Institute of Actuaries of India

Subject SA2 – Life Insurance

May 2013 Examinations

INDICATIVE SOLUTIONS

Introduction

The indicative solution has been written by the Examiners with the aim of helping candidates. The solutions given are only indicative. It is realized that there could be other points as valid answers and examiner have given credit for any alternative approach or interpretation which they consider to be reasonable.

Solution 1 :-

(i)

It's a non-par product- benefits are guaranteed and insurance co does not have any discretion

The customers neither participate in the upside nor the downside of experience variance

Any experience variance upside or downside will have to be borne by the company.

There is **significant reinvestment Risk** under in the product given the uncertainty at which the future premium and coupons from existing assets can be invested.

The Annual Guaranteed addition with a floor of 5% p.a. is onerous and may lead to significant cost of put option embedded in the contract.

In order for the contract to be non-par, there can be no discretion over surrender values. Therefore the surrender value basis should be defined at outset.

Any increase in future interest rate would lead to fall in value of assets and if this is accompanied by the mass surrenders; there is a risk that the value of assets may be lower than the face value/surrender value of the policy, leading to loss to the company.

Even in the absence of surrenders, the requirement to reserve at surrender value would result in earnings being at risk.

Given onerous guarantees involved in the proposed product structure, the company will have to match the assets and liability very closely leaving lower scope for the investment manager to grab arbitrage opportunity available in the market and hence leading to lower investment income.

Given the onerous guarantees, the pricing will have to be done at prudent interest rate, which will make product uncompetitive against alternatives.

leading to lower than expected sale of the product.

…..lower sale may to lower contribution to the fixed initial costs of the company.

Low sales would lead to low profits and expense overruns

Apart from these there are other common risk involved in pricing any contracts e.g.

The mortality turns out to be lower than assumed.

Higher than assumed persistency may pose a risk if the product is lapse supported.

Expenses assumed may not be sufficient to cover the costs. **(6)**

(ii)

Given the potentially onerous guarantees embedded in the contract, its vital to evaluate the cost of guarantees.

Capital requirements may be assessed using stochastic or deterministic techniques.

The profit testing should be net of this cost of capital incl cost of guarantee..

To reduce the **reinvestment risk** , the product may be offered as a limited premium payment contract. e.g. 5 pay for 15 year contract.

ensure that the duration of assets and liabilities are as closely matched as possible for such contract, leaving lower scope of shortfall in assets when interest rates in future rises or falls.

The Liabilities are likely to be of longer duration, given the lack of availability of longer duration bonds and zero coupon bond in India, stripped coupon arrangement may used to increase the effective duration of assets.

Lower Minimum guatantee may be offered compared to proposed or Linked to Repo or Gsec Yield

This will ensure that the Monthly Increases move in line with the investment income, in turn reducing the cost of guarantee.

To reduce the **mis-seling risk**, the product should be pitched as insurance contract rather than a pure saving contract to ensure that people are able to differentiate this contract from other pure investment alternatives available in the market.

Need based selling and explaining to the customer at the time of sale will help reduce the persistency risk. However, this product is likely to be priced lapse and surrender supported, because surrender benefits must be guaranteed at outset. Therefore, needs based selling is liable to increase persistency but reduce profitability.

The contract may offer lower GSV to ensure cap on losses due to some policyholders leaving the fund when the market value of the assets is lower.

Use the mortality experience of similar life insurance product targets to similar customer segments to price the contract.

Use persistency experience of conventional policies with some prudence ; need based selling and free look cancellation should help to reduce persistency problems.
use current business planning expenses/ Expenses assumed in the EV calcultions to ensure consistency.
To reduce the risk that Sales may turn out to be lower than assumed; discuss with the distribution channels and use the estimates of the volumes produced by distribution channel. **(6)**

(iii)

Pro:

Provides the Rules to be followed; may not necessesary require experienced people

Brings consistency across the market. All players will have similar products in the market.

Similar products will be easy to compare from the customer perspective.

It becomes easier for the regulator to regulate the market; less discretion to the market players

Easy to audit so far the audit of the compnay is concerned.

Relatively lower need to have expensive experienced professional in regulator's office

May be suitable for a new market with lack of experienced people

Cons:

Prescriptive products regulations adversly affects any innovation in the market; leading to common standard products being offered to the customers

low motivation for companies to set up R& D deperatment

The option available to policyholders to choose from the products suite is limited.

Each customer's need is unique depending upon the age and social and economic profile; it may not be possible to capture rules in the prescrptive regulations to meet the needs of all classes of customers.

The cost of regulations may go up depending upon the requirement imposed in the prescriptive regulations.

The requirement imposed in the prescripive regulations may be onerous from adminstrative perpective. **(5)**

(iv)

Change in the risk profile of the company :

Regulations requires all benefits to be explicitly stated in advance; all benefits under the Products are guaranteed.

This expose insurance co to a significant interest rate risk; uncertainty of the rate at which future premium shall be invested ; while the benefits are guaranteed.

This will result into a significant increase in the capital requirement of the company under the risk based capital regime.

