INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

28th October 2009

Subject CA3 – Communications

Time allowed: 3 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 to read the questions. You are strongly encouraged to use this time for reading only, but notes may be made. You then have 3 hours to complete the paper.***

3. ***You must not start writing your answers until instructed to do so by the Supervisor.***

4. ***Attempt BOTH the questions.***

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

AT THE END OF THE EXAMINATION
Please return your answer book and this question paper to the supervisor separately.

Q. 1 You work as an actuary in the product development department of a large insurance company offering unit-linked, term insurance and health insurance products.

Your manager, the Marketing Director, has asked you to prepare a note on the trends in profitability and product capital consumption for your company. In particular she has asked you to explain the following in your note:

- Reasons for changing the profitability methodology?
- Rationale for using risk-free rate of return in profitability when historical trends confirm that equity returns are higher than government bond yields over long periods of time. Profitability is also being measured over long durations so won't this methodology lead to underestimating profit margins?
- What will be the impact of changing the methodology for each of the three product lines? How will the actual profitability compare with the profit margins estimated under the old and new methodology?
- How does pay back period differ from new business strain and what do they convey about product capital consumption?
- Is the increase in pay back periods for unit-linked business for 2009 related to the change in methodology? If so, why does the new business strain remain unaffected?

Draft a memorandum in about 500 – 600 words in response to your manager's request.

In order to assist you in this task a student actuary has compiled briefing notes set out below.

- Profitability measured as profit margin which is defined as the ratio of the present value of profit over the duration of the contract by the present value of premiums
- Discount rate set at risk discount rate – which is advised by our corporate actuarial department
- Risk discount rate set as risk-free rate plus risk margin
- Risk-free rate defined as the prevailing 10-year government bond yield
- Profitability trends by line of business shown in Table 1
- Table 1 shows profitability for new business written in the year
- Unit-linked profitability steady in 2007/ 2008 but dropped in 2009 due to a change in the methodology
- Methodology change involved using risk-free rates of return to project investment returns for all products
- Methodology change advised by Chief Actuary who was concerned about capitalizing risk margins associated with risky investments, such as equity, in profitability at policy issue
- This methodology also applied to project growth rates of all unit-linked funds
- Above methodology adopted for all unit-linked funds including those with 100% equity
- 3 unit-linked funds are offered since 2007 including "Secure", "Balanced" and "Growth"
- Growth Fund has consistently given returns in excess of the risk-free rate, in particular over 2009 it grew by 4% in excess of the risk-free rate
- Term and health insurance products invest only in risk-free instruments

- Discounted pay back period is defined as the period by which the discounted value of profits since inception is equal to zero
- Discount rate used is the same as the risk discount rate – advised to us by the corporate actuarial department
- New business strain is the ratio of the statutory profit at inception divided by the annualized first year premium
- Statutory profit is considered after tax and cost of capital
- Health insurance launched in 2008 so no figures for 2007

Table 1: Profitability trends over 3 years

Profit margin	**2007**	**2008**	**2009**
Unit-linked	6.3%	6.1%	4.2%
Term Insurance	0.5%	-1.2%	0.8%
Health Insurance	NA	9.1%	11.3%

Table 2: Pay back period (in months) trends over 3 years

Discounted pay back period	**2007**	**2008**	**2009**
Unit-linked	45	46	51
Term Insurance	32	35	33
Health Insurance	NA	22	21

Table 3: New business strain, expressed as a percentage of annualized first year premium

New business strain	**2007**	**2008**	**2009**
Unit-linked	23%	24%	24%
Term Insurance	9%	9%	8%
Health Insurance	NA	5%	4%

[60]

Q. 2 Your friend has read the following note from a friend who works in the actuarial department of a life insurer and is unable to understand the concepts explained.

"Charge cap on unit-linked products"

Under unit-linked products there are a variety of charges that are levied by the insurer to cover the various risks and expenses of the entity issuing the products in addition to which the charges are levied at a level where there is a commensurate return to the sponsoring shareholders of the entity manufacturing the policy.

Typically the premium paid by the policyholder is not allocated in its entirety to the unit fund with only a proportion being allocated. The residual, that is, the difference between the premium paid and that allocated accrues to the insurer and is often termed premium allocation charge.

In addition further charges that are commonly levied include mortality charges, expense charges and fund management charges. The mortality charge is levied on the "sum at risk" which represents the excess of the mortality benefit over and above the fund value as this residual is a strain on the insurer in the case of the demise of the policyholder. The charge is computed as the product of the above sum and the assumed mortality probability.

Expense charges are often deducted from the fund as a fixed regular monetary amount on a monthly basis. Fund management charges are computed as a fixed percentage of the fund and taken from the fund.

The cumulative effect of these and other charges results in a diminished return to the policyholder vis-à-vis the actual fund performance. The latest circular from the regulator prescribes a limit (for all unit-linked products) of 1.5% based on a specified fund growth rate of 10% of the extent to which the policyholder's return on maturity can be reduced by the operation of the insurer's charges. This effectively results in a limitation on the charges that can be levied as excessively high charges will lead to a situation where the reduction in maturity returns violates the limit specified.

It is important that the limitation on reduction in return is computed at the specified growth rate set out by the regulator. The importance of this arises from the fact that for the same policyholder the reductions in maturity return may be different under differing assumptions regarding unit growth rate. Also, the actual reduction in maturity yield may be more than the prescribed limit due to the actual realized investment returns over the period of the policy.

In addition, products are sold to varying age groups of customers with differing premium levels and terms. The reduction in maturity yields will differ by various parameters including the ones set out above and therefore insurers will need to robustly test proposed charging structures to ensure compliance with the aforesaid regulatory circular – otherwise there is a significant risk that for particular combinations the product may exceed the regulatory cap.

Redraft the note in about 450-550 words to make it suitable for sending it to your friend who is not conversant with financial matters.

[40]

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