INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

16th November 2011

Subject SA2 — Life Insurance

Time allowed: Three hours (9.45* - 13.00 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 expected to be India Specific application for the syllabus and corresponding core reading. However, substantially the core reading material is still taken from material supplied by Actuarial Education Company which are meant for UK Fellowship examination. The core reading also contains some material which is India Specific, mostly the IRDA regulation. In view of this, it should be noted that focal point of answers is expected to be India Specific application. However if application specific to any other country is quoted in the answer the same should answer the question with reference to Indian environment.*

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

6. *Mark allocations are shown in brackets.*

7. *Please check if you have received complete Question Paper and no page is missing. If so, kindly get new set of Question Paper from the Invigilator.*

AT THE END OF THE EXAMINATION

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

Q. 1) You are the Appointed Actuary of a life insurance company in India in mid 2011. The insurer has a product portfolio including unit-linked, participating and non-participating business both in force and open to new business. The Company's operations have been affected recently due to regulatory changes that capped charges on unit-linked products. As a result the Company is looking to reduce costs and improve productivity. As a result of these changes, the Company's new business profile, as measured by annualised premium equivalent, has witnessed a significant change, with 60% of the new business coming from participating products (previous year 25%), unit-linked business contributing 25% (previous year 65%)and non-participating the remaining 15% (previous year 10%).

One of the unit-linked products your Company is planning to introduce is the Highest NAV Guaranteed Product. The key features of the product include a policy term of ten years, a premium payment term of seven years. At maturity, the product pays out a maturity benefit equal to the higher of the highest unit price achieved during the first seven years of the policy times the number of units outstanding, or the prevailing unit price times the number of units outstanding. In order to manage the unit price guarantee the Company is planning to use the Constant Proportion Portfolio Insurance (CPPI) technique. CPPI involves using an assumption for the maximum fall in equity values, without any trading being possible and the inverse of this maximum fall used to set a 'constant proportion' that determines the allocation of assets between equities and debt.

The CEO raises a question regarding the appropriateness of the product for the Indian market, and the potential risks associated with the product.

i) Describe the key risks that the product poses to the Company. In your response you should include a brief description of the CPPI technique. (7)

The product proposal will be discussed at a forthcoming Board meeting and your CEO has asked you to prepare a memorandum on the mitigants available to reduce the level of inherent risk such that the residual risk is within the Company's risk appetite.

ii) Describe the mitigants you would propose to reduce the level of inherent risk. (6)

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Q. 2) You prepare an analysis of surplus on the statutory profits annually. The Valuation Actuary in your team has prepared a draft for you for FY2010/11 set out below.

Unit Linked Business, Figures in Rs Crore			
Sources	**Expected Profit (E)**	**Experience Profit (A-E)**	**Actual Profit (A)**
Mortality	20	5	25
Persistency	50	-30	20
New business impact (on Structural Costs)	0	-20	-20
Costs (Expenses and Commission)	40	30	70
Investment	35	10	45
Assumptions/methodology	-	-	0
Total Unit-Linked Business	**145**	**-5**	**140**

Participating Business, Figures in Rs Crore			
Sources	**Expected Profit (E)**	**Experience Profit (A-E)**	**Actual Profit (A)**
Mortality	35	5	40
Persistency	40	-50	-10
New business impact (on Structural Costs)	0	100	100
Costs (Expenses and Commission)	65	-90	-25
Investment	50	25	75
Assumptions/methodology	0	0	0
Total Participating Business	**190**	**-10**	**180**

Notes:

1. 'Expected profits' includes the impact of Margins for Adverse Deviations included in the valuation basis and other margins in the valuation basis such as zeroisation of negative reserves.

2. You can ignore all other elements of Sources that may be considered such as the impact of reinsurance and global reserves

3. On the valuation maintenance expenses, the Company does not have a maintenance expense overrun. The Company has an acquisition expense overrun. These are included in the Costs line.

