Institute of Actuaries of India

Subject CA3 – Communications

May 2008 Examination

INDICATIVE SOLUTION

Introduction

The indicative solution has been written by the Examiners with the aim of helping candidates. The solutions given are only indicative. It is realized that there could be other points as valid answers and examiner have given credit for any alternative approach or interpretation which they consider to be reasonable.

Indicative Solution: Question 1

New Market Opportunities in XYZ
Presentation by the Strategy and Research Department

15 May 2008

Contents

- Macro-economic overview
- Regulatory overview
- Products and their performance
- Summary

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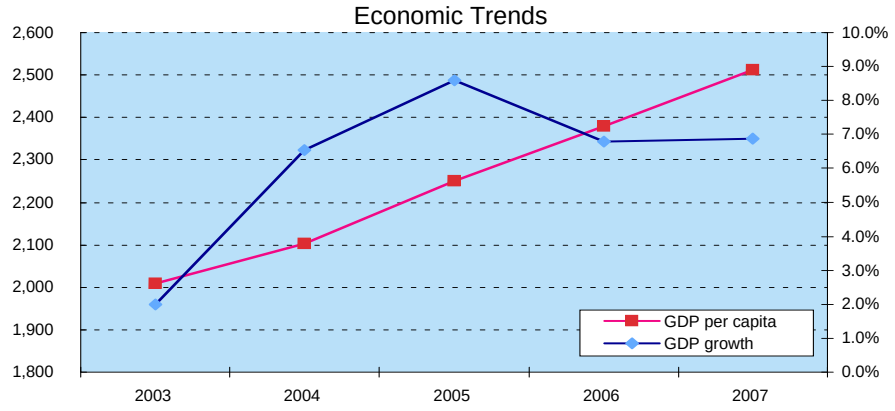
Macro-economic overview

- XYZ – an emerging country
- GDP growth of 6.1% over the last five years
- GDP per capita increased 4.7% over the same period
- Inflation averaging 5.6%, above the inflation target of 4%



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Insurance Regulatory Overview

- Regulatory environment evolving but progressive
- Appointed actuary system adopted in life insurance in 2006
- Pricing of life insurance products restricted by prescribed maximum interest rates
- Motor and home insurance products under tariff – other products are free from tariff

Fiscal policy

- Life insurance premiums are tax deductible, subject to an annual limit.
  - 2007 limit was Rs595
  - Limit has grown at 4.7% over the last five years
- Maturity or surrender values attract tax at 20% on the gains
- No tax incentives on general insurance products

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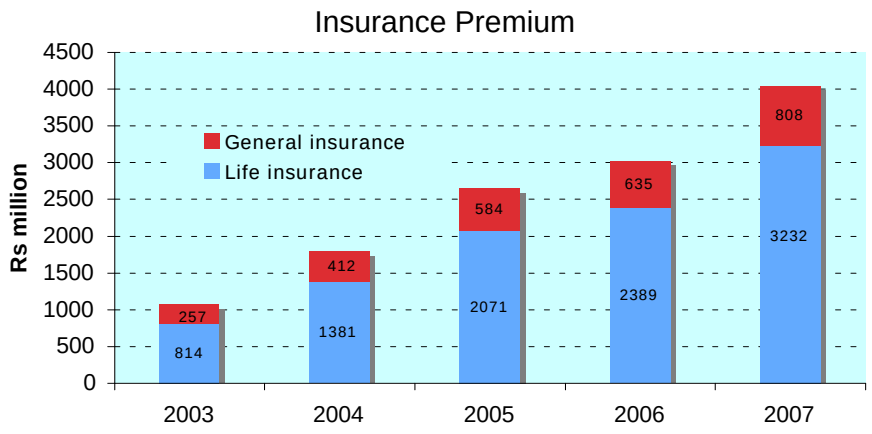
Insurance Industry Statistics

- Industry growth of 40% CAGR over the last five years
- Life industry grew 42% while the general insurance industry grew 34%
- Life insurance contributed towards 80% of the total industry premium, up from 76% in 2003



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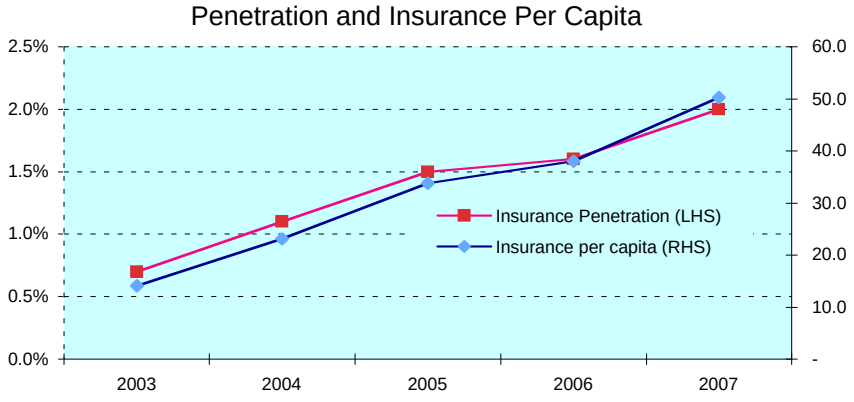
Insurance Industry Statistics (2)

