INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

28th May 2012

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. Your Company's product portfolio consists of individual and group unit linked, conventional and unitized with profit, group term and individual term life contracts both in-force and open to new business. During the last financial year the Company's new business consisted of 25% individual conventional with profit and unitized with profit, 50% unit linked, 15% participating group gratuity and leave encashment business and the remainder from group term and rider benefits.

Due to certain regulatory changes and equity market movements, unit linked contracts have become less attractive to shareholders and the Company wishes to diversify into non-participating conventional products. In a recent meeting, the Marketing Director suggested a regular premium product structure such the death benefit under the contract is at least 150% of the premiums payable under the contract. The sum assured on maturity is 120% of all premiums payable under the contract. Simple Monthly increases are made to the Maturity Amount of the contract expressed as a proportion of sum assured. The Marketing Director further suggested that given this is a non-participating contract, the Monthly Increases to the contract should be made at a fixed rate, say 4% p.a. of the sum assured and should neither be discretionary nor be based on any external index.

i. What are the provisions in the Indian legislation or regulation regarding the classification of business between participating and non-participating? (2)

The product proposal will be discussed at a forthcoming Executive Committee meeting and your CEO has asked you to prepare a memorandum on risks inherent in the proposed product structure and what are the options available to company to mitigate or reduce the level of risk.

ii. Describe the key risks that the product poses to the Company. (5)

iii. Describe what you would propose to reduce the level of inherent risks in the product. (5)

The Finance Director is concerned that the operating expenses incurred by the Company may exceed the maximum management expenses allowed as per the legislative provisions and the product team needs to ensure that an appropriate level of expense is allowed by the design of the contract.

iv. State the legislative provisions on limitation on management expenses and commission of a life insurance company and how could they apply to the pricing of products. (7)

The Industry body has recently released the statistics of the market share of premiums written by each of the insurance companies in the market. It has been noted that your company's share of the market for term insurance contracts is declining for the last two years.

v. Describe the possible actions open to the company to reverse this position. (5)

vi. Discuss the data and other key aspects you need to consider before implementing these actions. (5)

The Marketing Director has recently joined the Company from another life insurer that only sells Unit Linked business. The Marketing Director wrote to you that many Scheme sponsors object to the application of a Market Value Adjustment (MVA) to the group gratuity participating contracts. He further mentioned that he never understood why it was necessary to apply an MVA and agrees with the views of scheme sponsors. He has specifically asked you to guarantee that the MVA will never be applied to group gratuity contracts. He further goes on saying that being able to offer these kinds of guarantees will help to write more schemes and grow the volume of business.

vii. Outline the points you would make in reply to the marketing manager. You should include an explanation of what an MVA is, why it is applied and whether or not you would consider removing the MVA. (10)

Your Company has been asked to quote for group term life for an employer-employee scheme. You have been provided with the following details of the scheme and have been asked to provide a quotation for one-year renewable group term cover. Currently, the scheme is self-insured:

Name of Scheme: Sandhu Pharma Pvt. Ltd.

Industry sector: Manufacturing and distribution of pharmaceutical products

Locations: Production facility – Himachal Pradesh

Head office – Shimla (few employees of head office are within factory site)

Distribution offices - 12 in metros and other large cities

Current membership details: (amount in 000)

Grade	Nos of Lives	Annual average salary	Age
CEO	1	6,000	55
Director	10	3,500	47
Managers (Sales)	60	2,000	38
Managers (technicians)	250	800	35
Sale staff	1,500	300	30
	1,821		

Claims Experience:

Year	2008	2009	2010	2011
Average no. of employee	951	1,118	1,316	1,548
Nos. of deaths	1	0	3	1

Two benefit designs are being considered by the client:

a) Fixed sum assured of Rs. 1 million for each employee

b) Sum assured equal to 3 times annual salary

viii. Describe the approach that you would take to underwrite these two proposals for insurance. (5)

ix. Following your initial quotation, the CFO of Sandhu Pharma has commented that the premium rate of Rs. 2.2 per thousand of sum assured quoted for benefit (a) is much higher than warranted by Sandhu Pharma's historic claims experience. Discuss briefly the points that you would make in your response to the CFO to justify the rate quoted. (6)

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Q. 2) You are the Appointed Actuary of a life insurance company operating in India in early 2012. The insurer has a well-diversified product portfolio with participating, unit-linked and non-participating business both in force and open to new business.