4. New business is analysed using costs in the structural position of the Company when there are no expense overruns.

You present this analysis of surplus to the Board. A Non Executive Director on the Board, who does not have a financial background, asks you to comment on the following elements in particular:

- what circumstances are required for the Actual profit to be attributed to Expected Profit entirely?
- impact of writing new unit-linked business and participating business on the surplus arising in the financial year,
- cost line being negative for participating business but positive for unit-linked business
- impact of persistency being negative in the analysis of surplus whereas the persistency experience has been higher than the valuation assumptions? The Director has further commented on the persistency experience being higher for unit-linked business due to the phenomenon of revivals of policies. She asks for an explanation why revival of a policy may result in a negative outcome for surplus although it should be good for business to revive policies.

i) What considerations will you have in drafting a response to the Directors' queries on the analysis of surplus? In your response you should include appropriate commentary on the methodology for analysis of surplus in addition to responses specifically addressing the comments made by the Director. You should also comment on the sources of surplus contributed by the way the Company has been managed in the FY2010/11. (15)

In response to the challenges being faced due to the regulatory changes, in particular charge caps on unit-linked business, the Company is developing a new participating product. Although the Company is 10 years old, it has an acquisition expense overrun projected to continue for another three years.

The Sales Director raises the issue of benefit illustrations and suggests following the same principles adopted for pricing unit-linked products. In particular this would include illustrating policyholder bonuses using structural costs (the costs excluding acquisition expense overrun) not current costs. The expense charge levied on the asset shares in the Participating Fund will continue to be based on current costs, a practice consistently followed for other lines of business as well.

ii) Discuss the Sales Director's proposal including aspects of any professional guidance or legislation relevant in this situation. (7)

The Board has recently constituted a Policyholder Protection Committee. One of the agenda items for the forthcoming meeting is the area of treating customers fairly. The CEO has asked you to prepare comments on how you would treat new participating policyholders fairly. You comment one of the key principles of treating customers fairly is the equitable distribution of financial outcomes amongst the various stakeholders. The CEO asks you to elaborate on this principle for the Board Committee meeting.

iii) What points would you make in considering an equitable distribution of financial outcomes for a participating product, with specific reference to the Indian regime and having regard to professional and regulatory considerations? (9)

A Director on the Board has read your recent report on Liquidity Risk. He comments on the high level of liquidity being maintained in the business and whether it represents an appropriate risk/ return trade-off. The Director mentions transactions structured in some overseas markets where insurers with excess liquidity transfer highly liquid assets, such as government bonds, to banks which typically have less liquid assets on their balance sheet. In return, the bank pledges less liquid assets, such as mortgage-linked assets to the insurer.

iv) Define liquidity risk. (2)

v) Describe the changes to your Company's risk profile should it enter into such a liquidity swap. You can ignore any IRDA restrictions on such transactions. (4)

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Q. 3) You are the Appointed Actuary of an established life insurance company in India fully owned by a Large Indian listed company. The Life Insurance company has been selling conventional participating Life, Pension and Unit Linked non participating products for the last more than 10 years. The company's portfolio, by annual premium, comprises of 25% individual conventional participating products, 65% individual unit linked product and remainder is individual term assurance, group gratuity and group mortality business.

You are approaching the financial year end and have to perform the annual statutory valuation of the assets and liabilities of the company.

i) List appropriate IRDA regulations and Actuarial Practice Standards (APS) previously called Guidance Notes (GN) that shall be applicable to you while performing in the role of an appointed actuary in your company. (5)

ii) What specific regulatory and professional considerations would you have while conducting statutory valuation of various types of assets of your company? (8)

The Unit Linked non participating pension contracts of the company provide for a cash fund at retirement that is used to purchase annuities in the open market. The company matches it assets and liabilities as closely as possible. Over the last one year, the gross redemption yields on government bonds have fallen significantly.

iii) Describe the impact of the reduction in gross redemption yield of the government bond on the statutory valuation basis and the reserves held for each of the principal product types, and hence how surplus emerging may be expected to change. (15)

As a part of annual valuation, you have to prepare the annual bonus recommendation report and present it to the Board.

iv) Describe the investigations that you would need to carry out in order to recommend the reversionary and terminal bonus rates. (10)

In your bonus recommendation report, you have recommended reducing the bonus rate on participating life and pension business by Rs. 5 per one thousand sum assured. One of the Directors mentioned that the share price of insurer's parent company has recently been underperforming and further the insurer is planning for an IPO, so the company should be increasing rather than reducing the bonus rate.

v) Discuss the issue raised by the Director. (6)

The finance director mentioned that Indian stock market has fallen by over 10% during the last 6 months and if it were to fall further by another 25% during this month, the bonus recommendation would no longer be appropriate.

vi) Discuss the points that you will consider in addressing the issue raised by Finance Director. (6)

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