Institute of Actuaries of India

Subject SA2 – Life Insurance

December 2022 Examination

INDICATIVE SOLUTION

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) Risks that are common to both products:

a. Insurers generally meet their expenses, other costs and profit margin requirements by levying explicit / implicit charges. For example, there may be a guarantee charge in the unit-linked plan; or there may be specific allocation charges, admin charges etc. in these products to meet the expenses, commission payouts etc.
b. Although some of these charges may be varied subject to regulatory approval, it may be either difficult to obtain such an approval or there may be a limit on maximum that the charges can be increased up to.
c. There is a risk that the actual expenses and costs in the future are higher than expected and hence the charges so levied turn out to be insufficient, resulting in the insurer either unable to meet its target profit margins or in extreme scenarios, making a loss. [1 mark]

Risks specific to the unit-linked product:

a. The insurer may manage the investment portfolio in the unit-linked product with highest unit-price maturity guarantee by regularly varying the proportion of 'risky' assets (such as equities) and 'risk-free' assets (such as Government securities) in the fund.
b. Thus, at the time of initial subscription, the fund may be entirely invested in equities. If in the future, the unit-price falls below the level as at 31 March in the previous years since policy inception, the insurer would compute the present value of the guarantees that are expected to bite and sell off that much equities from the fund to invest the same in the Government bonds of appropriate outstanding duration.
c. This mechanism is expected to be followed continuously (e.g. daily) in order to ensure that any emerging cost of guarantees are appropriately managed.
d. It might not be practically possible for the insurer to manage the portfolio more frequently than daily. Given this, during pricing, the insurer might consider the maximum volatility of asset values that could happen within a day. [1 mark for broadly identifying how the portfolio may be managed]

Considering this, the main risks in these products are –

a. Inability to manage the investment portfolio effectively in order to minimize the risk of any guarantee hitting the insurer's profitability –
   - There may be a timing gap between the insurer identifying the extent of any emerging guarantee costs and actually re-balancing the portfolio.
   - The timing gap may result in further movement of the market values of the underlying assets, thereby making the extent of portfolio re-balancing less effective.
   - During the trading day, the asset values may be more volatile than the threshold considered at the time of pricing. Considering that more frequent re-balancing of the portfolio than daily may not be practical, the insurer may not be able to manage the portfolio to mitigate such gap risks fully.

   [3 marks]
b. Systemic risks –
   - All insurers offering similar highest unit-price guarantee plans may have to sell or buy the underlying assets at roughly the same time given that they may all have to manage the underlying costs of the guarantees that emerge.
   - Given this, depending on the quantum of such transactions for the industry as a whole as compared to the liquidity in the equity and Government securities markets, insurers may not be able to buy or sell the assets at the required price. This would make any intended portfolio re-balancing less effective.

[1 mark]

c. Risk of policyholder discontent resulting in bad publicity -
   - The insurer may be inclined to manage investments such that the guarantee may not hit at all, by investing only in Government securities of appropriate duration. However, in such a scenario, the resulting maturity values may be lower than what they would have been had a portion of the fund been invested in equities as well. This may lead to policyholder discontent and bad publicity.
   - If unit values are growing over the policy period, there may not be any guarantee cost for the insurer. However, in such a scenario, the guarantee charges levied (if any) may lead to lower overall returns to the policyholder.
   - The overall policyholder returns on this product may be lower than that on unit-linked products without the highest unit-price guarantee due to the guarantee charges levied (if any) and due to the increasing proportion of Government securities in the underlying fund in a volatile market scenario.
   - Such scenarios could lead to mis-selling or mis-representation complaints by the policyholders.

[1.5 mark]

d. The insurer may need to rebalance the portfolio frequently to manage the guarantee risk, resulting in additional transaction costs which might not be allowed for in pricing. [0.5 marks]

Risks specific to the index-linked product:

a. In an index-linked product offered on a variable linked insurance product category, the insurer credits interest on the policyholder account in the following manger –
   - A floor rate – Fixed at outset of the contract and credited at least quarterly in advance
   - A non-negative variable rate – Linked to the external benchmark and credited at least quarterly, in arrears.
   - A non-negative residual addition – Credited at least annually in arrears, to comply with the IRDAI's regulations governing the maximum reduction in yield (RIY) in unit-linked products.

