

# **Institute of Actuaries of India**

## **Subject SA2 – Life Insurance**

### **November 2012 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.

**1(i)** Deduction for tax purposes is allowed up to Rs 100,000

Further, the deduction is restricted to premium per annum up to 10% of the Capital Sum Assured. Thus, the part of premium paid in a financial year greater than 10% of the Capital Sum Assured is not eligible for deduction under Section 80C.

These limits were brought down from 20% to 10% of the Capital Sum Assured in the Finance Act, 2012

For policies issued after April 2012, any sum received under a life insurance policy is exempt from taxation subject to the condition that the premium is less than or equal to 10% of actual Capital Sum Assured.

**1(ii)** Rider considerations are set out in the IRDA (Protection of Policyholders Interest), 2002

Rider premium is capped to 30% of base premium however there are exceptions

Term assurance and CI products where the rider premium can go up to 100% of base premium

In addition there is a cap on rider sum assured which cannot exceed base sum assured. The utility of protection riders such as accidental death benefit, term rider, CI rider is limited to a large extent due to this condition.

Nature of rider follows the base policy so that a rider attached to a participating policy becomes participating and likewise for non-participating base policy

Due to the rider classification, the lift in profitability by selling riders is somewhat muted to the extent that the riders sold are attached to Par policies. Even so due to the savings in expenses associated with issuing and maintaining riders likely to accrue, there should be an increase in profitability. All riders attached to non-par policies are likely to lead to a material increase in profitability

Given that riders commonly sold in India are protection oriented, for eg Accidental Death Benefit, Critical Illness etc the profit margins for such business are expected to be higher than savings business. This is another reason why the sale of riders will positively impact profitability.

Regulatory changes impacting the life insurance industry are likely to further reduce the profitability of savings business and this will provide further impetus to focus on protection business to drive margins

**1(iii)** The actual profit for Par business in FY11/12 was Rs180Cr. This amount is available in the Statutory Financial Statements. The AOS first splits this profit into two main components of profit, Expected Profit and Experience Profit.

**1(iii)** Expected Profit represents the release of profit during the period of reporting, based on the statutory reserving assumptions at the beginning of the year. It assumes that the actual experience during the period of reporting will be identical to the beginning of the year assumptions and no new business will be written;

Experience Profit then captures the variation in actual experience relative to the opening assumptions adopted. The key elements of experience include persistency, mortality, investment and expenses. Lastly, if the company writes new business it is also an element of experience profit

The analysis of surplus shows the surplus emerging. The surplus is then distributed to policyholders and shareholders. Thus a part of the surplus would be distributed in the current year's bonus declaration, reflected in future bonus assumptions in the reserving and a part transferred to the estate for future appropriation.

The analysis of surplus indicates that the Expected Profit was Rs100 Cr. The Experience Profit contributed to 80 Cr of the total Rs180Cr profit.

The Expected Profit indicates the margins in the reserves that would no longer be required at the end of the year and thus released into profit. The biggest component is costs, which contributed 30%, followed by investments and persistency at 25% each and mortality contributing 20%. This indicates the relative importance of each of these drivers of profitability for Par business and should be used to guide management effort to improve profitability.

Since the Expected Profit is a function of the reserving assumptions, a more prudent level of assumption would lead to higher releases of surplus when the margin is no longer required. It is a good indicator of the uncertainty around the parameter which in turn could be a function of the availability of past experience, the method adopted in setting the assumption and factors that affect the actual experience

The Experience Profit is helpful in understanding actual management performance in the period in this case FY11/12. The key sources contributing to positive performance include costs which have led to a reduction in the reserving assumption of Rs50 Cr and actual costs incurred lower than reserving assumption by Rs10 Cr. Persistency contributed to Rs30 Cr, mortality to Rs10 Cr and investments to a small Rs5 Cr. New business contributed negatively in the period. While the above comments state the facts it is important to further analyse the experience.

While persistency has contributed positively, actual lapses have been higher than expected based on the reserving basis. This indicates that the Company releases profits at the time of lapse - a phenomenon associated with the reserving approach where the reserves held at a policy level cannot be lower than surrender value. Thus while the Company has done poorly on lapses, this leads to short term profit realisation but over the long term it could have a negative impact on profitability.

This could be due to loss of future margins lost in the renewal income.

