the private insurer.
  - This leads to a far higher level of claim.

- Prevailing legal and regulatory matters
  - Advice will be required on legal and regulatory matters where local custom and practice will need to be taken into account.

- The requirements to put contracts in place:
  - The insurer will need to put contracts in place, subject to local law.
  - Local representation will be vital to see that these are interpreted and effected as originally intended.

- The need for reinsurance.
  - Reinsurers can provide much assistance in establishing health insurance markets overseas.
  - This can range from being able to assess risks particular to the local territory to providing the data required to model the viability of the proposed launch.
  - The reinsurer's assistance can therefore be essential to the success or otherwise of the project.

(15 Marks)
[Total 20 Marks]

Solution 2 :

i) The ways in which reinsurance can be used to control risks are:
- To limit exposure to risk
- To enable larger risks to be written and smooth profits
- To enable the reinsurer's technical expertise to be used
- To help with group schemes
- To help with concentration of risk
- To help with new products.

(3 Marks)

ii) ***Advantages*** of ART:
- Smoothes earnings using fewer and less costly hedges compared to conventional hedging.
- It can use natural hedges created by non-correlated risks to reduce overall costs.
- Under ART, deals are company specific and made to order. The company does not buy what it does not need.
- Allows company to focus on what it does best and outsource the rest.
- Reduces administrative duties through less paperwork and fewer contacts.

Disadvantages of ART:
- May require large initial outlay and may make deal-making and legal process lengthier.
- Requires paradigm shift in way company measures and manages risk leading to cultural barriers.
- There is confusion regarding the regulation and accounting standards for ART.

- ART is less-standardized and more difficult to price and understand terms.
- It is new concept, making it difficult to assess the capabilities and reputation of ART counterparties. **(7 Marks)**

[Total 10 Marks]

Solution 3 :

i) a. Process for evaluating the need for a product includes the following:

- Pro Forma should be prepared to analyse the potential for meeting growth and profit objectives.
- Target population to be covered.
- Needs of target customers to be identified and accordingly product features finalised.
- Payouts for the distribution channels to be determined.
- Products are priced based on either company's own experience or representing industry experience.
- Competition benchmarking and fine tuning product that meet needs of all stakeholders, customers, distributors and shareholders.

(2 Marks)

b. Factors to be considered when establishing a network provider are:

- Population to be served
- Type of product being offered
- Accessibility of providers in urban / rural areas
- Trade-off between the size of the network and level of discounts
- Trade-off between the size of the network and medical efficiency
- Entities with which to contract
- Target reimbursement levels and methodology
- Current referral patterns
- Consideration of the quality levels of the providers you contract with.

(3 Marks)

c. Measures of any network performance can be classified under monetary and non-monetary factors:

Cost:

- Price charged for their services.
- Discounts negotiated with various hospitals.
- Utilization measures i.e. number of claims settled per 1000 members.
- Average claims cost per member.
- Types of cases admitted.
- Length of stay by diagnosis.

Quality:

- Number of hospitals where tie ups made for cashless and other services.
- Access of care within these hospitals.
- Process and documentations that are obtained for claim processing.

- Sense of well- being by policyholders.
- Perceived quality and behavioural indicators.

(3 Marks)

ii) Characteristics of different factors that have an impact on lapse assumptions:

- **Age –** Younger policyholders tend to have a higher lapse rate than older policyholders, except at ages just prior to retirement.
- **Frequency of premium reviews (long-term policies) –** A policyholder with monthly premium payments has twelve times as many opportunities for lapsation as one paying annually. However when premiums are collected automatically through ECS facility and cancellation requires a positive action by the insured, persistency usually significantly increases, therefore worst persistency is seen in quarterly and half yearly mode compared to annual and monthly model policies.
- **Duration –** Most blocks of policies will have lapse rates that decrease by duration. Lapse rates will usually become level after a period of time. They will often be expressed as a constant level after a specific duration.
- **After - sales service –** Policyholders buying health is a sophisticated customer and therefore after sales service, regular renewal notice are very important factors affecting product lapses.
- **Distribution methods including distribution channels –** Banc-assurance as a distribution channel has much better customer loyalty, there is less miss-selling in the interest to protect image of the bank and therefore better persistency is experienced compared to agency model.
- **Past claims experience (regular claimants are less likely to lapse) –** those policyholders who are claiming regularly, they see a cash benefit in continuing policy and much lesser likelihood of their lapsing the policy.
- **The economic situation –** when the economic cycle is down it will have a co-relation with increased lapsation.
- **Competitiveness –** Premium levels can have a significant impact on lapsation. If policyholders can find equivalent coverage elsewhere for less money, they are much more likely to lapse a current policy than otherwise. Premium increases can have a drastic effect on lapsation. Some insurers have experienced situations in which the entire expected aggregate increase in premium was offset by increased lapsation.
- **Occupation –** The occupation of the policyholder can have a significant impact on persistency. While this is usually considered in analysis of disability income covered, it is usually not considered for medical coverage.

(5 Marks)

iii) Key challenges in group sales market by employers:

- **Steep increases in cost of insurance –** The increasing cost of treatments has exposed organizations to financial burden of increasing insurance premiums which could be contained by either limiting existing benefits under insurance policy or sharing the costs with the employees which conflicts with the objective of providing these benefits.

- **Constant pressure from employees to increase benefits –** Most of the organizations are dealing with the employees' demands to increase benefits limits under existing insurance plans which are not in-line with the current costs and health seeking behaviour under changing circumstances.

- **Limited Coverage –** Insurance benefit is restricted to hospitalization only and that too with policy terms & conditions that limit the coverage. Also, there is no scope for preventive healthcare / primary healthcare that's essential to be healthy and therefore minimize hospitalization.

- **Data insufficiency –** Insured organizations do not have sufficient data to know the health profile of its workforce and take corrective steps wherever applicable and they are dependent on data being collected by their Third Party Administrators (TPAs). This limits them to perform only rudimentary analysis, limiting their understanding of emerging and underlying claims experience.

- **Paying for Insurance companies' profits –** Premiums charged by insurance companies include overheads like brokerage, administrative expenses, fees payable to TPA, and margins for profits plus service tax (that in itself is more than 10%). All these add up to form a significant portion of the total outgo from employers towards premium.

- **Less control over vendors:**

  - Financial interest of TPAs:
    Their service fee is mostly linked to premiums. This leaves TPAs with no incentive to lower claims costs that directly impacts premium.

  - Biased attitude of hospitals:
    Most if not all hospitals tend to maximize billing through needless tests / procedures / prolonged stay when they treat an insured under a corporate health insurance policy. This increases the claims costs and hence future premiums costs for organizations.

Possible solutions:

- **Data comes first –** It's high time for companies to start investing in data collection processes in order to understand healthcare needs of its workforce from close. Sickness and its resultant absence behaviour of workforce should be studied in different forms and segments to understand their specific behaviour and related healthcare needs.

- **Invest in preventive healthcare –** Prevention is better than cure. Companies need to understand their employees' health needs from a long term perspective, device and implement appropriate wellness programmes by suitable vendors to alter employees' health behaviour and help them increase their fitness and productivity levels.

- **Communicate and engage workforce –** It's always good to hear out from employees about what they want. Invest in effective communication with employees to understand their needs and encourage them to bring changes to their lives to attain overall fitness and reduce stress and hence illnesses. Engage leaders to take it forward and share the success stories of achievers to motivate other people.

- **Changes in existing insurance plans –** Ideally, seek inclusion of Outpatient costs towards preventive and primary healthcare to start with. And over time, bring in lifestyle management benefits under the existing insurance plans to reduce future frequency and severity of ailments or diseases and hence claims costs. Go for a structured coverage in the policy so that it can respond to a variety of situations.

- **Control over vendors –** Set clear performance benchmarks for TPAs' steering them to reduce costs and improve efficiencies. Have proper service level agreements in place stating the type and frequency of reports required by them. Keep a check on costs of treatments under different hospitals and compare the same with industry averages to identify anomalies and biases.

- **Learn from the market –** Clues could be taken from what others employers are doing to improve health and productivity of their employees and implement similar measures appropriate to one's organization.