[1 mark for identifying the interest credit mechanism]

Considering this, the main risks in these products are –

a. Risks related to external benchmark and interest crediting mechanism
   - Considering that the interest credits are expected to be non-negative, depending on how the external benchmark is defined, the insurer may not earn sufficient investment income to match the interest credits based on the external benchmark.
   - The external benchmark may be published less frequently, or may become unsuitable for use due to, for example, lack of liquidity, or may even be discontinued. Although the insurer may be allowed to change the benchmark in such scenarios, subject to regulatory approvals, there may be a delay in replacing the benchmark. [1.5 mark]

b. General risk arising pertaining to investments and asset-liability mismatch
   - Given that there is a minimum investment return guarantee on surrender and maturity, the insurer would be exposed to the general risks pertaining to underlying investments such as credit default, counterparty and liquidity risks.
   - Irrespective of how the underlying investments are made (whether in the benchmark itself or in any other manner), given that the external benchmark is fixed for the entire duration of the policy, the interest credits based on the benchmark would lead to a mis-match between assets and liabilities under this product.

- Considering that there is no ability for the insurer to impose a market value adjustment (MVA), this would create the risk of the insurer suffering a loss when the market value of the underlying assets is lower than the account value payable on surrender or maturity. [1.5 marks]

[Max 12]

ii)

a) Regulatory reserving requirements

The regulatory reserving requirements applicable for unit-linked business and the index-linked product offered on a variable linked basis are similar. These are discussed below.

In respect of the unit-linked product with guarantees:

a. Insurer have to create reserves for unit linked business in two parts, unit reserves and general (non-unit) fund reserves.
    - The unit reserves need to be calculated for the units allocated to the policies in force at the valuation date, using the then applicable unit values.
    - The general (non-unit) reserves have to be calculated using the discounted cash flow method, take into account all the future cash flows like premiums, expenses and commission outgoes, benefit outgoes etc.
    - In projecting the future cash-flows, any applicable guarantees (e.g. the highest unit-price at maturity) need to be considered. Similarly, any non-negative residual additions applicable to the unit-linked business should also be considered.
    - The assumptions used in the projection of cash-flows to calculate the non-unit reserves should be based on best estimate and reflect appropriate level of margins for adverse deviations (MADs) that are set based on the professional guidance provided in this regard.
    - Any future negative net cash-flows need to be provided for and any negative non-unit reserves at the valuation date should be eliminated.

b. Given the underlying guarantee on the unit prices at maturity, insurers are required to hold additional reserves at an aggregative level to reflect the possibility of any future additional strains arising. Although the regulations do not prescribe the methodology, the Appointed Actuaries are expected to follow the guidance provided in this respect by the Institute of Actuaries of India.

c. Given that the insurer is yet to reach a break-even in its business operations, there could be expense overruns. The regulations require the insurer to set aside reserves for the same. [5.5 marks]

In respect of the index-linked product:

a. The index-linked product with interest credits linked to external benchmark fall within the category of variable linked business. For this business, the insurers are required to set up reserves consisting of two components - policy account reserves and general fund reserves.
    - The balance in policy account on the date of the valuation is considered as the policy account reserves.
    - Discounted cash flow method needs to be used to estimate the general fund reserves, taking into account all future cashflows such as premiums, expenses and commission outgoes, benefit outgoes etc.
    - In projecting the future cash-flows, any applicable guarantees (e.g. the minimum investment return guarantee on surrender and maturity) need to be considered. Similarly, any non-negative residual additions applicable to this business should also be considered.
    - The assumptions used in the projection of cash-flows to calculate the general fund reserves should be based on best estimate and reflect appropriate level of margins for adverse deviations (MADs) that are set based on the professional guidance provided in this regard.