Lapses will also cause the liability duration to shorten. As this happens, assets invested may need to be realised and over time the Company will reduce the asset duration in order to maintain the ALM Duration gap. This of course is a function of the Company's investment strategy. There will be ALM mismatch as this partly allows for investment surplus to emerge. Regular premium par business will inevitably have an ALM mismatch given the operating challenges of obtaining appropriate investments, in particular the lack of zero coupon bonds.

A sudden increase in lapses will cause an alteration to the Duration Gap between assets and liabilities. Further changes in interest rates will thus have a different impact on the Par portfolio. For example, if the asset duration remains unaltered and was matched originally to the liability duration this would cause the asset duration to exceed liability duration. A subsequent interest rate rise will cause asset values to fall more than liability values. This would require changes to the asset duration.

Higher lapses would ultimately lead to lower investment yields as the asset duration is shortened and yield for longer duration bonds is sacrificed, assuming an upward sloping yield curve.

Lapses will also impact expenses. In order to derive efficiencies in maintaining an in-force book of business, it is important to grow the in-force base. Lapses would reduce the in-force base. Thus over time, apart from its direct impact on profitability higher lapses would adversely impact the experience profit element related to costs.

Poor persistency has a direct impact on customer satisfaction. Apart from some situations where the customer is in financial distress lapsation would indicate dissatisfaction with the policy. For all these reasons it is important to continue to focus on persistency

Another key driver of Experience Profit is costs which contributed to 60 Cr largely due to a change in assumptions. This could have been caused by efficiencies realised in the past and the reserving assumption adjusting for it.

Note that this would typically be a one-off item and it would not be expected to continue contributing such profits annually.

**1(iv)** In order to arrive at sustainable experience profits it is essential to isolate profits that are one-off and not likely to be repeated

Assumption change is one item that would likely be a one-off and should be excluded from sustainable experience profits.

The impact of new business could be adjusted in arriving at sustainable experience profits. For e.g. business plan projections could be used to arrive at projected new business volumes.

The profile of new business, and in particular the associated new business strain would be a key driver in assessing the new business contribution to sustainable profits

For other elements of experience eg mortality, persistency and investments it would be relevant to understand the approach adopted in setting the reserving assumptions.

Any assessment of sustainable experience profits would need to consider the current performance, any likely changes that would impact the risk profile for eg changes in underwriting standards, new distribution channels, new products in particular the component of protection vs savings

It would also be critical to decide the amount of surplus declared as current bonuses and that set aside for future appropriation by transfer to estate.

**1(v)** There are several aspects to consider in responding to this question including:

*Customer attractiveness*

In order to understand customer attractiveness the starting point would be to define the target customer segment, their income and age profile, the needs being met by the products

Consideration of the benefits offered under the two platforms including the premium rates, life insurance cover, savings elements, surrender values.

In particular the key benefits offered under the product would be the death benefit, the maturity benefit and the surrender benefit

These would need to be analysed in relation to the level of premium. One way to consider these would be to determine the reduction in yield due to the various costs of the product.

The reduction in yield would assume a gross rate of return on the premiums, say 10% and then determine the reduction in yield due to the various cost elements. This may be determined at various policy durations and provides a good way to compare alternate product offerings

The reduction in yield may also be considered excluding the cost of insurance and service tax, which may be relevant for a comparison against other financial products

In comparing the two product platforms it would be relevant to compare the guaranteed benefits and non-guaranteed benefits. This should be done using the prevailing benefit illustrations that shows illustrated benefits at 6% and 10% illustration rates

Life insurance products provide attractive tax benefits and it is therefore relevant to consider whether the product qualifies for tax benefits for customers

Premiums paid up to Rs100,000 annually may be subject to deduction if the product has a capital sum assured at least 10 times the annual premium. Any part of the premium paid in a financial year that exceed 10% of the capital assured will not qualify for tax deduction.

Other aspects that are relevant to consider include:

Guarantees. Customers would be interested to know the various guarantees offered. These would include investment guarantees on maturity, surrender value guarantees at various points during the product tenor

Options: Various options provided under the product include non forfeiture option such as making the policy paid up and its terms, option to increase the sum assured or alter the premium, option to opt for riders at point of sale or at future points during the policy tenor

For the participating product, the level of guarantees offered may be lower compared to the non-par product if it has fixed benefits defined at the contract outset but the non-guaranteed elements of a Par product would include a bonus element. Therefore, the company's performance generating bonuses would be relevant.

