INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

2nd December 2020

Subject SP2 – Life Insurance

Time allowed: 3 Hours 30 Minutes (09.30 – 13.00 Hours)

Total Marks: 100

INSTRUCTIONS TO THE CANDIDATES

1. ***Please read the instructions to examinees sent along with hall ticket carefully and follow without exception.***

2. ***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.***

3. ***Mark allocations are shown in brackets.***

Q.1) An insurance company is reviewing its premium rates for term assurance. Discuss how it should arrive at the lapse assumption for profit testing the premium rates. **[8]**

Q.2) Describe the various parameters the company should monitor for maintaining a profitable annuity portfolio. **[9]**

Q.3) **i)** Describe the impact of decrease in the level of prudence in the reserves on the embedded value of unit-linked contract. (3)

ii) A single premium unit linked endowment assurance policy of three years is sold by the propriety life insurance company. At year ending 31st March 2020, the company has published the financial returns filed with the regulator:

- Assets 10,000 Crores,
- Unit reserves 6,000 Crores,
- Non-unit reserves 500 Crores,
- Solvency capital requirement 120 Crores,

Of the unit reserves in force, 1/3rd policies will mature in each of next 3 years i.e. on 31st March 2021, 31st March 2022 and 31st March 2023.

Non-unit reserve is released in the same pattern as the unit reserves mature.

In its embedded value as at year end 31st March 2020, the company assumes the following:

- Earned investment returns on all assets of 8% per annum.
- Annual management charges of 1% of unit funds, deducted at the end of each year.
- Expenses of 0.5% of unit funds, incurred at the end of each year (you can assume that charges and expenses occur before any policies mature).
- Lapses and mortality: Ignored for embedded value purposes as they are very low.
- Risk discount rate of 12% per annum.
- Cost of capital is ignored.
- No tax is payable.

Calculate the embedded value of the company. (10)
[13]

Q.4) Country Zari has a well-developed equity market. During the financial year end there was huge market volatility and many investors have lost 30% to 40% of values in a span of ten days.

Insurance companies in the country also have a sizeable exposure to the equity market in their portfolio.

Discuss the possible impact of market volatility on the insurance companies with regard to:

i) Unit linked insurance products; (4)

ii) With profit insurance products; (4)

iii) Index linked insurance products; (4)

iv) Without profit insurance products; (3)
[15]

Q.5) **i)** Discuss why deduction for cost of capital should be allowed for the asset share calculations of the with profit portfolio. (6)

ii) The with-profit actuary was asked to explain to what extent the margins allowed for in pricing with profit insurance products, could be used to reduce bonuses to reflect poor experience.

a) Discuss the possibilities of using margins to reduce bonuses (5)

b) How it would differ under different bonus distribution methodologies. (4)
[15]

Q.6) The Lifelong insurance company writes only conventional with profit and unit linked insurance policies. Now, it has proposed to introduce unitised with profit products also.

i) Explain the difference between the unit linked products and unitised with profit products. (9)

ii) Explain the statement in this context "Any significant unintended change in the mix of new business by nature or by size of contract could lead to a significant change in the risk profile or capital needs". (9)
[18]

Q.7) There is an outbreak of a pandemic that is being infected through touch, sneezing, cough.

i) Outline the possible reinsurer support that a life insurer should consider for its pure protection policies to deal with pandemic. (9)

ii) The Government wants the insurers to allow the policyholders to be covered for the pandemic under their existing policies, subject to underwriting and payment of some additional premium. Outline the possible challenges the insurer may face in:

a) designing the option (5)

b) pricing the option. (8)
[22]

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