- Insurance penetration has gone up to 2.0% of GDP in 2007 from 0.7% in 2003
- Insurance premium per capita has increased to 50 in 2007 from 14 in 2003



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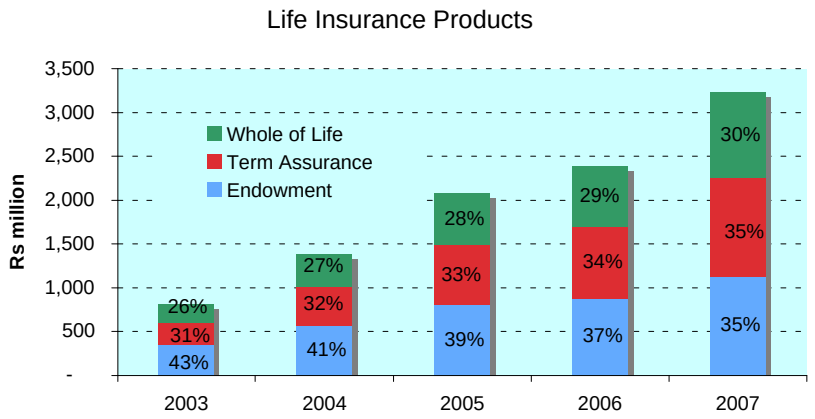
Products – Life Insurance

- Limited range of products sold
  - Endowment
  - Whole of Life
  - Term Assurance
- Unit-linked products not yet authorized – expected c2010



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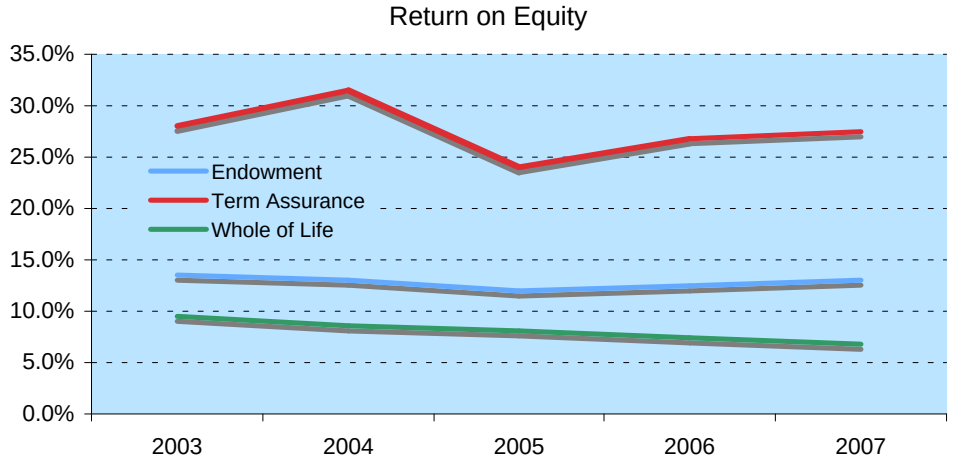
Product Profitability – Life Insurance

- Profitability measured by return on equity (ROE)
- Term assurance highly profitable, but variable over the last 5 years
- Endowment ROE stable around 12% - 13%
- Whole of Life least profitable with declining ROE



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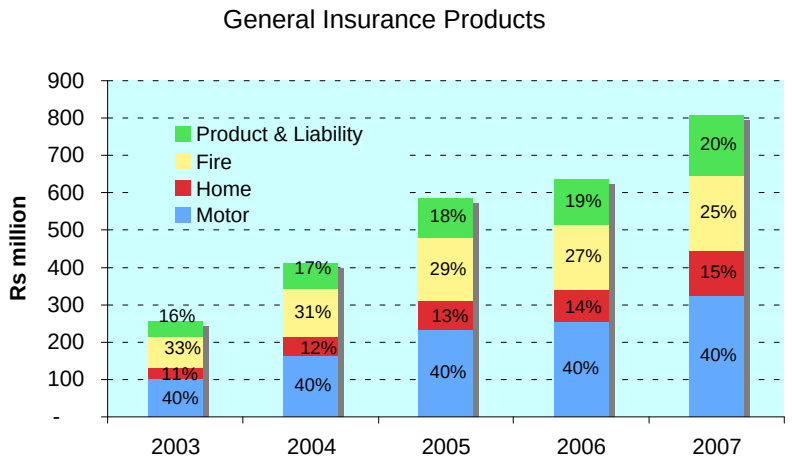
Products – General Insurance