Although past investment performance is not a good guide for future performance, the Company's cost ratios, claims experience and persistency would be considered in making an assessment regarding potential bonus rates. The benefit illustration would provide useful insights into projected bonus rates at the 6% and 10% scenarios.

For the non-par design, the level of guaranteed investment return is likely to be more important. If the product has variable benefits based on future investment performance scenario analysis could be used to compare the two offerings.

Given that non-par designs transfer the entire investment risk to the shareholders, it is critical to manage the investment risk appropriately. If the product offers fixed benefits defined at the outset, the guaranteed return would need to have regard to the investment climate, investment strategy, risks to the strategy including reinvestment risk, credit risk.

For non-par designs that offer variable benefits, the nature of this variability would drive the ALM arrangements

The premium and policy terms are relevant to compare. Depending on the target customer segment, the two offerings may be considered for attractiveness. For eg, customers nearing retirement age may prefer shorter premium terms. The policy term would need to have regard to the needs being targeted eg for child savings the tenor may be linked to a pre-defined

Other considerations would include entry limits such as age, premiums.

Underwriting standards is also be a relevant factor to consider particularly the trigger for full medical underwriting

The tax treatment of par and non par business is different. Bonuses declared under par business are net of tax, while all the benefits under non-par are before tax. Thus, more value can be passed to a policyholder under a non-par product subject to investment risk being managed appropriately.

### *Distributor attractiveness*

The key aspect from a distributor perspective is the distributor remuneration and ease of sale

Distributor remuneration would comprise of initial and renewal commissions, any bonus commissions/overrides paid for eg persistency linked

The level of commissions would typically be linked to premium and policy term, with longer terms typically paying higher commissions. There may be a link between commissions and the level of protection by using sum assured, although due regard will need to be paid to the statutory limits on commission rates which are expressed in terms of premiums

Products with a strong sales story may be more attractive for distributors even at lower commissions

It is typically easier to design long term (both premium and policy terms) products under Par platform compared to non-par given the ability for the insurer to pass on experience variances to the policyholders. This may also translate in higher commission levels.

On the other hand, it is likely that the sales attractiveness may be higher for non-par design

The distribution channel employed, or multiple channels, are likely to have its own preferences. For eg a bank channel may have preference for a shorter premium term along with an easier sales pitch that could be explained in a relatively shorter time compared to Agency

#### *Shareholder attractiveness*

In looking at the shareholder attractiveness the following aspects would typically be considered:

Profitability outcomes such as new business margins, profit margins, IRRs

Capital impact measured through new business strain, payback period; projections of capital requirements.

Reserving and solvency margin requirements which would drive the profit signature, capital requirements

The distribution of surplus regulations restrict shareholder transfer of surplus to 10% for Par products, however 100% of the surplus may be distributed for Non-par

The profit signature would drive the free cash flow generation for shareholders. For the Par design, since the shareholder transfers depend on the bonus rates as these build up, the shareholder transfers would increase.

Bonus scales may be designed to minimise the strain in the initial years. Further, the reserving basis used to determine the cost of bonus declared (in case of reversinary bonuses) also determines the shareholder transfer and the use of a more prudent basis also increases the shareholder transfers

The level of guarantees and options would be relevant in ascertaining the riskiness of the product proposition.

Par designs typically have lower guarantees and thus the profitability hurdle requirement may also be lower compared to non-par design which is likely to have higher product guarantees

For the Par design, the level of Par Fund Estate (FFA) would be relevant. If the FFA is greater than the solvency margin requirements, shareholders do not need to set aside capital to back the solvency requirements

On the other hand, if the Company's Par Fund is not mature ie in order to declare bonuses shareholder transfers are required then 100% of these would need to be funded by the shareholders

However, for purposes of evaluating a new Par product, it is typical to assume a steady state in which the shareholder financing is no longer required. Not doing so is likely to penalise the current cohort of Par policyholders

The proposed investment strategy would also be relevant in ascertaining the riskiness of the two propositions. For eg the level of ALM mismatch, the proportion and type of risky assets eg corporate bonds and equities

- 1(vi)** Operational risk is typically defined as the risk of loss arising out of inadequate or failed internal processes, people and systems, or from external events.

