INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

9th September 2016
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 you are required 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.***
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) A life insurance company has written unit-linked business for many years.

i) Explain why the company may need to hold both a unit reserve and a non-unit reserve under a unit-linked policy. (2)

ii) Outline how the company can determine the non-unit reserves. (4)

iii) List the restrictions a regulator may impose with regards to holding negative non-unit reserves. (2)

Currently, the regulations in the country do not permit non-unit reserves to be negative. The industry has suggested to the regulator that negative non-unit reserves be allowed as long as the sum of negative non-unit reserves and unit reserves is positive.

iv) Discuss the suggestion, including how this might benefit the organization. (4)
[12]

Q. 2) A life insurance company currently sells regular premium endowment products, where the benefit payable on death and maturity is equal to the sum assured chosen by the policyholder. The same premium rates are offered to both the standard and sub-standard lives as defined by the current underwriting policy, excluding those whose impairment is so severe that cover is declined. The company is now considering developing a new term assurance plan, where the sum assured is payable on death and there are no other benefits payable.

i) State the reasons why the underwriting policy for the new term assurance product needs to be different compared with the underwriting policy for the existing endowment products. (5)

ii) Discuss the risks to the company if the same underwriting policy is retained for the new term assurance product. (6)

The company has decided to reinsure the term assurance product.

iii) Discuss the factors the company should consider while deciding reinsurance for the term assurance product. (5)
[16]

Q. 3) A life insurance company has been writing all types of business over the last 10 years through its tied agents and has been experiencing expense overruns for the last five years. The Board has asked the company to do an expense investigation.

i) Describe how the company might perform an expense investigation to determine the potential areas which might be leading to expense overruns. (11)

You are not required to discuss how to determine the expense assumption.

The expense investigation revealed that low persistency is one of the reasons for the expense overrun.

ii) Discuss how low persistency could result in expense overruns. (4)

iii) Discuss the steps and measures that the company can take to improve the expense overrun situation. (11)

[26]

Q. 4) A life insurance company that has been operating for 10 years has significant inforce business of term assurance products, without profit endowment products and with-profits endowment products. Some, but not all, of the term assurance business was rider benefits attached to with profits policies and are thus in the participating fund. The surplus in the participating fund is distributed in a 90:10 ratio, with 90% belonging to the policyholders and 10% to the shareholders.

Each year the embedded value of the company is calculated, and the change in embedded value is reported as profit in the group accounts of its parent company. The company is about to begin the annual calculation of the embedded value for this purpose.

i) Describe how the embedded value will be calculated for this company, with reference to the businesses mentioned. (15)

ii) Comment on the basis that would be used for calculating embedded value, including consistency with previous calculations. (7)

[22]

Q. 5) A small life insurance company in country XYZ sells only conventional without-profits immediate annuities. The company only invests in local government bonds and corporate bonds. The insurer uses reinsurance from a single reinsurer. The regulations in country XYZ require the calculation of free capital as follows:

Free Capital =
+ Bonds to be valued at book value
Less Value of liabilities to be determined using gross premium valuation at prudent assumptions and floored to zero
Less Required Solvency Margin calculated as 1% of the Value of the liabilities

Due to change in regulations, the Free Capital now needs to be determined using market-consistent methodology, which is as follows:

Free Capital =
+ Bonds to be valued at market value and not book value
Less Value of liabilities to be determined using gross premium valuation at best estimate assumptions with no flooring
Less Risk Margin calculated using cost of capital approach

Market-consistent methodology requires the insurer to consider all the risks to which it is exposed that may impact on its ability to meet the policyholder liabilities.

i) Describe the risks that the insurer should consider when calculating the liabilities under market-consistent valuation (10)

The insurer's risk officer has commented that given the insurer writes immediate annuities, there is a significant risk of the future mortality assumption going wrong.

ii) What are the risks associated with determining the future mortality assumption (3)

You are not required to discuss the mortality risk

iii) Outline how the risk margin may be determined using the cost of capital approach (6)

It was observed that the Free Capital under market-consistent methodology increased versus the Free Capital under the older regulatory regime.

iv) Discuss the possible reasons of the improvement in Free Capital (5)
[24]

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