Under certain scenarios the risk capital may exceed the statutory capital requirements.

Co shall need to ensure close matching of duration of Asets and Liability ; given the liability duration is longer, it will lead to mismatch.

There are no Zero coupon bond available in indian market; the G-sec bonds are avaliable with high coupon rates and hence reduces the effective duration of the assets.

The resilience reserve requirement of the company is likely to go up.

The company shall get significantly exposed to the policyholder behaviour risk; if the future interest rate in the market rises; there may be surge in the surrenders rate. The policyholders likely to surrender the policy and invest at higher interest rates.

Co will have to keep a cap on the share of business from this LOB in line with capital available.

Pro and Cons of this regulation on Policyholders :

+ it meets the needs of risk averse customers who want guaranteed benefits.

+ the policyholders buying this product shall get guatanted known (certainty) benefit.

+ co will have no descretion about the benefits and regular additions and no issue of equity or smoothing

- The co may use relatively cautious approach while deciding assumptions used in pricing

- Higher cost of capital required for the guaranteed business shall be passed on to the Policyholders
- may leade to higher premium for similar benefits under non-guaranteed contracts.

(7)

(v)

Pro:

Prescribed minimum death benfit will ensure there is uniformity of the death benefit across the market.

Minimum Death benefit regulation shall ensure that there is sufficient cover under the products and contract may not be deemed as pure investment contract.

Cons:

This will result into Lack of flexibility in Designing contracts

Complicate the Traditional Classic Endowment structure where there used to be defined Sum assured. Now there will be separate sum assured on death and a different sum assured for Maturity purpose.

lead to very complicated death benefit structure for the policyholders to understand. The death benefit each year will may be different, unlike level death benefit in Endowment products.

All customers do not need high death benefit cover e.g they may already have the term assurance. Such customers with higher ages, who are buying policy for saving purpose, may be forced to take high cover with higher mortality loosing value of their Money.

Challenges for the company :-

System requirements ; the sum assured on death benefit and sum assured on maturity is different. Therefore compnay may have to incur significant expeneses to built systemt to meet this requirenment.

Most of the existing products may not be compliant with the minimum death benefit regulations, leading to refiing of most products with regulators.

Change in all the product structure; would require company to change all the benefit Illustrations; marketing material ; policy contracts ; leading to increased costs for the company.

Given all the new products; the insurer would need to enhance the training and therefore a lot of resources will have be alocated towards training of the sales staff.

Given min death benefit requirement, underwriting mannual of the company need to be reviwed as now the death benefit may not be level across the term of the product.

There is a risk of delay in the implementation of the systems; training etc leading to loss of business opportunities and loss of business**.** **(5)**

(vi)

The relevant legislation is Sec 40B of the Insurance Act 1938, and Rule 17(D) of the Insurance Rules, 1939

As Sec 40B defines "management expenses" to include commission, payable to them.

Sec 40A – Limitation of expenditure on commission - is also relevant.

The Brokers and Corporate Agents regulations prescribe the maximum remuneration

Sec 40A prescribes commission ceilings. Broadly these are:

On single premiums: 2%

On deferred annuity – regular premiums: FY 7.5%; subsequently 2%

Other assurances–regular premiums: FY 35%, 2nd and 3rd yrs:7.5%; thereafter 5%

Slightly higher commissions can be paid in the first 10 yrs of a new company. There are various provisos to the section.

Brokers & Corporate agents: Similar to agents with some changes

Sec 40B prescribes maximum expenses that could be incurred by a Life company. This read with rule 17D broadly prescribes a first year cost ratio of 90% and 15%. Relaxations apply in the first 10 yrs for a new company.

Policies where the premium paying term is not more than 12 years, the first year expense ceilings are restricted to 7.5% multiplied by the premium paying term. There are various provisions and administrative provisions in the section.

Application to pricing of products:

While setting commission and expense assumptions for a new product, the actuary needs to take into account the provisions of Sec 40B and Rule 17D.

The maximum commission scales prescribed under Sec 40A should not be exceeded.

The maximum expenses including commission allowed under 17D depend on the premium paying term

e.g. the maximum first year expenses for a policy where premiums are payable for only 3 years is 3 x 12.5 = 37.5% in the first year and the actuary has to ensure that a product where under only 3 premiums are payable is priced taking this into account.

In order to maximise the limits imposed by Rule 17d, the premium paying term should be extended to the greatest possible extent, subject to other risk-related considerations.

Although the expense ratio is computed on the entire portfolio of business, it **may** help in terms of setting unit expense targets for the company if the ceilings are adhered to in pricing for each product/term.

Note that when the proportion of short term business is high, the average premium paying term of the portfolio shortens and the permitted expense ratio may fall

Sec 40B(1) requires the actuary to furnish (in a prescribed form) the premium basis used for new business to the IRDA giving details of expense loadings as well as mortality, rate of interest and bonus loadings. **(7)**

(vii) Risk of default of counterparties significantly increased during the year, reflected in widening credit spreads, though there may be arguments put forward that some of credit spread widening is due to illiquidity rather than credit risk.
Some counterparties may already have defaulted, and it could well be that actual default experience has been in excess of that estimated in the economic capital calculation last year.