- Any future negative net cash-flows need to be provided for and any negative non-unit reserves at the valuation date should be eliminated.

b. Given the minimum investment return guarantee applicable on surrender and maturity, insurers are required to hold additional reserves at an aggregative level to reflect the possibility of any future additional strains arising. Although the regulations do not prescribe the methodology, the Appointed Actuaries are expected to follow the guidance provided in this respect by the Institute of Actuaries of India.

c. Given that the insurer is yet to reach a break-even in its business operations, there could be expense overruns. The regulations require the insurer to set aside reserves for the same. [5.5 marks]

[Max 11]

b) Implications of the proposal of the management:

a. It is unclear which of the following guarantees is the management suggesting to not provide explicit reserves for in respect of the unit-linked product:
    - Guarantees already crystalised due to the current unit-prices being lower than the unit-prices as on 31 March each year prior to the valuation date;
    - Guarantees which are yet to be crystalised – i.e. they may bite in the future at maturity, if the unit-prices then are lower than those as on 31 March each year prior to the maturity date.

b. With respect to guarantees that are already crystalied, as per the regulations, the cash-flows used in the calculation of the non-unit reserves are expected to be derived after considering the crystalised guarantees.
    - Thus, if the management proposal is implemented, the insurer could be seen as violating the statutory requirements and may be subjected to penal actions. The concerned Appointed Actuary may also be subjected to disciplinary actions.
    - This may also lead to bad publicity to the already stressed insurer with the Actual Solvency Margin (ASM) slightly above the regulatory minimum and its promoter that is known to be in financial distress.
    - Thus, it may not be possible for the insurer not to provide reserves in respect of such guarantees.

[2 marks]

c. With respect to guarantees that are yet to be crystalied:
    - As discussed earlier, the main risks underlying this business relate to the gap risk pertaining to the management of the underlying investment portfolio and the systemic risk applicable for the industry as a whole.
    - If the internal processes of the insurer are such that even for large market value movements, the insurer may still be in a position to re-balance its investments on an (almost) continuous basis; and if the markets are liquid enough for the insurer to buy / sell assets without impacting either the market prices of the securities or its own guarantee exposures, the gap and systemic risk may actually not be material risks.
    - Considering this, any stochastic assessments performed by the insurer to determine the additional guarantee reserve requirements may not lead to sizeable reserving requirements.
    - Depending on other implicit and explicit margins in the reserving methodology / assumptions adopted by the insurer, it may not be unreasonable for the insurer to not set aside an explicit additional reserve for the un-crystalised guarantees. [2 marks]

d. However, if there is a non-trivial reserving requirement, and if the insurer does not set aside the reserve, there may be other implications:

- The insurer may not have sufficient reserves to pay its outgoes arising due to the difference between the highest unit price and the then current unit price.
- This may lead to the insurer facing financial distress, and lose trust in the eyes of policyholders, apart from attracting penal actions by the regulator.
- Any such scenario may also adversely impact the future new business and growth prospects for the insurer. Given that the insurer is yet to reach a break-even state, slower future growth may put further burden on its financials.
- In extreme scenarios, the available capital may also not be sufficient to pay the liabilities and the insurer may become insolvent. [2 marks]

[Max 6]

iii)

a. Different stakeholders have differing interest in ensuring capital adequacy of the insurer.
- Policyholders and regulators would be most interested in the insurer's ability to meet its obligations to the policyholders at all times.
- Shareholders and promoters would be most interested in achieving their desired return on capital. Besides, they may also be interested in ensuring that apart from meeting the various obligations as and when they arise, the insurer also has sufficient capital to write new business on an ongoing basis. The promoters may also be interested in achieving appropriate credit ratings.

b. As the insurer has not achieved break-even as yet and considering the promoter's suggestion that the insurer manages its capital needs on its own, the insurer may need to look at avenues that would allow it to:
- Conserve the available capital; and
- Manage future capital requirements. [1 mark]

The possible options that may be considered by the insurer in managing its capital are discussed below.

a. Review of reserving bases in existing products
- Considering that non-unit reserves / general fund reserves are typically a small proportion of the overall reserves in the unit-linked / index-linked product, any change in reserving bases may not have a significant release in reserves.
- Nonetheless, the insurer might assess if there are any unnecessarily high levels of prudence built into the valuation bases and consider releasing the same.

