INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

13th May 2010

Subject ST2 — Life Insurance

Time allowed: Three hours (14.45* – 18.00 Hrs)

Total Marks: 100

INSTRUCTIONS TO THE CANDIDATES

1. *Please read the instructions on the front page of answer booklet and instructions to examinees sent along with hall ticket carefully and follow without exception*

2. ** You have 15 minutes at the start of the examination in which to read the questions. You are strongly encouraged to use this time for reading only, but notes may be made. You then have three hours to complete the paper.*

3. *You must not start writing your answers in the answer sheet until instructed to do so by the supervisor*

4. *The answers are not expected to be any country or jurisdiction specific. However, if Examples/illustrations are required for any answer, the country or jurisdiction from which they are drawn should be mentioned.*

5. *Attempt all questions, beginning your answer to each question on a separate sheet.*

6. *Mark allocations are shown in brackets.*

AT THE END OF THE EXAMINATION

Please return your answer book and this question paper to the supervisor separately.

Q. 1) A company sells only non participating term insurance business. The company reinsures the policies on its books on a risk premium constant retention basis whereby death benefit at risk above a specified retention limit is ceded to the reinsurers.

i) The company has calculated the reinsurance premium due for the recent quarter. Mention the checks you might apply in order to ensure consistency, accuracy and completeness of the reinsurance premium calculations. (6)

ii) The company plans to launch a new non participating term product targeting lower socio-economic segments of the society for the first time. Death benefits are likely to be much lower than the current retention limits of the company. Explain the reinsurance arrangement the company might use to reduce its risks under this product (2)

[8]

Q. 2) A life insurance company promotes a limited payment unit-linked contract with the following features:

- A death benefit of 105% of fund value of units
- Surrender benefit of 100% of fund value of units
- Initial commission of 15% of the first year's premium; renewal commission of 1% in years 2 and 3
- Policy term of 10 years with a premium payment term of 3 years
- Maximum entry age 65
- No medical underwriting

The charges under the contract are:

- Initial charge of 10% of one year's premium
- Fund management charge at the rate of 1% per annum of the value of units, charged by deduction of units at the beginning of each month

i) Discuss the risks to the company of selling this product (5)

To improve the competitive position of this product in the current economic downturn, the company proposes to introduce a 'watermark' guarantee in which the unit price at maturity is guaranteed to be not less than the highest unit price recorded on any day during the 10-year term of the policy. The fund will be close-ended and will be invested in a mixture of equities and bonds. This guarantee is available only on maturity and not on earlier death or surrender.

ii) Discuss the additional risks to the company of this proposal. (2)

The company operates in a country where insurance companies are prohibited from using derivatives. Further, the company is very risk averse and wants to keep the risks to a minimum without compromising the competitiveness of the proposal.

iii) Explain the investment strategy that the company would adopt in such an environment to manage the additional risks arising from this proposal. (3)

[10]

Q. 3) In the context of the supervisory valuation of a life insurance company

i) State the principles of setting supervisory reserves for solvency purposes. (10)

Realistic reserves i.e. reserves without any prudential margins are sometimes used by management for measuring company's financial performance and rewarding key staff.

ii) State the main reasons why these realistic reserves might be negative at the start of a contract (3)

iii) Explain why a premium pricing basis can sometimes be stronger than the reserving basis (3)

[16]

Q. 4) The insurance regulator of a developing country has recently published a report on the persistency experience in the industry. A life insurance company, which has been writing predominantly unit-linked business ever since it commenced operations four years ago, has found that its persistency experience is the worst in the industry and is also much worse than that assumed in its pricing basis.

i) Discuss the possible reasons for the poor persistency experience of the company. (7)

ii) Discuss why poor persistency may be taken seriously by the management of the company. (6)

[13]

Q. 5) Regulations surrounding unit pricing and allocation in a certain Asian country have recently been changed requiring a company selling unit linked contracts to allocate/de-allocate units to policyholders on the same day's unit price as the cash/cheque for renewal or request for surrender/cancellation is received. A company operates sales offices all around this geographically diverse country where such requests are received but processing takes place at a single central location in batches

i) State the basic equity principle in unit pricing for internally linked funds (1)

As a result of compliance with the new regulations, the company is experiencing gains and losses in shareholder account in order to maintain existing policyholder's equity.

ii) Explain why such a gains and losses might occur (3)

The stock markets have become more volatile as a result of the recent financial crises. The Board of Directors has asked for a plan to minimize these gains and losses on the shareholders' account.

iii) The Chief Operating Officer has in turn approached you to come up with a range of steps that might be taken to overcome this situation. Mention the steps you would outline in your advise to the COO (5)

The company has been using appropriation price for unit pricing. Recent financial crises have reduced Unit Linked Insurance Plans ("ULIP") sales to a minimum and a significant proportion of existing policyholders have started surrendering their policies.

iv) Explain the changes that need to be incorporated in the unit pricing bases to maintain policyholder equity (3)

[12]

Q. 6) The life insurance sector in a country is dominated by endowment products. There has not been much innovation and sales in pure term insurance business in recent years. In face of increasing competition in the endowment segment, one insurance company has decided to differentiate by developing a niche play in term insurance business

The chief marketing officer has suggested that surrender values bepaid on term insurance contracts as is the case with other endowment products.

i) Outline the disadvantages of this suggestion (3)

As an alternative, the marketing officer has suggested offering a term insurance contract with a return of premiums at end of the contract.

ii) Explain whether it is possible to offer a surrender value under this version of the contract. (3)

The marketing officer has thought of another version of the pure term contract where the policyholders would have an option to renew their policy at end of the policy term or convert their policies to endowment plans without underwriting. The policyholders are also promised that the rates that would be offered on renewal/conversion would be the same as for new business being sold at that stage.

iii) Discuss the factors and risks to consider when pricing this option along with possible mitigating actions that would reduce the risk to the company from this option. (7)

The initial pilot launch indicates that this is an extremely price sensitive market and the marketing officer decides to drop all proposed innovations and offer the cheapest version in the market. One idea is to offer a plain vanilla term assurance product via internet sales (a first in this market) thereby using the savings on intermediary commissions to enhance premium rates.

iv) Describe the possible risks from this proposition (4)

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Q. 7) A life office operating in a developing country for the past three years is jointly owned by a domestic company and a foreign insurer. With the recent economic crisis, the domestic company is struggling to fund the capital injections required to support the Joint Venture (“JV”) and is looking to sell its share of the holdings in the life company. About 90% of the life office business is unit-linked with no guarantees or options, while the remaining 10% is pure term assurance, both of which are sold through the company’s own sales force and bank distribution partners.

i) Explain how to calculate the sale price of the life company? (7)

A local banking group is looking to enter the insurance space and is seriously considering this opportunity. The bank has employed a consultant to independently validate the calculation of the sale price.

ii) Discuss the critical elements in the sale price calculation that the consultant would particularly look at. (5)

iii) Outline the other factors the bank needs to consider before deciding on the purchase. (7)

The Appointed Actuary presented the sale price on a traditional Embedded Value basis using a future earned rate of 9% per annum and a Risk Discount Rate (RDR) of 15% per annum. One of the Board members wanted to understand how the appraisal value would change if the figures were instead calculated on Market Consistent Embedded Value (MCEV) basis. Under MCEV basis, both the earned rate and RDR would be at a risk-free rate of 6% per annum with an explicit allowance for risk (which you may assume in this case to be negligible).

iv) Discuss the impact of changing from traditional EV to MCEV separately for Unit-Linked and Term Assurance businesses (5)

[24]

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