- Motor and home insurance under tariff
  - Resistance against motor de-tariffication
- Fire, Product & Liability business de-tariffed
- Fire losing share to Home and Product & Liability product lines



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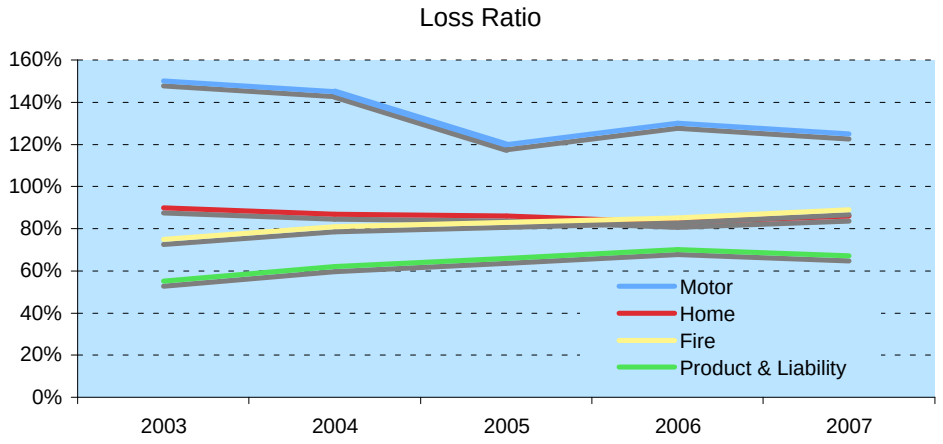
Product Profitability – General Insurance

- Motor hugely loss making (with 40% of the market)
- Fire losing share and witnessing higher losses
- Product & Liability highly profitable and stable



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Summary

- XYZ's insurance market is evolving rapidly
- Very strong insurance growth of 40% over the last 5 years
- Several regulatory constraints:
  - Unit-linked products not allowed
  - Motor and home product under tariff
  - Pricing restrictions on life insurance products
- Term assurance highly profitable and gaining share
- Endowment and Whole of Life considerably less profitable
- Tariff products less profitable, although showing recent improvements

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(Marks 60)

Indicative Solution: Question 2

Dear John,

Market value of insurance liabilities

It is very difficult to calculate the market value of insurance liabilities as there is no market where these liabilities are bought and sold. So unlike say a share which is listed on the stock exchange you cannot look up the market value in a newspaper or on a market trading screen.

Therefore as there is no regular market insurance companies have to calculate the market value from in-house financial models. These models are very complex in nature and many assumptions go into the model. Important assumptions are those regarding how volatile asset values are, death rates of policyholders, expenses of the insurer, and the rate at which policyholders surrender their policies. As the insurer is trying to calculate a market value, assumptions should always be based on market data where such data is available. For example, the extent to which the market assumes asset values can vary can be worked out from market prices of derivative instruments.

Insurance contracts are difficult to value particularly those which offer guarantees to the policyholder (e.g. a promise of a minimum 3% return on the premiums invested) and/or give the policyholder certain rights (e.g. right to a guaranteed minimum surrender value). For contracts with such features there is no formula approach that gives the correct answer. Therefore for such contracts the insurer has to run thousands of so-called "market –consistent" simulations of the model to calculate the liability.

The above simulations need to capture how the various factors relate to each other with for example the rate at which policyholders are assumed to surrender often being linked to the prevailing economic conditions. It is very important to have this linkage in the case of policies which offer guarantees to the policyholder. For example, if the policy guarantees a 7% return and interest rates have fallen to 3% more policyholders may keep their policy going which increases the insurance company's ultimate liability as the insurer has to pay the policyholders 7% when it can earn only 3% from the market.

Each simulation gives a value for the liability. The average of these forms what is called the best estimate liability. This is not the same as the market value of liabilities though. This is because if the company were to sell the liabilities on to another company the buying company would also have to hold capital to back the liabilities. The need to hold capital arises as no matter what assets the purchasing company invests in it will still be subject to certain risks (e.g. policyholders surrendering their policies at different rates to that assumed). The buying company therefore needs to hold capital to support these risks.

Holding capital however has a cost and therefore we need to add on to the best estimate liability the cost of holding capital to derive the market value of liabilities.

When insurance companies carry out this work it is important to be careful in the choice of assumptions. This is because the market value of liabilities can often be sensitive to the assumptions made about how often and to what extent adverse events take place. This is particularly so for policies providing options and guarantees to the policyholder. Recent events in the global financial markets have shown that such adverse events often occur more frequently than models have assumed and also that the extent of the downturn is often worse than that assumed in the model. Therefore one has to examine this aspect very carefully.

I trust the above clarifies the various queries you had regarding the market value of insurance liabilities.

Regards

Frank

(Marks 40)

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