INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

20th May 2009

Subject ST2 — Life Insurance

Time allowed: Three hours (14.15* pm – 17.30 Hours)

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)** A small life insurance company has recently re-priced its traditional product range and as a result is now selling significantly higher volumes of new business.
Describe the risks to the company that may result from this. (3)

b) The company sells non-linked term assurance contracts through insurance intermediaries. There has been significant pressure from the sales force to increase the medical underwriting limits (level of cover beyond which a medical examination will be required). The company is actively considering this.

Describe the factors that the company should take into account when setting the new medical limits and how it would determine the new limits. (7)
[10]

Q 2) **a)** In the context of Financial reinsurance what is "Value in force"? (3)

b) Explain the two principal types of financial reinsurance available? (7)
[10]

Q 3) **a)** You are the Actuary of a life insurance company that has written non-linked business and is now considering writing unit-linked business. The company has been using a discounted cashflow method for its non-linked business. How would you use this approach to value linked business? (9)

b) What is meant by negative non-unit reserve and what are the usual restrictions that may be imposed by regulators on the use of negative non-unit reserves? (4)
[13]

Q 4) You have been recruited as a Pricing Actuary of a new life insurance company. One of your first assignments is to design an actuarial model to assess the profitability of the products the company desires to sell. Describe the key factors that influence the adequacy of an actuarial model that you would use for projecting cashflows for this purpose. **[10]**

Q 5) A proprietary Life Office writes conventional with profits endowment assurance business. In the recent years, the office has distributed high proportion of surplus emerging under contracts through reversionary bonuses. Terminal bonus is paid on death or maturity but not on surrender. Terminal bonuses are expressed as a level percentage of the reversionary bonuses attaching.

A new series of endowment policies is now proposed to be launched with a much higher bonus loading in the premium rates; the premium rates and the bonus levels will however remain similar. The terminal bonus will be expressed as a variable percentage of the sum assured and the attaching bonuses, the rate of terminal bonus varying with the calendar year of policy commencement. Terminal bonus will now be paid on surrender as well.

Discuss the implication of the introduction of the new product from the point of view of the life office and the shareholders in terms of

- Smoothing
- Capital requirement
- Profitability
- Guarantee provided
- Risks

From the point of view of the policyholders, discuss the implications in terms of the level of guarantees available as well as the expected returns available on surrender and maturity. **[15]**

Q 6) The CEO of the life insurance company for which you are the Appointed Actuary has asked you to prepare a presentation on distribution of profits to with profits policyholders. In your presentation you need to

a) List the main methods of distributing profits to with-profits policyholders; and (2)

b) Compare these systems in terms of equity and smoothing, flexibility, simplicity and investment freedom. (12)

[14]

Q 7) You are the Chief Actuary of a small proprietary life insurance company that transacts only without profit whole life and endowment assurance business subject to annual premiums and are about to revise its premium bases.

In connection with the expense loadings to be incorporated in the premiums discuss

a) What process should be followed to apportion expenses to determine what loadings should be made? (4)

b) Two methods of allowing for those expenses which are independent of the size of the policy. (6)

c) The allowances, if any, to be made for inflationary trends. (4)

[14]

Q 8) You are the pricing actuary of a life insurance company. The company is pricing a term insurance product using cash flow approach. The only benefit is the sum assured that is payable on death.

The company intends offering two premium payment options – a single premium and a regular premium payable throughout the term of the policy. After seeing the premium rates and product features, the Sales Director has questioned the rationale behind not paying any surrender value on the single premium version of the product. She contends that the company should pay a surrender value equivalent to the excess of the single premium over the sum of all premiums that would have been paid on a similar regular premium policy.

Briefly discuss the points raised by her. **[6]**

Q 9) Describe the use of option-pricing/ market valuation techniques to calculate the cost of an investment guarantee on an Endowment assurance product with guaranteed maturity value. **[8]**

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