- **Last but not the least: "Self-Insure" –** Why to pay for insurance companies' profits when a company knows what its workforce needs! Pay only for benefits which are highly uncertain and build a pool to meet the costs from predictable claims. This would save insurance costs and help in channelizing funds in the right direction.

(7 Marks)
[Total 20 Marks]

Solution 4 :

i) Claim cost per policy = Frequency X Severity = 30,000 X 10% = Rs. 3,000/-
Claim cost per policy including claims expenses = 3,000 X 1.05 = Rs. 3,150/-
Claim Outgo + Claim Expenses + UW Cost = 3,150 + 200 = Rs. 3,350/-
Claim Outgo + Claim Exps. + UW Cost + Mgmt. Exps. = 3,350 X 1.06 = Rs. 3,551/-
Overall Intermediary Cost = 50% X 10% + 30% X 12% + 20% X 0% = 8.6%
Gross Premium before Service Tax:

$$Gross\ Premium = \frac{Claims\ \&\ Fixed\ expenses\ per\ policy}{1 - (Variable\ expenses + Profit)}$$

Claims & Fixed expenses per policy = Rs. 3,551/- (as computed above)
Variable expenses (intermediation) + Profit= 8.6% + 4.0% = 12.6%

$$Gross\ Premium = \frac{3551}{1 - 12.6\%} = Rs.4{,}062.93$$

Overall Service Tax = 12% X (1+3%) = 12.36%
Premium including service tax = 4,062.93 X 1.1236 = Rs. 4,565.11

(12 Marks)

ii) Verification Table:

Row#	**Particulars**	**Computations**	**Results**
1	No. of policies sold	Information given in question	50000
2	Premium Collected	Row (1) X Premium from part (i)	50000X4565.11=228255500
3	Service Tax	[Row (2) X 12.36%] / 1.1236	228255500X12.36%/1.1236=25108917.59
4	Premium excld. tax	Row (3) – Row (2)	228255500-25108917.59=203146582.41
5	Total claim outgo	Row (1) X Claim cost per policy	50000X3000=150000000
6	Claims expenses	Row (5) X 5%	150000000X5%=7500000
7	UW expenses	Row (1) X 200	50000X200=10000000
8	Management expense	Rows (5+6+7) X 6%	167500000 X 6%=10050000
9	Intermediary Cost	Row (4) X 8.6%	203146582.41 X 8.6%=17470606.09
10	Profit	Row(4) – Row (5+6+7+8+9)	203146582.41-19,50,20,606.09=8125976.32
11	Profit as % of prem.	Row (10) / Row (4)	8125976.32 / 203146582.41=4.00%

As is clear from the above table the figure of profit computed as a balancing figure of premium less claims and expenses turns out to be the desired level, namely, 4% of premium which shows the per policy premium computed in part 1 is correct.

(6 Marks)

iii) Now, in order to break even:

Premium excluding service tax = Claims + All Expenses [in part (i)] + Sales promotion expenses

OR

Premium=Claims + UW Exp. + Claims Exp. + Management Exp. + Intermediary Exp. + Sales Promotion

Let the no. of policies to be sold = N, so that,

4062.93 x N = 3000 x N + 200 x N + 150 x N + 3350 x 6% x N + 4062.93 x N x 8.6% + 5000000

Solving the equation gives N = 30765.82

Hence, at least 30766 policies should be sold in order to break even in the first year considering the fixed expense of Rs. 50 Lac. This can also be verified by preparing a table as in point (ii) above.

(7 Marks)

[Total 25 Marks]

Solution 5 :

i. Following are the major heads of Assets of a Standalone Health Insurance Company in India:

1. **Investment:** This consists of GOI bonds, corporate bonds, infrastructure bonds, housing bonds, mutual funds, money market instruments, equity shares, etc. As far as value is concerned this is generally the most important asset category in the balance sheet. The currency of the assets is generally INR and tenure can be long term, medium term, short term, liquid, etc. depending on the Company's investment policy for various assets classes.
2. **Fixed Assets:** This consists of land & building, office furniture, equipment, vehicles, software, etc. As the name suggests this is long term in nature and annual depreciation is charged on its value.
3. **Cash & Bank Balance:** This is the most liquid asset and consists of cash, bank balance, short term deposits, etc.
4. **Miscellaneous Assets:** Other assets are pre-paid expenses, deposits, advances, reinsurance recoverable, etc. These generally are of comparatively small in value and may be of short to medium term.

