

INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

15th September 2017

Subject ST2 – Life Insurance

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

Total Marks: 100

INSTRUCTIONS TO THE CANDIDATES

1. *Please read the instructions inside the cover 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) i)** State the options/alterations that could attach to an endowment assurance contract (2)
- ii)** State the principles that alteration values must satisfy (3)

[5]

- Q. 2)** A life insurance company ABC Life has been writing a significant amount of new business in the past two years. This is leading to a high new business strain and a drop in the company's solvency position.

ABC Life's management is considering Financial Reinsurance to improve its solvency position, and has initiated some discussions with a reinsurer XYZ Re. XYZ Re has proposed using a "loan" arrangement for this.

- i)** Describe how the proposed Financial Reinsurance or "loan" arrangement would help to improve the solvency position, as compared to risk sharing reinsurance arrangements. Also comment on how this "loan" can be arranged, including any regulatory considerations. (7)

XYZ Re has suggested that ABC Life should make the loan "contingent on the emergence of VIF" of the business, and exclude a particular block of loss-making term assurance business from this arrangement.

- ii)** State why XYZ Re would wish to exclude the term assurance block of business? (2)

[9]

- Q. 3)** A large life insurance company operating in the country Actuarial sells a wide range of products, including all the main types of with profits and without profits business.

- i)** Describe what "MVR" or market value reduction is, and its purpose. Your answer should consider which products usually require an MVR, and compare them with the products where an MVR is not usually used. (6)

A recent study showed that Actuarial has seen:

- (a) A significant growth in household average income; and
 (b) An increasing proportion of elderly people (60+ years).

- ii)** For each observation (a) and (b), discuss the customer needs for the relevant type of customer. Also suggest the types of life insurance products that should be considered as priorities for future new business strategy for the company to meet these customer needs. (6)

[12]

- Q. 4)** A newly established life insurance company sells primarily unit linked assurance contracts. In order to expand its product offering, it is planning to launch a new conventional with profits product.

For the bonus distribution method, the company is considering the main bonus methods, i.e. addition to benefits, revalorization, and contribution methods, but it will finally select one of these methods.

The company's proposed bonus framework states that the bonus distribution method "should not be too complex, should be broadly equitable to policyholders, and should allow the company some discretion in case of any extreme events".

- i) Describe the main factors the company should consider when selecting the bonus method, and how the three methods compare on these factors. (8)
- ii) Discuss, with justification, why the company only plans to calculate asset shares for the new with profits business, with no corresponding calculation for the non-profits or unit linked business. (4)

Your staff have produced some asset share projection results for you to review. The projected asset share for a sample policy is shown below for a regular premium with profits endowment product:

Year	Asset Share
1	1,15,00,000
2	1,00,00,000
3	60,00,000
4	30,00,000
5	0
6+	-20,00,000

The only information you have apart from the above table is that the sum assured for the policy is INR 1,00,00,000.

- iii) Outline the comments you would make to your staff, including whether you think the asset share pattern looks reasonable. (5)
- [17]

Q. 5) A life insurance company ABC has started its operations this year and will be calculating statutory reserves for the first time this quarter. It has sold non-participating, regular premium unit linked and term insurance products so far. The company intends to calculate gross premium reserves.

- i) Discuss the relative merits and demerits of cashflow vs formula methods of gross premium reserve calculation for this company. (4)

The statutory regime of the country where ABC operates allows negative reserves to be held for a policy, provided on an aggregate product level the reserves are positive. The required solvency capital to be maintained over and above the reserves is calculated as 1% of the statutory reserves.

- ii) Discuss why would ABC want to hold negative reserves and state the risks that ABC exposes itself to by holding negative reserves (4)

The regulator proposes to disallow holding negative reserves going forward. It is also expected that the regulator will simultaneously change the required solvency capital % to be used.

- iii) Discuss, with reasons, the direction this change in solvency capital is likely to take (3)

The company also plans to put in place a mechanism for monitoring experience

iv) State the reasons for monitoring experience (3)

v) List the data that ABC would need to gather going forward in order to conduct reasonable experience studies for mortality and persistency. (5)

It has been suggested that a consultant be hired to conduct “big data” analysis.

vi) Describe how this could be relevant for the term insurance product in future. (5)
[24]

Q. 6) A life insurance company currently sells a regular premium unit linked product with the following features:

- The policyholder may choose one of three fund options based on his/her risk appetite: low risk, medium risk, high risk
- In all cases, the surrender benefit and the maturity benefit is equal to the value of the units, and no surrender penalties apply
- The sum assured under the product is equal to 15 times the annual premium. The death benefit is the higher of this sum assured value or the value of units at the time of death

The company is reviewing its actuarial models and how to use them for management decisions.

i) Discuss the objectives of constructing actuarial models in general. (2)

ii) Discuss the features of the above product that would impact the potential investment strategy and outline the likely strategy for assets backing both the unit and non-unit liabilities. (7)

iii) Discuss how the company could use an actuarial model to determine its optimal investment strategy. This should include consideration of the information required to decide the investment strategy, and how this can be generated from the actuarial model. (9)

It has been suggested that to boost the sales of this product, a minimum maturity value equal to value of the premiums accumulated at 3% p.a. (provided all the regular premiums have been paid), is to be provided for all future new business.

iv) Discuss the factors to be considered before making this alteration to the product design. Your answer should only focus on the factors relevant for this proposed change. (10)

v) Outline how this guarantee might be costed using stochastic techniques (5)
[33]