Since there could be overlaps with other risk categories eg poor systems resulting in inadequate monitoring of concentration risk for counterparties which could also be categorised under credit risk it is more important to have an internal definition that is consistently applied and understood than agonise over the precise wording of the definition.

**1(vii)** New product introductions is likely to be associated with potential new system requirements and processes

It would be important to identify for each new product introduction the benefits offered, any options and guarantees and whether these require any changes to existing systems or processes.

In doing this assessment it is critical to assess any new features that are required to be built on systems or changes to processes. It is also important to identify whether the changes may have any impact on other existing processes/systems

It would be relevant to consider whether any processes are manual.

Apart from systems and processes it is also relevant to consider the impact of the product introductions on human resources. Are there new skills that the company may need to acquire to administer these products?

If there are product features not required to be set up at product launch, it would be important to monitor the timely development to avoid last minute changes. External events, such as changes to regulatory requirements may lead to a change in priorities w

With reference to the specific product, clearly there will requirement to build the inflation protector optionality in the various systems. This would include a consideration of financial reporting ie the treatment of additional premium for new business/renewal premium, similarly for the additional sum assured.

Commissions may be generated from an independent system or integrated and would require a change to administer the commission rate on the additional amounts

The valuation data provided for liability valuation to the actuarial team would require the option chosen to be provided including whether a 5% or 10% increase was selected in order to appropriately

Benefit illustrations would require a change to provide facility to illustrate the new option

A new product may also bring about new misselling risk that needs to be managed.

*In order to mitigate the additional operational risk additional controls that may be considered:*

Rigorous testing by various functions in the Company on the new products as well as existing products to avoid any unintended consequences

The use of test cases in such cases is common, and the cases must be chosen carefully to cover various situations. This requires experience of where the potential failure points may lie, including learning from previous experience.

The Company may want to consider dedicated, or part time, cross functional team to monitor and test the outcomes of various aspects on an ongoing basis given the frequency of product introductions

Since efforts need to be well targeted an assessment could be made on the impact of the various processes and the controls established could be weighed based on the risk assessment. These should be established within the Company's risk management system

In case any of the processes are manual in nature, these would need to be tracked with frequent reviews and additional controls established

Finally internal and/or external audit plans should factor in these developments including identifying any control weaknesses

**2(i)** The bonds in the company's fixed interest portfolio should be grouped according to credit rating, e.g. using Standard & Poor's or Moody's ratings.

They should also be grouped by outstanding term.

Past experience of the level of defaults on bonds should be researched and analysed, and judgements made about future rates of default. Investment banks and the insurance company's investment department would be able to provide views on future default rates.

An assumption should also be made for the degree of recovery (or severity of loss) expected on default.

Using this data, appropriate per annum default rate assumptions should then be assessed for each credit rating and each term grouping. The highest rates will apply to the lowest rated and longest dated bonds.

These default rates can be deducted from the current yield of each bond. The resultant adjusted yields should then reflect the risk free yield (e.g. close to gilt yields) plus a liquidity margin to reflect the lower marketability of corporate bonds.

Finally, these adjusted yields should be used to determine the future investment return assumption for the company's corporate bond portfolios within its embedded value projections.

Parameter risk (the risk that the default assumptions are mis-stated) and other secondary risks (e.g. random fluctuation or default catastrophe) could be taken into account when setting the risk margin in the discount rate.

However, it is unlikely to be appropriate for the entire allowance for credit risk to be made within the risk discount rate.

**2(ii)** The assumptions for supervisory reserves are prescribed and influenced by IRDA regulations and APS as issued by the IAI.

IRDA( ALSM) ; APS1, APS2 and APS7 provide guidance to set up the Valuation assumptions.

Supervisory reserves include specific prudential margins by allowing for Margins for Adverse Deviation in the assumptions.

The projection assumptions would be best estimate assumptions of the most likely outcome.

The company writes Par business, non-par business and unit Linked business;

**Regulation requires a Gross Premium Valuation (GPV) for par business, at a prudent valuation rate, and it also requires a consistent assumption regarding the future bonus rate.**

For In-force Premium paying Par Business, the asset shares in **general may be** held as statutory valuation reserves, so the valuation assumptions may not actually lead to any additional prudence. In valuation world **in general** the future bonuses are such that the reserves are equal to asset shares.

However, for reduced paid up and policies expected to revive, GPV is held that involves MAD in all assumptions including valuation interest rate.