There may have been downgrades within the portfolio. e.g. an overall portfolio that was on average A rated at the end of previous year, may now have a far lower average e.g. BBB- depending on the downgrades experienced by the portfolio.

The company should consider the extent to which its specific bond holdings have been affected, and whether there are any specific indications of further defaults e.g. corporate bonds put on credit watch by ratings agencies.

Cash deposits may also have been impacted by any banks defaulting

Depending on levels of new business versus offs, the life insurer may have been a forced seller of some credit risky assets during the year (at a time of low corporate bond prices).

Investment mix changes due to market movements may cause a change in exposure going forward. In addition the company may have also have changed the asset mix in response to the conditions which will have further changed exposure going forward.

Also the shape of the corporate bond portfolio may have changed e.g. credit spreads may have widened more for some sectors than others, which may have shifted the balance of the portfolio, in terms of market value, towards particular sectors.
Further, depending on the company's solvency position, the **regulator may have required** the insurer to reduce credit exposure in particular markets or in particular sectors.

Aside from corporate bond exposure, the insurer may also be exposed to credit risk due to increased risk of reinsurer default to the extent that reinsurance is used to support the business.

Need to consider whether exposure to reinsurer default has increased, as a result of a change in value of liabilities (as a result of market movements). In addition a derivative provider may default.

Also need to check whether the risk of default of reinsurers has increased, by looking at their latest credit ratings.

The insurer also has counterparty exposure in relation to its government bond holdings has changes as per the JV partner requirements.
It will be possible to assess this by looking at how the yields on government bonds have changed over the year versus other instruments.

(7)

(viii)

First need to define the stress tests likely to be included in economic capital calculation for market risk. e.g. *x*% fall in equity markets, *y*% fall in interest rates, change in shape of yield curve etc. (+/− z no of bps at different terms)

Need to consider whether the size of the shocks should change from those used at the previous year end.

This might depend on the relationship between the stress tests carried out at last year end compared to the market movements.

If last year's experience was worse than the "1 in 200 stress" used in last year's economic capital calculation then the company might have to consider that a 1 in 200 year event may be worse than had previously been allowed for.

Alternatively, if it believed that what occurred was in fact a 1 in 200 year event, then the company will have to consider the likelihood of another 1 in 200 year event occurring again this year. It may therefore be suggested that lower shocks should be used this year, on the basis that the base capitalcurrently contains an element of shocked capital.

The insurer will need to consider which market risks are now its most significant exposure, since both the value of the insurer's assets and liabilities will have changed significantly in the last year.

Looking at management information regarding market exposures will help to identify the most important market shocks for the insurer at this year end.

The insurer will need to consider management actions and the extent to which these are adequately reflected during the shock,

For example the company may change asset mix dynamically with market movements

Given the economic downturn and the combination of events that occurred over the last year, the company may want to consider whether calculating shocks for each type of market risk in isolation and aggregating them is sufficient, or whether multiple variables should be shocked during a single run, which may give a more realistic picture of the impact on the company.

In either case, the correlations between the different types of market risk (and other types of risk) need to be reconsidered.

It may also be possible to demonstrate that the aggregation of certain events provide a higher answer for market risk capital than an aggregated run (the "non-linearity adjustment").

The company would also consider available guideline from regulator or JV partner.

(7)

[Total 50 Marks]

Solution 2 :

i) Products offered and type of bonuses:-

The Company offers a wide range of with-profits/participating products under both life insurance as well pension business category. Under this participating product policyholders are entitled to share in the surplus of the participating funds. The Company need to maintain two such participating funds – one for life business and one for pensions business.

As per prevailing/current insurance regulations policyholders are entitled to receive at least 90% of any surplus distributed from these funds with shareholders receiving at most 10%.

The Company currently offers the following types of products with differing types of bonus declaration:

a) Reversionary Bonus and Terminal Bonus products

Under these products a guaranteed benefit is set at the time the policy is issued. This is the minimum benefit guaranteed to be paid on dates or events specified under the policy (typically on maturity or death). Reversionary bonuses may be added to the guaranteed benefit over the term of the policy. In addition, a terminal bonus may be paid.

While most of the products falling under this category have provision for both reversionary bonus and terminal bonus certain products only have provision for reversionary bonus and others have provision for only terminal bonus.

b) Cash Dividend products

Under these products in addition to the guaranteed benefits there is provision for paying cash dividends to policyholders throughout the term of the policy.

2. Role of the Estate/FFA and policyholders' reasonable expectations

Company currently maintain a significant level of FFA/Estate in respect of participating fund(s). The Estate/FFA represents the excess of assets in participating fund(s) over the liabilities as on valuation date.

The primary role of the estate/FFA is to provide for the possibility that the provisions made for the liabilities of the participating business may prove to be insufficient and for any unforeseen liabilities attributable to the participating business. The FFA/Estate also works as a bonus smoothing account/provision which will vary from year to year with transfers to and from it after having carried out distributions to policyholders and shareholders.

