INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

23rd May 2014

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 large life insurance company writes all types of term assurance and traditional endowment products. 40% of the new business premium is for term assurance and the rest is for traditional endowment products. The company currently does not have any reinsurance arrangements.

All life insurance companies within the country are required to hold a minimum solvency capital requirement (SCR), over and above the statutory reserves. The SCR is calculated as a percentage of the sum at risk, which is defined as the difference between the sum assured and the statutory reserve.

There has been a recent change in regulations where the regulator has revised the SCR percentages. The SCR percentage for term assurance has increased whereas the SCR percentage for traditional endowment has decreased. The revised SCR percentages will apply to both the new business and existing business.

Discuss the impact of the change in SCR for the company and the actions which the company might take as a result. **[9]**

Q. 2) **i)** What are the factors a life insurance company should consider in determining the appropriate level of underwriting under its protection business. (6)

A large life insurance company writes all types of business and specializes in selling term assurance products through its tied agents. Under all its term assurance products, the non-medical limit (NML) is Rs. 4 million i.e. up to Rs. 4 million of Sum Assured, no medical underwriting is required.

In order to increase the volumes of term assurance business, the Marketing Director suggests the following propositions:

a) Increase the NML under its existing term assurance products from Rs. 4 million to Rs. 7.5 million, without any change in premium rates.

b) Launch a new term assurance product to be distributed exclusively via the internet

Both the propositions have been accepted by the company.

ii) List the controls which the company can put in place at the underwriting stage in order to manage the risk from the increase in NML under proposition A. (4)

After gaining some experience in its internet term assurance product, the company analyzed the mortality experience. The analysis revealed that the mortality experience under its internet term assurance business is much lighter than assumed during pricing.

iii) Discuss the factors which may have led to the mortality experience being lighter than assumed while pricing the product. (4)

[14]

Q. 3) **i)** List down the principles of investment for a life insurance company. (2)

A life insurance company has been selling only unit-linked products since its inception. It intends to start writing a new participating traditional product, the structure of which is as follows:

- Policy Term and Premium Paying Term as 10 years only
- Premium frequency as yearly only
- Maturity benefit equal to 150% of the premiums paid
- Guaranteed surrender value, payable after 2 policy years, equal to 50% of the total premiums paid
- Simple regular bonus will accrue at the end of every policy year and a terminal bonus may be payable at maturity

ii) Discuss how the company would formulate an investment strategy for the new product with due consideration of the risks involved. (10)

Your answer should be specific to the above benefits only. **[12]**

Q. 4) There have been numerous articles written in the newspapers and court cases on issues relating to mis-selling of unit linked products. Analysts have concluded that the demand for unit linked products will drop significantly in the coming years. They further say that the companies should focus on traditional endowment products to sustain business volumes. The CEO of a life insurance company, which has only sold unit linked products, has been worried about the recent events. He is convinced of the analysts' views and wants the company to prepare to change the products it sells.

Discuss the factors which the company should consider before designing traditional endowment products. **[10]**

Q. 5) A medium sized life insurance company primarily selling unit-linked business is planning to launch a traditional participating deferred annuity plan with the features described below.

- Choice of deferment term of 15, 20, 25 or 30 years.
- Regular premium policy; which means that the premium payment term and the deferment term is the same.
- The company will declare compound reversionary bonus on an annual basis from the first policy year which will depend on the surplus arising from the participating fund.
- Bonuses once declared shall become guaranteed.
- The death benefit payable is the sum assured plus the accrued bonuses.
- At the end of the deferment term, the sum assured plus accrued bonuses shall be used to buy an annuity for life from the company. The annuity rate will depend on the assumptions at that point of time; however the annuity amount per annum shall not be less than 3% of the maturity amount.
- Policy allows for paid-ups and surrender of the policy on non-guaranteed terms.

i) Describe the risks associated with this product and the possible mitigating actions. (15)

ii) Outline the principles to be followed in setting the following assumptions while pricing this product:

a) Investment return (6)

b) Mortality rates and mortality improvement factors. (5)

iii) The company is considering reinsurance for this product to cover the mortality risk during the deferred period

a) List the factors to be considered before opting for reinsurance. (2)

The pricing actuary has proposed risk premium reinsurance on quota share basis to cover the mortality risk.

b) Explain how such arrangement would work. i.e. how the reinsurance premium would be determined. (3)

c) Discuss the suitability of such an arrangement including alternatives, if any. (4)

[35]

Q. 6) A life insurance company selling a without-profits regular premium endowment policy has defined the surrender value as follows:

Surrender value = Present value of Paid-up Sum Assured discounted at pricing (best estimate) interest rate subject to a minimum of 70% of total premiums paid

Where Paid-up Sum Assured is defined as:
Sum Assured times (number of premiums paid / number of premiums payable)

Discuss how well the above surrender value formula fits into the general principles of determining surrender value. **[10]**

Q. 7) A life insurance company writes all types of unit-linked products through its tied agents. The only charge is a fund management charge (FMC) of 1.5% p.a. in all its unit-linked products. There are no other charges. The only way the company remunerates its tied agents is by commission. The first year commission (FYC) is 20% and renewal commission (RC) is 2% across all its unit-linked products.

In order to increase its new business volumes and improve persistency, the Distribution Director suggests launching an incentive structure for its tied agents. The incentives will be paid at the end of each year to only those sales people who meet one or more of the following criteria:

- Incentive of 10% of FYC to sales people who fall in the top quartile in terms of the new business volumes written over the year
- Incentive of 5% of FYC to sales people who achieve 13th month persistency of at least 70%
- Incentive of 5% of FYC to sales people whose average case size is higher than the company's average case size

Discuss how the suggestion might impact the company's profitability. **[10]**

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