Following are the major heads of Liabilities of a Standalone Health Insurance Company in India:

1. **Unearned Premium Reserve (UPR):** This would be a major chunk of outsider liability of a health insurance company. Since, tenure of majority of the health policies is one year the nature of this reserve is short term only.
2. **Claims Reserve:** This consists of outstanding claim reserve and reserve for claims incurred but not reported (IBNR). Since, health insurance is a short tailed line of business, nature of this is short-term. If the company is writing overseas health insurance too, then actual claim amount for outstanding claims may be in foreign currency and converted in INR for the purpose of showing in balance sheet.

3. **Other Reserves:** There can be Catastrophic (CAT) Reserve or Premium Deficiency Reserve (PDR). Utilization of CAT reserve may be uncertain and it may be short, medium or long term. PDR is short term in nature like UPR.
4. **Miscellaneous Liabilities:** Other liabilities are advance premium deposit, expense payable, tax payable, sundry creditors, etc. Most of these are short term in nature.

Besides this, other items that appear in liability side of balance sheet are Share Capital, Share Premium, General Reserve, Capital Reserve, etc. which belong to shareholders than outsider liability. Profit & Loss Account may appear on either side of the balance sheet depending on whether it has debit balance of credit.

(10 Marks)

ii. In order to match assets and liabilities first of all, discounted mean term (duration) of all asset and liability items is calculated. Then value of assets and liabilities are put against each duration bucket, for example, how much is the value of assets and liabilities with duration of 0 to 1 year, 1 to 2 years, etc. Then mismatch if any is calculated for each duration bucket. This mismatch (assets – liability) should be zero or positive for each duration bucket in order to completely match assets and liabilities.

(4 Marks)

iii. It is not absolutely necessary to strictly match all assets and liabilities by duration. Neither regulation makes it mandatory nor is it required from risk management perspective. However, insurer needs to monitor the mismatch if any in assets and liabilities by duration and should have adequate measures to minimise adverse impact of mismatching if any. Mismatching may not impact insurer adversely if there are free assets available and if its portfolio is growing, so that, gap may be bridged from the positive cash flow from policies that it is going to write in future.

(2 Marks)

iv. a) Exactly matched by duration: If the portfolio is exactly matched then there is no risk of liquidating investment at inopportune time (because of movement in interest rate or equity value). All the liabilities due may be met by the proceeds of the assets and there may not be any gap. But on the other hand, the assets will be of shorter duration as we have seen in point (i) liabilities of health insurers are of short term in nature. This means lower yield in normal circumstances.

b) Not matched by duration: If the portfolio is not exactly matched, in the absence of free assets or net positive future cash flows, the company may be compelled to sell its long term investment to meet its liabilities. If for example interest rate is higher at that time, the realisation from the sales proceeds of long term bonds, etc. will be lower resulting in loss on sale of investment. However, the return in terms of normal yield will be higher if money is invested in longer term assets.

Essentially company needs to maintain a trade-off between risk and reward in managing its assets and liabilities. **(4 Marks)**

v. The alternative to matching the assets and liabilities by duration is to use a cash flow approach. In which case, all future cash flows from existing assets and liabilities and future planned business should be considered. The cash flow can be prepared for short to medium term (few years in future). Once this is done, various scenarios can be built around future business projection, loss ratios, capital infusion, etc. This may also highlight weaknesses in investment policy of the company if any and can be acted upon. The cash flow approach would consider coupon payment and maturity timing from each bond, etc. separately unlike discounted mean term that takes average tenure based on net present value as weights. This would be more accurate.

This would help health insurance Company to mismatch in assets and liabilities by timing and value and would help in controlling risk of mismatch if any. Stochastic approach can also be of use here to give outcome with respective probability value.

(5 Marks)

[Total 25 Marks]

****