As significant capital support was provided during the start-up of the participating fund(s) particularly to finance the bonus allocation/distribution by the shareholders the Company may not aim to distribute the estate to the participating policyholders.

In future, even if the Company and the Appointed Actuary believe that the estate is excessive in relation to the risks being run by the participating fund(s) and having regard

to policyholders' reasonable expectations (PRE) the Company may not be able to transfer such excessive assets to the shareholders.

The Company believes that PRE primarily relates to the payment of benefits broadly in line with asset shares (subject to any contractual guarantees) as described below subject to the financial adequacy of the participating fund(s). PRE would also cover any ongoing communication to the policyholder on likely benefit levels subject to the adequacy of the participating fund(s). PRE in particular does not extend to any interest in the estate.

3. Principles and practices governing bonus and dividend distribution

The principles and practices governing bonus and dividend distribution may change from time to time. Some factors such as the results of reviews carried out concerning the methods and parameters used to determine payouts for participating business may result in changes to practices.

Any changes to the principles and/or practices must be recommended by the Appointed Actuary and must be approved by the Board.

Other factors that may cause changes to either principles or practices include but are not limited to:

a material change in the financial condition of either of the participating funds

a material change in external economic conditions

regulatory changes

considerations of equity between different types of product and/or different generations of policyholders

i) Setting of reversionary bonuses and cash dividends

Principles

Any bonuses and cash dividend declaration will be in accordance with Section 49 of the Insurance act and IRDA (Distribution of Surplus) Regulations,2002.

Reversionary bonuses and cash dividends are declared at the discretion of the Board and there is no contractual entitlement to receive these on the part of the policyholder.

For those products having provision for terminal bonus reversionary bonuses are set at levels which aim to achieve a gradual build-up in guaranteed benefits whilst not unduly constraining investment freedom and the prospect for terminal bonuses.

For those products with no terminal bonus provision the reversionary bonus rates and cash dividend rates will be more volatile reflecting changes in experience, external economic conditions and other relevant factors. Company will seek to set reversionary bonuses with reference to asset shares with the long term aim of paying out 100% of asset share on and before maturity

For those products with cash dividends, the Company will seek to set cash dividends with reference to asset shares with the long term aim of paying out 100% of asset share over the lifetime of maturing policies

In setting reversionary bonus rates and cash dividend rates the Board also takes into account the current and projected financial position of the participating funds and will set reversionary bonuses and/or cash dividends to zero if necessary.

Reversionary bonus rates and cash dividend rates are set for each relevant class of participating policy and reflect its characteristics including any guarantees.

The Company may declare separate reversionary bonus rates and cash dividend rates as deemed necessary having regard to considerations of equity among the policyholder (products/group/generation). This may include the declaration of different reversionary bonus rates and cash dividend rates by for example cohort, premium payment term, maturity term and other relevant characteristics.

Current Practice:

Company declare reversionary bonuses, cash dividends and terminal bonuses annually as part of annual actuarial investigation/reporting.

Currently the company declares the same reversionary for both type of type of products. Company may declare deferent bonuses series for different type/category of products. A bonus series may be closed or new bonus series may be introduced (for a new or existing policyholders) where board considered it appropriate based on the advice of the Appointed Actuary.

This actuarial investigation involves a comparison of the asset share against the present value of future benefits payable to both policyholders and shareholders on different reversionary bonus rates or cash dividend rates as appropriate. The present value calculations take account of the company expected experience in the future regarding investment returns, mortality, surrender rates, expenses, tax, the cost of guarantees and other relevant factors.

This investigation also takes into account the need to provide a buffer against adverse experience in the future taking into account differing degrees of prudence as indicated above for products having different types of bonus provision.

For products having terminal bonus provisions we investigate the rates of reversionary bonuses that are affordable in the long term having regard to the need to achieve a gradual build-up in guaranteed benefits whilst not unduly constraining investment freedom and the prospect for terminal bonuses.

For cash dividend products and products having only reversionary bonus the investigation of affordability is in a similar manner but with little or no margin for

prudence as there is no ability to make up earlier shortfalls in distribution through terminal bonus.

The declaration also takes into account the Company's aim that changes in reversionary bonus rates should be gradual in nature for those products having terminal bonus provisions.

While the Company's aim is to only make changes gradually over time for such products, there may be circumstances when more significant changes are needed. Such circumstances may include for example significant changes in the prevailing economic conditions, the regulatory environment or the financial position of the participating fund(s).

i) Setting payouts

Principles

The Company's aim is to ensure that subject to meeting all contractual obligations and maintaining an adequate financial position for the participating fund(s) the payouts to maturing policyholders on the relevant participating policies (including any terminal bonus applying) should fairly reflect the experience of the relevant participating fund applicable to such a policy after any adjustments for smoothing and any communications to the policyholder.

The Company determines pay-outs to maturing policyholders including terminal bonuses with reference to asset shares. In calculating asset shares the Company will make fair deductions where appropriate to reflect its assessment of the cost of the guarantees.