For the non-par business, the MAD in the valuation assumptions mortality, morbidity, persistency, valuation rate leads to prudence in reserving. This results into deferment of the profits future as MADs are released in future.

For linked business, the valuation assumptions for supervisory reserves **really only affect the revenue account to the extent of change in the non-unit reserves.** However, assumptions for the EV projection model affect all the items of the revenue account and hence EV.



The non-unit reserves actually held **may not be** very sensitive to the discount rate. Although, **the impact of future expenses and expense inflation assumptions may be significant. Over all impact on Non-unit reserves is lower due to zeroisation of reserves requirement.**

For the projection of the **ASM for EV purpose**, the assumed investment earnings on the shareholders' fund is likely to be material.

The regulatory valuation assumptions need to be prudent ; require MAD in the lapse assumption such that MAD results into higher reserve.

The EV projection assumptions would most likely make allowance for lapses as a best estimate build up of assets and liabilities is required.

Policy maintenance expense assumptions for supervisory reserves are likely to be a cautious estimate of long term expense levels. For the EV projection model however, expenses are likely to be actual current year budgeted expenses including cost overruns.

The prudence in reserving results does not impact the actual profit from the contract during its term, however, strengthening of the valuation basis results into deferment of the profits and hence lower EV due to higher RDR in TEV.

**2(iii)** The analysis would need to be done separately for par and non-par business.

**PAR FFA:** Par Estate can be taken either at 10% of the current market value .or 1/9th of the cost of bonus that will exhaust the par estate.

**The analysis of change in embedded value may include:**

Expected investment return on non-par net assets and the Shareholder Fund (included at market value in EV)

Expected investment return on the free estate (FFA) in par-fund if included at 10% of current market value.....

**Unwinding of the risk discount rate:**

On non-par fund its unwinding of present value of future profits at RDR

On par fund; unwinding of the PV of future shareholder transfers including the distribution of the free estate, if assumed to be distributed as bonus.

Value of new business written during the year.

Changes in assumptions, such as:

Future experience assumptions (economic, demographic etc).

Statutory reserving bases.

Discount rate.

The difference between actual and assumed experience during the year, including:

Actual v. expected investment returns (including on shareholder funds and net assets ).

Actual v. expected decrements (mortality, lapses etc).

Actual v. expected expenses.

Actual v. expected bonus declarations (e.g. change in RB/TB split).

Actual v. expected tax.

Capital injections and dividend payments.

Model changes / corrections.

Unexplained (this should be minimised).

- 2(iv) The conventional without profits immediate annuity business is written on 0:100 basis. Therefore the profit arise on these contracts are valued at 100%.

**Valuation rate of interest**

The strengthening of the valuation rate of interest will result into increase the statutory valuation reserves. This will effectively delay the emergence of the profits on this line of business.

Normally in a traditional embedded value calculation, deferral of profit emergence would reduce the embedded value. This is because the discount rate normally exceeds the net earned investment return assumed on the underlying assets.

However the overall impact may be relatively small, particularly;

- the margin between earned rates and the discount rate is relatively small and/or
- if the annuitant portfolio is not significant in size relative to the overall profits of the business.

Therefore, if this business is included within the embedded value via explicit calculation of the present value of future surpluses arising on the embedded value basis then the overall impact is likely to be a relatively small reduction in embedded value.

**Mortality assumption**

For valuation, strengthening the mortality implies mortality is lighter than the assumed earlier.

The impact of strengthening this assumption within the valuation basis is as above, and the impact on embedded value may therefore be similar.

However, the actuaries preparing the embedded value calculation should discuss the reasons behind the strengthening of the mortality assumption basis with the reporting actuary. If the basis change reflects solely an increased prudence margin, then the impact is as for the valuation rate of interest.

However, it may instead reflect a change in the underlying expected future mortality, perhaps due to data that was not available at the time at which the embedded value calculation was performed.

Perhaps more credible experience now reveal that the experienced annuitant mortality is lighter than assumed and the best estimate mortality assumed need to reflect this.

If this is the case then the annuitant mortality basis used in the experience assumptions should also be reviewed, and updated for the next time at which the embedded value is calculated.

Change the experience basis in this way would reduce the embedded value.

- 2(v) The experience assumptions used for future embedded value reporting should be a realistic estimate of future experience. The company would need to consider whether the experience in the last year was likely to be representative of future experience.