b. Review of charging structure in existing business
- Subject to regulatory approvals, the insurer may assess if there is a possibility of increasing some of the charges in its existing unit-linked and index-linked products. This may help in lowering the future reserving requirements to a certain extent (to the extent of reduction in the non-unit / general fund reserves) and also increase the working capital.

c. Review of term insurance product
- In order to minimize the future capital requirements arising from the sale of such business, the insurer may review the product structure / pricing of these products.
- The insurer may want to maximise the benefit of reinsurance by minimizing the reinsurance retention level or by having reinsurance on original terms basis. This may help the insurer obtain capital relief arising from future new business.
- The insurer may consider charging appropriate level of premiums that is expected to generate sufficient profits for the insurer. To do this, the insurer may consider its unique value proposition to

differentiate itself from the competition so that it can charge slightly higher level of premiums for this business.

- The insurer may also re-consider withdrawing from segments that are extremely competitive (e.g. online term insurance), if offering products through such channels would lead to increased capital requirements in the future.
- In order to ensure that the future claims experience is in line with that allowed for in pricing the product, the insurer may need to ensure that the underwriting of term business is consistent with its pricing. For example, for a limited period, the insurer may consider restricting the sale of such business to customers in higher socio-economic class, in order to ensure that the business does not lead to adverse claims experience.
- Unless the pricing structure are consistent between the online and offline term products, the insurer may also restrict the sale through offline channel, especially if there are high distribution costs involved.

d. Review of non-participating whole life with guaranteed coupons product

- Considering the guaranteed coupon payments for life and the non-participating nature of this product, the product may be capital intensive.
- In order to shorten the liability duration, the insurer may consider restricting the sale of this product to customers in the higher age group. Alternatively, the duration of the product may be restricted to say 20 or 30 years (instead of whole life). A shorter duration of liabilities would allow the insurer to have a lower level of margins for prudence in the reserving basis, thereby making the product less capital intensive.
- The insurer may also explore possibility of having longevity reinsurance arrangement, allowing it to lower any margins in its mortality assumptions. This too may help lower the reserving / capital strains in the future.

e. Restriction on future new business volumes

- The insurer may consider placing limits on the new business that may be sold over the next three years.

f. Financial reinsurance

- Subject to regulatory approval, the insurer may consider a financial reinsurance arrangement. Although this may mean the insurer would need to part with future profitability of the reinsured business, depending on how the financial reinsurance arrangement is structured, it may enable the insurer get some additional capital to support its capital needs.

g. **Hedging arrangements**

- The insurer may also consider managing the guarantees in the non-participating whole life business by considering different types of derivative instruments available for hedging purposes.
- To the extent the insurer is able to hedge its future investment risks, the margins for adverse deviation (MAD) adopted in the reserving bases may not be required to be as high as currently adopted. By releasing some of this MADs, the insurer may be able to release some additional capital.

h. Strict control on discretionary expenses / capital expenditure

- Considering the need to conserve capital over the next three years, the insurer may consider placing strict control on discretionary expenses. Also, certain type of capital expenditure such as developing a new system for business administration may be deferred to conserve the available capital.

i. **Alternative sources of capital**

- Considering that the promoter may not be able to provide further capital, the insurer may explore other avenues such as issuing subordinated bonds. However, considering that the promoter is in financial distress and the insurer's ASM is close to the regulatory minimum, it may not be able to issue subordinated debt at a low financing cost. Nonetheless, this may be considered as a last resort, should the insurer need capital for maintaining regulatory solvency requirements over the next three years. [2 marks for each option appropriately discussed]

[Max 16]

iv) As per the current regulatory requirements, the following assets are considered at value zero for solvency purposes:

a. Agents' and intermediaries' balances and outstanding premiums in India, to the extent they are not realised within a period of thirty days
b. Agents' and intermediaries' balances and outstanding premiums outside India, to the extent they are not realisable
c. Sundry debts, to the extent they are not realisable
d. Advances and receivables of an unrealisable character
e. Furniture, fixtures, dead stock and stationery
f. Deferred expenses
g. Debit balance of Profit and Loss Appropriation Account and any fictitious assets other than pre-paid expenses
h. Reinsurer's balances outstanding for more than ninety days
i. Leasehold improvements
j. Service Tax Unutilized Credit outstanding for more than ninety days
k. Any other assets, which are considered inadmissible under Section 64V of the Insurance Act, 1938.

