

INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

26th May 2009

Subject CA3 – Communications

Time allowed: 3 Hours (14.15 - 17.30 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 a product development actuary in a life insurance company. The Company has recently appointed a new manager with a marketing background to head the Product Development Group. He does not have any prior life insurance experience.

In anticipation of a meeting to discuss two product proposals, he has asked you to prepare a memorandum comparing the two products.

To help you prepare for the meeting a student actuary who has worked on both proposals has summarized the following information.

Table 1: Comparison of product design		
	Product A	Product B
Product type	Regular premium unit-linked insurance	Regular premium unit-linked insurance
Term	10	10
Premium Term	10	10
Sum assured	10 times annual premium	5 times annual premium
Death Benefit	Sum assured plus fund value	Higher of fund value or sum assured
Maturity Benefit	Fund value	Higher of fund value or total premiums paid
Surrender Benefit	Fund value less surrender charges	Fund value less surrender charges

Table 2: Comparison of product charges		
Fund management charge	1.00%	1.75%
Premium allocation charge	Year 1: 30% Year 2: 20% Year 3: 10% Year 4 onwards: 0%	Year 1: 15% Year 2: 10% Year 3 onwards: 5%
Administration charge	Rs500 per annum increasing at 5% every year	Rs750 per annum increasing at 5% every year
Surrender charges	As % of premium: Year 1: 50% Year 2: 35% Year 3: 20% Year 4: 10% Year 5 onwards: 0%	As % of fund value: Year 1: 25% Year 2: 20% Year 3: 15% Year 4: 10% Year 5 onwards: 5%

Note that the rate of mortality charge under both products is identical.

Table 3: Point of Sale Illustration at three hypothetical rates of interest - Product A

Year	Premium	Allocation Charge	Admin Charge	Mortality Charge	Fund Value projected at:		
					0%	6%	10%
1	25,000	7,500	500	250	16,583	17,588	18,258
2	25,000	5,000	525	275	35,425	38,627	40,829
3	25,000	2,500	551	300	56,503	63,289	68,100
4	25,000	-	579	325	79,793	91,755	100,494
5	25,000	-	608	350	102,797	121,587	135,745
6	25,000	-	638	375	125,516	152,853	174,108
7	25,000	-	670	400	147,951	185,622	215,861
8	25,000	-	704	425	170,105	219,968	261,308
9	25,000	-	739	450	191,977	255,968	310,780
10	25,000	-	776	475	213,569	293,703	364,637

Table 4: Point of Sale Illustration at three hypothetical rates of interest - Product B

Year	Premium	Allocation Charge	Admin Charge	Mortality Charge projected at:			Fund Value projected at:		
				0%	6%	10%	0%	6%	10%
1	25,000	3,750	750	105	105	105	20,039	21,262	22,078
2	25,000	2,500	788	92	90	89	40,930	44,707	47,307
3	25,000	1,250	827	73	69	66	62,664	70,433	75,953
4	25,000	1,250	868	51	41	34	83,998	97,238	106,951
5	25,000	1,250	912	25	7	-	104,942	125,172	140,497
6	25,000	1,250	957	-	-	-	125,500	154,253	176,762
7	25,000	1,250	1,005	-	-	-	145,650	184,521	215,966
8	25,000	1,250	1,055	-	-	-	165,399	216,022	258,350
9	25,000	1,250	1,108	-	-	-	184,750	248,807	304,174
10	25,000	1,250	1,163	-	-	-	203,708	282,928	353,718

Further analysis carried out by the student actuary to compare the illustrations of the two products is set out in tables 5 and 6.

Table 5: Effect of charges on customer returns – Product A			
Gross Fund Return	0%	6%	10%
Customer IRR	-2.9%	2.9%	6.8%
Reduction in Yield	2.9%	3.1%	3.2%
Allocation Charge	1.1%	1.4%	1.6%
Fund Mgt Charge	1.0%	1.0%	1.0%
Administration Charge	0.5%	0.4%	0.4%
Mortality charge	0.3%	0.3%	0.2%

Table 6: Effect of charges on customer returns – Product B			
Gross Fund Return	0.0%	6.0%	10.0%
Customer IRR	0.00%	2.24%	6.22%
Reduction in Yield	0.00%	3.76%	3.80%
Allocation Charge	1.20%	1.30%	1.30%
Fund Mgt Charge	1.75%	1.75%	1.75%
Administration Charge	0.80%	0.70%	0.70%
Mortality charge	0.02%	0.02%	0.02%
Maturity guarantee	-3.77%	0.00%	0.00%

Your manager has asked you to cover the following aspects in particular:

- Key product design differences between the two products
- Comparing the charging structure of the two products
- Why does Product B illustrate different mortality charges under the three hypothetical rates of interest whereas Product A only shows one column? What rate of interest has been used in the projection of mortality charge for Product A?
- What impact does offering the return of premium maturity guarantee under Product B have for the customer? Please elaborate on the negative reduction in customer IRR under the 0% scenario for Product B.

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

Customer IRR is defined as the internal rate of return on cash flows considering a policyholder pays annual premium in advance and receives fund value at the end of the policy term. You can assume that the calculations carried out by the student actuary are correct and that no further information is required.

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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

“Economic capital

Economic capital is commonly taken as the excess assets measured in market value terms over the market-consistent value of liabilities that needs to be held by an entity to be assured of economic solvency (ie market value of assets being in excess of market value of liabilities) over a specified timeframe at an agreed probability level.

In the absence of a deep and liquid market for insurance liabilities where market prices can be readily observed market-consistent values of liabilities are usually computed using stochastic modeling techniques involving various economic scenarios and with appropriate linkages between demographic assumptions and the scenarios generated.

It is important to ensure the scenario generator is market consistent which is commonly done by testing its ability to reproduce prices of financial instruments particularly derivatives appropriate to the liability structure of the entity being valued. In emerging markets the dearth of such instruments makes calibration a particularly challenging task and underscores the need to show sensitivities of the capital to the various parameters.

Policyholder behaviour should be linked to the economic scenarios particularly in the case of policies where options and guarantees exist. Financial anti-selection can be expected to be exhibited and this linkage should be incorporated in the model otherwise the value of liabilities may be significantly understated.

Economic capital is required to allow the entity to absorb a variety of risks while remaining solvent. In computing the economic capital the level of stress tests applied to the various parameters (eg, equity markets, interest rates, mortality, lapses) has a large bearing on the resulting economic capital requirement. The desired probability confidence level is often measured against corporate bond defaults of the rating that the institution targets. Shock tests should therefore be appropriate for the confidence level targeted and the calibration of such tests should be carefully carried out.

Finally, in terms of the timeframe considered internationally there seems to be a preference for one-year with the assumption being that the liabilities can be transferred to another entity within a year.”

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. You can assume that the information contained in the note is correct and that no further information is required.

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