In determining this, the company would want to consider the **length of time over** which the experience been worse than the assumptions. If there has been a sustained period of worsened experience this would give a stronger case for changing assumptions that if this was a one off.

The company would want to ensure it was happy the data in the analysis was sufficient such that the result was credible.

If it was felt to be a random variance not an indication the underlying experience had worsened it may not want to change the assumption.

In addition the company would want to look at a trend in experience over time before making a decision.

There may also have been events that may have caused an impact on the experience over this period that may not be repeated, for example poor stock market performance, customer service issues, poor media industry coverage post any regulatory changes, any recent media coverage of the company or industry.

The company could consider whether the experience is the result of a large tranche of business **reaching policy anniversary where the surrender penalty is lower or zero**. It should investigate persistency by in-force duration.

The company would also need to consider the comparability of business over time. It is possible that business written in different time periods may be subject to different policy conditions which may in turn lead to different persistency experience.

The company would need to consider the extent to which it is intending and able to implement mitigating action to improve persistency in future.

The company would also need to consider the financial impact of the change. An adverse impact of Rs. 10m in one year's experience is likely to have a much more significant impact if capitalised through a change in assumptions, perhaps of the order of Rs. 50–100 m.

Impact of any changes need to be communicated to both the shareholders

Whilst the company should use assumptions it feels are reflective of future experience it would need to consider the impact of the changes on its JV partners' perception by the stock market and ensure that it can communicate the rationale for these effectively.

The company should also consider the frequency with which it normally reviews and changes its assumptions, and how long ago they were last updated., and it should consider the impact of the experience information on other areas, such as assumptions used in pricing.

- 2(vi)** Liquidity refers to the risk arising from short-term cash flows,  
It refers to the risk that the company, while maintaining statutory solvency, cannot meet its short term cash outflows, or can meet them only at an excessive cost.  
It refers to the risk arising from the fact that the assets may not be realised at appropriate price when needed to be liquidated.  
Examiners to give marks for any alternative definition
- 2(vii)** Liquidity would be aggravated by immediate demands from policyholders exercising options such as surrender or switching investment options.  
Need to consider abnormal cash demands relative to cash on hand or cash generated by sale of investments  
Need to develop policyholder behaviour scenarios  
Consider activities of corporate agents advising 'their' clients ; how are they selling and dealing with existing clients  
Consider time frames – 30 day, 6 months, one year  
Consider extent of policyholder demands in these timeframes

Consider ability to realize investments - consult with Chief Investment Officer

Unit linked less problematic unless illiquid assets held; whatever is realised can flow through to unit prices

But beware of unit pricing operational risks when transaction volumes are Abnormal

Certain mandated investments in Controlled Funds could be problematic

Express results in terms of coverage of cash demands from realisable assets over time frames and under scenarios

Extreme case would be mass surrender of existing policyholders; however, for conventional policies, the GSV is typically low, and the special surrender value is reviewable subject to GSV floor; the company may have the right to defer surrender payments.

## **2(viii) ALM purpose**

“The purpose of asset liability management (ALM) is to derive an investment strategy that takes into account the insurer’s attitude to investment risk, meaning the extent to which it is prepared to take the risk of not being able to pay its claims.

This attitude will vary according to how strong the insurer is in terms of the relative size of its free reserves.”

The company need to derive an investment strategy so as to ensure guarantees can be met.

The co may need to be investing in assets which produce a flow of asset proceeds to match the liability outgo. However, it depends on the risk appetite and availability of the capital.

Annuity payments - fixed monetary terms

Fixed interest investments

Government bonds are risk free but may consider corporate bonds or other fixed interest investment for a higher yield

Then need to take into account the additional (credit and possibly liquidity) risk with such investments

The company need to take into account term of the liability outgo

Take into account probability of the payments being made

Probably impossible in practice to find assets whose proceeds exactly match the expected liability outgo.

Terms of available fixed-interest securities are often much shorter than the corresponding liabilities.

Technique of immunization may be used but is subject to theoretical and practical problems.

- Lack of zero coupon bond in market

- Risk of default by the Borrowers

- Immunization technique assume flat Yield curve which only shift parallel etc.

Reinvestment risk is significant

Equities may be considered for long term element of liabilities but need to take into account the additional capital needed for the additional risk involved