In normal circumstances the Company seeks to smooth pay-outs to participating policyholders at the time of claim due to maturity. The Company aims to operate smoothing of pay-outs in such a way as to be neutral for policyholders as a whole over time but the pay-out applicable for any individual policyholder may be impacted positively or negatively by the application of smoothing.

The Company aims that on average maturing policyholders as a class should receive 100% of the asset share subject to the adequacy of the participating fund(s). In exceptional circumstances, for example caused by very adverse financial conditions the Company may target a lower percentage of the asset share.

The methodology and parameters used in pay-out calculations by way of necessity involve some measure of approximation. The Company reviews regularly the methodology and parameters used and set parameters on bases appropriate for the class of business involved.

The Company may change historical parameters applied in the asset share calculations in light of subsequent information about actual experience. Variations between the historical parameters and the actual experience of

participating policies may be directly attributed to or met by the asset shares of participating policies through experience adjustments.
For surrender pay-outs the Company has regard to the level of guaranteed benefits and may also take a portion of the non-guaranteed benefits as measured by the asset share. The Company aims to ensure that surrender pay-outs do not cause a strain to the asset shares of continuing policyholders. For death pay-outs the Company follows similar principles as for maturing policyholders.

Current practices

a) Asset shares and payouts

Asset shares are used as a tool to help calculate fair pay-outs on maturity. The asset share of a policy represents the accumulation of premiums (less any amounts in respect of withdrawals, if relevant) at the investment returns on the backing assets less deductions for:

· expenses;

· commissions;

· mortality and other risk benefit costs;

· transfers to shareholders;

· tax; and

· any amounts in respect of the assessed cost of guarantees subject to any experience adjustment.

Further discretionary adjustments that can be made to asset shares to determine maturity pay-outs include any smoothing, augmentation in view of policyholder communications and any augmentation necessary to meet contractual commitments.

b) Smoothing

Smoothing of total benefits paid over the time is a key characteristic of any participating fund/product.

Smoothing can help to reduce the effects of fluctuations in investment returns shortly before a claim is paid. The Company aims to smooth out short-term fluctuations in investment returns over time for maturing policies. However, the Company does not aim to fully protect maturing policyholders from the effects of short-term changes.

The extent to which the Company is able to smooth payouts depends on the financial position of the participating fund(s). There may be circumstances of

financial stress in which the Company would not smooth out fluctuations in investment returns.

The Company aims that payouts to the maturing policies should be between, say, 75% and 125% of asset shares. However, in some circumstances pay-out values for a far lesser proportion of policies may fall within this range for example after a sudden change in asset values.

The extent to which smoothing of payouts applies may be restricted so as to limit the expected impact on payouts for the remaining policyholders. Smoothing will normally be reduced whenever it is expected to result in:

· gains or losses on maturity payouts in any given year of more than x% of the asset shares of the remaining policies at the end of the year; or

· total accumulated gains or losses on past maturity payouts of more than y% of the asset shares of the remaining policies at the end of the year.

Despite these restrictions on the smoothing of payouts actual smoothing gains or losses may fall outside these limits (e.g. in circumstances such as rapidly falling or increasing investment returns).

4. Approximations

In calculating asset shares the company aim to use the best estimates of the relevant parameters. In calculating some parameters, for example, per policy expense allowances there is an element of averaging across participating policies. Similar issue arises while allocating the same investment returns across various participating products. Also the asset share calculations have not use daily investment return data but use annual rates of return. Company will revisit/ review the methodology to limit such approximation in future, where ever is possible

When calculating asset shares a deduction is made for the assessed cost of providing guarantees. The deduction varies between products broadly reflecting the level of guarantee offered. The cost of guaranteed should ideally computed on Market - consistent valuation basis which required various risk-neutral scenarios files. However, company used approximation in determining the cost of guaranteed. Company will review this area regularly as the cost will depend inter alia on economic conditions and policyholder behaviour. If necessary, the company will review charges made for guarantees retrospectively as well as adjusting charges prospectively.

In normal circumstances these approximations are not likely to lead to significant overstatement or understatement of asset shares. However, we do review the approach taken regularly with the objective of achieving greater accuracy. **(14)**

ii) Life insurance companies often have difficulties in calculating accurate asset shares both at product level as well as policy level primarily due to very long nature/term of the business and lack of historic record/data at product and /or each policy level.

In order to compute asset shares at policy level the premium records/data i.e info/data is required regarding the premium paid by the policyholder in each year since policy inception is required. This is more important if policies have been altered during the policy tenure.

Even the Policy administration/IT system may record/store this type/level of information, it may be extremely difficult to extract such data both in term of effort and cost due to complexity of requirements.

Historic information will also be required in respect of expenses incurred by the company each year since the commencement of the policy and/or policy cohort and the expenses attributable to that policy cohort(s).

As current regulatory/IRDA Regulations requires companies to make segmental reporting for each line of business that companies are writing it may likely to have record of total expenses incurred each year in respect of participating business however these info/data may not be available at fund(s)/product and policy cohorts level. Also it is unlikely that company have carried out detailed expense investigation/analysis each year to demonstrate how expenses should be apportioned particularly in respect of initial years of operation.