You currently use a valuation interest rate of 7.0% before the application of margin for adverse deviation for determining statutory liabilities. Recent months have witnessed a rise in inflation and interest rates with the 10-year government bond yield having risen from 7.5% last year to 9.0% this year. You are preparing for the year end statutory valuation including setting the actuarial assumptions to be adopted for the valuation. In discussions with the CFO, he comments that the increase in interest rates has led to a decline in the market value of bonds and asks your views on a corresponding reduction in the value of liabilities.

i. State the regulatory considerations you would have in setting the statutory valuation interest rate assumption. (5)

ii. Discuss the professional guidance applicable to you in setting the statutory valuation interest rate assumption and the valuation inflation rate. (8)

Both participating and non-participating products have an embedded guaranteed interest rate to meet all guaranteed cash outgoes. The guaranteed interest rate for the participating business at an aggregate level is 2.0% and for non-participating business is 4.0%. The participating business offers guarantees on surrender and maturity. The CFO comments that the rise in interest rates should lower the cost of guarantees for participating and non-participating business which would enable the Company to offer improved returns to policyholders. You comment that there are additional considerations in determining the cost of guarantees for in-force business including the aspect of policyholder behaviour.

iii. Explain the term policyholder behaviour in the context of determining the cost of guarantees. (2)

iv. Describe the factors that would be relevant in determining the cost of guarantees for the participating business sold by your Company, including policyholder behaviour? (10)

Your Company publishes financial results on an embedded value (EV) basis in addition to the statutory accounts. This involves, in particular, the use of a risk discount rate based on the prevailing risk free rate, defined to be the 10-year government bond yield, plus a risk premium. Your Financial Reporting Actuary has completed the analysis and noted that the Return on Embedded Value (defined as the internal rate of return assuming opening EV and any capital injections as negative cash flows and shareholder dividends and closing EV as the positive cash flow) for the last financial year is less than the risk discount rate.

The following additional information is available to you:

- In the last year, the Company's Net Worth as a proportion of the EV has gone up from 30% to 50%,
- The Company had a capital injection in the last quarter of the financial year,
- Experience variance was marginally positive ignoring the acquisition expense overruns but was negative including it (experience variance includes expense variance both acquisition and maintenance),
- The Company does not have any maintenance expense overruns,
- There were no shareholder dividends in the financial year.

The CFO queries you on the possible reasons for the Return on EV to be lower than the risk discount rate. He comments that the acquisition expense overruns being related solely to new business should not affect the ROEV as EV only considers in-force business.

v. Describe the use of Return on EV as a measure of shareholder profitability and contrast it with new business profit margin. (5)

vi. Explain the possible reasons for the Return on EV to be lower than the risk discount rate for your Company to address the CFO's queries. (8)

Your CFO is considering ways to strengthen the solvency balance sheet of your Company. He mentions that financial reinsurance could be used to improve the Company's solvency ratio and describes a proposal from a reinsurer that would allow your Company to use x% of the value of in force (VIF) from the embedded value to be recognised as an asset available to meet the Company's required solvency margin. This would be achieved by the reinsurer providing an agreement that would allow the Company to recognize x% of VIF as an asset in the form of a non cash reinsurance receivable, in return for an ongoing charge on the future distributable earnings.

vii. Describe the steps that a reinsurer would take to determine an appropriate value for x. (8)

viii. Ignoring any constraints imposed by the IRDA, what additional considerations will you have in accepting the reinsurance receivable derived from the Value of In Force, as described above, to back a part of the Company's available solvency margin? (4)

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