Company may use driver(s)/factors such as Sum Assured, Premium Size and number of policies to apportion the expense to various products lines/policy cohorts with hope/possibility that expenses in respect of recent years may be apportioned more accurately particularly in last 1-2 years.

It is also unlikely that company would be intended /interested to carrying out detail expenses analysis on retrospective basis due to manpower/cost issue. Hence company will end up using the approximation while computing the asset shares.

Historic data/info in respect of Mortality/morbidity payouts will also be required at fund(s)/cohort/policy level to compute the asset shares- this historic information may not be available.

Info/data regarding miscellaneous profit such as such as lapse/surrender and riders profits will also be required to calculate the asset share at product/policy/policy cohort level. This info/data may not be available for previous years.

In the past company may under/over distributed the bonuses in respect of some class of participating business/products – it may be difficult the record such augmentation.

Assets share computation will also be effected if accurate cost/charges for guaranteed not deducted appropriately particularly during initial year of operation when most of the insurance companies may not have recognised the level of guaranteed they were providing particularly implicit guarantees –e.g. level of regular bonuses etc and hence it is unlikely that companies would have an accurate calculation of this guarantees.

Similarly determining and charging appropriate cost of solvency margin/cost of capital from the Asset Share is another key practical difficulties company/companies may face if it is developing/computing the asset shares on retrospective basis, particularly for the period where free Estate/FFA is lower than the cost of solvency margin and shareholders have supported the regulatory requirements.

The investment return applied to asset shares need to be consistent with the investment return on the assets backing the asset shares. It is quite unlikely that company maintain the record of investment return achieved since inception particularly and hence it is extremely difficult to apportion the investment return in accurate manner to various participating fund/products and policy cohort in particular if company maintains different asset mix backing the policy liabilities/ asset share due to nature and term of the of the guarantees/liabilities that products offer.

Also it may be practicably difficult to use daily investment return in asset share calculations mainly due to lack of data and complexity involved in the calculation (system/effort and cost) and hence use annual rates of return.

Deduction of taxes from the Asset share is another area where Appointed Actuary/ Actuary may face practical difficulties particularly due to lack of clarity on tax rules in India. There is a possibility that participating fund might be generating taxable surplus on standalone basis but no tax liabilities arise at company level i.e. aggregate level due to losses incurred with respect to other line of business. **(9)**

iii)

Following is an extract from the draft revenue Account for the financial year ended 31st March 2013 (Current Year)

Particular	Schedule	Current Year	Previous Year
		(Rs. Lacs)	(Rs. Lacs)
Surplus during the year before transfer to/from Shareholders		-500	1,660
Transfer to shareholders' account		940	1,140
Transfer to shareholders' account			
Balance being transferred to Fund for Future Appropriation		-1,440	520

One of the Statutory Auditors made following comment:

"Given there is a deficit of Rs 5.2 crores in the fund a transfer of Rs 9.4 crores to the shareholders accounts may not be in line with Para 9 of Schedule A of IRDA (Preparation of Financial Statement and Auditors reports of Insurance Companies) Regulations, 2002 and Generally Acceptable Actuarial Practices(GAAP)" .

Justify the shareholder Transfer.

As per Para 9 of Schedule A of IRDA (Preparation of Financial Statement and Auditors reports of Insurance Companies) Regulations, 2002 "funds for future appropriation (FFA) represent all funds, the allocation of which, either to policyholders or to the shareholders, has not been determined by the end of the financial year."

Therefore, the funds for future appropriation (or Estate or unallocated surplus) in respect of participating business represents a bonus smoothing account/provision which will vary from year to year with transfers to and from it after having carried out distributions to policyholders and shareholders. In some years the funds for future appropriation (FFA) may grow while in other years it may fall. The FFA will move each year in line with the following:

Movement in FFA = Surplus/deficit arising during the year – policyholder cost of bonus – shareholders' share of the cost of bonus (i.e. 1/9th of the cost of bonus).

The Estate/FFA is the difference, if any, between the total assets in the participating (90: 10) Fund and those needed to support the current and future liabilities of the Fund. The amount of the Estate varies according to the Company's assessment of the cost of the future liabilities from time to

time, but in a given year it can also be increased or reduced by the allocation of some of the surplus or deficit arising, or reduced to the extent necessary to support bonus levels. In effect, the Estate is the means to provide a degree of smoothing on the business in the 90:10 Fund.

Surplus arises in the 90:10 Fund from a number of sources. Typically, the primary sources of surplus are the differences between actual investment returns and the investment returns allowed for in valuing the guaranteed benefits to which policyholders are entitled. Surplus arising in a given year can be either positive or negative: a negative surplus is also referred to as a deficit.

Surplus is distributed to with-profits policyholders in the form of bonuses. The amount to be distributed will depend to some extent on the amount of surplus (or deficit) arising. However, this amount may either be increased by including some of the retained surplus from previous years held in the Estate/FFA, or some of the surplus arising may be held back and used to increase the Estate/FFA.

Distributions of surplus from the Par Fund (90:10) are shared between with-profits policyholders and shareholders in the proportions 90% to policyholders and 10% to shareholders. This means that for every Rs 9 which goes towards the cost of bonus allocations to policyholders, shareholders receive Rs1 as set out in the IRDA (Distribution of Surplus) Regulations,2002.

Keeping FFA (or unallocated surplus or unallocated divisible surplus or Estate) is also a widespread practice internationally.

(5)

iv)

Following are the extract of Valuation/Actuarial Reports for valuation as on 31st March 2013 for 2- participating products which are entitled for reversionary and terminal bonuses.

Item	Product 1	Product 2
NOP	1197	547
Sum Assured (SA)	166,244	110,853
Vested Bonuses (VB)	27,243	27,333
Present Value (PV)of Sum Assured	56,682	27,183
Present Value (PV) of Vested Bonuses	11,935	7,885
Ratio 1=PV (SA)/SA	0.34096	0.24521
Ratio2 =PV (VB) / VB	0.4381	0.28849

Outline the possible reasons for difference between Ratio 1 and Ratio 2 within the product and across the product.

Following factors / reasons that may lead to difference in assurance factor for sum assured and vested bonus:

a) Larger contribution of policies with low duration in the SA assurance factor as compare vested bonuses assurance factor particularly in respect of new policies written during the current financial year i.e. 2011-13 where no vested bonus is applicable and hence zero contribution to average assurance factor for vested bonus, but the same contributes in the sum assurance factor. Generally shorter/early duration policies attributes lower assurance factors as compare to higher/later duration policies. Hence, we observed a decrease in assurance factor for sum assured and increase in assurance factor for vested bonus (as more policies get eligible for bonus) as compared to previous year.

b) Secondly, company allow future lapses/surrender in the cash flow projection and early duration lapse/surrender rates are generally higher than later duration lapse rate. This may also distorted the assurance factors for SA and Vested Bonuses.

c) Thirdly, the product may offer certain onetime and /or periodic increase in the SA either by way of guaranteed addition or one time increase. This may further distort the assurance factor of sum assured in opposite direction when comparing with level vested bonus assurance factor.

(3)

v) a) Margin for Adverse Deviation (MAD) is required in order to protect the interest of existing policyholders in general and to meat participating policyholders reasonable expectation (PRE) in particular.

MAD also protects company solvency and shareholders interest from any adverse scenarios/uncertainties in future.

MAD generally acts as cushion against any miss-estimation and/or any deterioration of the best estimates assumption used by the Appointed Actuary/Valuation Actuary for computing the policy liabilities particularly in area where credible relevant experience is not available and/or Appointed Actuary/Valuation Actuary is not very confident on these assumptions.

IRDA (Assets, Liabilities and Solvency Margin of Insurer) Regulations, 2000 (ALSM Regulations) requires Appointed Actuary to include, while determining the amount of liability, an appropriate Margin for Adverse Deviation (MAD) in the assumptions this assumptions which are usually based on insurer/industry credible experience or pricing assumption.

Actuarial Practice Standard (APS)-2 also requires Appointed Actuary to determining the MAD in compliance with ALSM Regulations.

Use of lower MAD may mean that the reserve will be insufficient to protect the policyholder's interest/payout in the adverse scenario(s) hence provide lesser security of policyholders interest. Use of higher of higher MAD will provide greater security of policyholder's interest. However, it will lead to higher capital requirement which may depress the both policyholders and shareholders returns.

Actuarial Practice Standard (APS)-7 advices to the Appointed Actuaries, Peer Reviewers and other Actuaries concerning the issues that must be considered and set the minimum margins that will generally be considered acceptable. **(4)**

b) Appointed Actuary/Valuations actuary must consider the various/relevant provisions of Insurance Act, 1938, IRDA Regulations, professional guidelines/Actuarial Practice Standard applicable to him/her in his role in determining the value of liabilities particularly the IRDA (Appointed Actuary) Regulations, 2000, ALSM Regulations, 2000, IRDA (Protection of Policyholder's interest) Regulations, 2002, IRDA (Distribution of Surplus) Regulations, 2002, APS-1, APS-2 and APS-7.

APS-7 advice to the Appointed Actuaries, Peer Reviewers and other Actuaries concerning the issues that must be considered in determining the level of MAD and also set the minimum margins that will generally be considered acceptable.

The Appointed/Valuation Actuary may first assess the best estimate assumptions and then add MADs. Alternatively, he/she may seek first to establish net of MAD

assumptions or provide an overall contingency reserve for adverse deviations using professional judgement. Whichever approach is taken, the Actuary must be prepared to quantify and justify the overall MADs used in the valuation as providing an appropriate level of prudence to enhance the degree of protection of policyholder benefits, from the impact of adverse experience.

The Appointed/Valuation Actuary may:

(i) rely on the overall MADs rather than just the MAD that may have been associated with a particular parameter, but only to the extent that it can be held that the risk of coincident occurrence of adverse experience in several parameters is expected to have insignificant impact on the amount of the liability;

(ii) have regard to the extent to which increases in liabilities may be offset by compensating increases in asset values;

(iii) consider the ability of management to react to adverse experience, for instance by changing asset mix, reducing or eliminating bonuses (subject to maintenance of PRE), increase mortality and other charges where there is discretion to do so, or more extremely closing to new business with perhaps consequential reductions in expenses;

(iv) consider the protection provided by reinsurance;

(v) consider the additional protection provided by the actual solvency margin held, only in the most extreme adverse scenarios, which should generally be highlighted to the Board as ones, which would require either further capital injections or the closure of the business after securing the interests of policyholders. In such extreme scenarios, only 10% of the free assets, if any, in the policyholders‟ participating fund can be assumed to provide the additional protection.

In constructing the adverse scenarios, the Actuary must:

(i) identify and give particular attention to the conditions or combinations of condition that will be the greatest threat to the security of policyholder interests;

(ii) identify and consider the extent, to which falling or rising interest rates may threaten the ability of the office to secure policyholder interests and where such risks cannot be substantially matched or mitigated;

(iii) consider more generally the interaction of liabilities and assets;

(iv) consider all options, with a view to policyholders acting rationally to maximize their own interests, particularly where this may be to the detriment of shareholders or other classes of policyholders. For instance, if in an adverse scenario, interest rates fall below the levels underlying guaranteed annuity rate options, then while selecting the adverse scenarios, the Actuary must allow for the risk that a large proportion (commensurate with the actual experience of the

company) of policyholders may exercise their options and then decide whether to provide for the additional reserve or not;

(v) avoid being influenced unduly, by personal opinion held appropriate concerning the future (of say mortality experience or interest rates), and ensure consideration of a full range of plausible adverse scenarios.

While setting MADs, the Actuary should consider the past experience of the company concerned.

While assessing the risks inherent in guarantees provided on long duration contracts and concerning the terms on which future premiums may be invested and investment income reinvested, the Actuary must consider the relevant experience available from jurisdictions other than India. This should include consideration of both deflationary and inflationary scenarios.

The overall objective of setting MADs should be to enhance the protection provided to policyholder benefits.

(8)

vi) a) Asset-liability management (ALM) is the practice of managing a business so that decisions and actions taken with respect to assets and liabilities are coordinated.

ALM can be defined as the ongoing process of formulating, implementing, monitoring and revising strategies related to assets and liabilities to achieve an organization's financial objectives, given the organization's risk tolerances and other constraints.

ALM is relevant to, and critical for, the sound management of the finances of any organization that invests to meet its future cash flow needs and capital requirements.

(1)

b). The objective of Asset Liability Management is not to eliminate risk.

The objective is to manage risks within a framework that ALM helps the Company balance competing objectives for growth, profit, and risk.

(1)

c). Key role of Risk and ALM Committee :-

· Setting the insurer's risk/reward objectives and assess policyholder expectations

· Quantifying the level of risk exposure and assessing the expected rewards and costs associated with the risk exposure

· Formulating and implementing optimal ALM strategies and meeting risk/reward objectives. The strategies must be laid down both at product level and enterprise level.

· Laying down the risk tolerance limits

· Monitoring risk exposures at periodic intervals and revising ALM strategies where required

· Placing the ALM information before the Board at periodic intervals

(1)

d). Key Risk cover by the ALM :-

Due to the nature of the life insurance business, there is a close relationship between ALM risk, product development and capital management. A key driver of the asset strategy adopted by an insurer will be its liabilities profile and the need to ensure that the Company holds sufficient assets of appropriate nature, term and liquidity to enable it to meet those liabilities as they become due.

Accordingly, the risks covered by Asset Liability Management are:

Market Risk

• Interest rate risk (including variations in market credit spreads): the risk of losses resulting from movements in interest rates and their impact on future cash flows. To the extent that assets and liabilities are not well matched, movements in interest rates can have an adverse economic impact

• Equity, real estate and other asset value risks: the risk of losses resulting from movements of market values of equities and other assets. The Company can be exposed to adverse economic impacts to the extent that the market values of equities, real estate or other assets held do not move in line with the liabilities

• Related credit risk: in coordinating its exposure to market risk, the Company may increase its exposure to counterparty credit risk

• Currency risk: Risk of losses resulting from movements in exchange rates. This may not be applicable to most of the Indian life insurance companies as they may not hold assets and liabilities in currency other than the Indian Rupee

Underwriting Risk

This is the risk arising from the underwriting of insurance contracts. Uncertainty of timing and quantum of future payouts require coordination with assets. Life insurance contracts offer choices to policyholders – policy surrender options,

policy loan options, etc. The Company needs to manage its assets and liabilities in a judicious manner. When policyholders exercise these choices, the Company may incur additional costs to meet the payout obligations.

Liquidity Risk

This is the exposure to loss in the event that insufficient liquid assets will be available, from among the assets supporting the liabilities, to meet cash flow requirements when they are due. This may force the Company to sell assets at unfavourable prices. The liquidity profile of the Company is a function of both – asset and liabilities and varies with market conditions.

(4)
[Total 50 Marks]

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