[0.25 marks for each correct asset identified, maximum 2 marks]

The rationale for placing a zero value on the above-mentioned assets are set out below:

a. The objective of holding solvency margin over and above the reserves is to ensure that the insurer has a sufficient buffer to meet any obligations that may arise due to adverse future experience that goes beyond what has been reflected in the calculation of reserves.
b. To meet such obligations, the assets should be available with the insurer immediately, should be realizable as and when required, without the insurer having to wait for any third party for payment. If assets do not portray these characteristics, they may not be suitable for solvency purposes. For example -
    - Any third-party payments are subject to credit risk and counterparty risk. Hence relying on such payments at times when the reserves are already proven to be insufficient could lead to further uncertainty and financial distress.
    - Fixed assets such as furniture, fixtures are, although in possession of the insurer, may not be easily marketable considering that the insurer may need to use such assets to discharge its daily activities.
    - Premiums receivables and reinsurance balances, if continue to be outstanding for more than a specific period, indicate the possibility of non-receipt in the future.
    - Deferred expenses become realizable on an ongoing basis and thus are not available for use.

[1.5 marks for specifying the reasoning and 1.5 marks for explaining with examples, maximum 3 marks]

[Max 5]

[50 marks]

Solution 2:

i) The benefits and risks arising from the proposed online marketplace are discussed below:

a. **Wider reach and increased penetration** - By making the products available across the country, this new online marketplace may lead to an increase in insurance penetration. Being a one-stop solution, the new marketplace may also ease the process of buying insurance for the policyholders. This may help the Company in increasing its top line.
   - However, unless the Company's existing sales and customer onboarding process is seamless enough, any new customers may not prefer to buy policies of this Company. There is a risk, therefore, that the new marketplace may actually result in reduction in the new business volume for the Company.
   - Even if there is no reduction in the new business volumes, considering that the Company has already been distributing its business through a variety of distribution channels, including through directly on its website, there is a risk that the new marketplace may result in cannibalization of business from the Company's existing distribution channels.

b. **Variety and availability of quality products** – Given that the marketplace will have products of all the life insurance companies, this may enable customers to easily carry out a comparison between various products and then decide which one is best for him / her. Given the variety of products available and the ability to buy the best suited products, the industry may be able to enhance its trustworthiness, again helping the Company in increasing its business volumes.
   - As there is an option of assisted sales, customers can take help of an insurance agent to decide the best product. Given this, the other form of intermediation may need to continue. Unless there is an increase in business volume for the Company because of the new marketplace, there is a risk that such continuation of the other forms of intermediation may adversely impact the overall cost structure of the Company.
   - The possibility of assisted sales may require training the insurance agents on any new products that the Company may introduce on the new marketplace and the usage of the online marketplace platforms. This may involve additional costs and there is a risk that the benefits (e.g. new business volumes) may not outweigh the additional costs incurred.
   - Given that the product comparison may become more seamless, the Company may be required to design products that offer the best value for money to the customers. For example - for a term assurance product, this may warrant best terms and conditions and lowest premium rates. Unless the Company offers this, there is a risk that it may not be able to increase its business through the online marketplace. There is also a risk that the competitive pressure on benefit structure and premium rates would adversely impact the overall profitability of the Company.
   - The Company already distributes a variety of products through different distribution channels. Unless the products offered through the new online marketplace are different as compared to those offered through the other distribution channels, there is a risk of a 'channel conflict' within the Company, especially if the products through the online marketplace are perceived to be a better value for money for the customer.

c. **Ease of policy servicing and claims settlement** - The new marketplace is also expected to facilitate policy servicing and claims settlement. This may help bring down the overall costs for the industry in policy servicing and claims settlement, if the fixed costs of the online marketplace are shared amongst all the insurers. The Company may benefit through such reduced cost structure. If the online marketplace enables insurers to share data pertaining to fraudulent claims, it may also benefit the Company in containing its claims investigation costs and improve its overall mortality experience.
   - There may be additional costs involved in 'linking' the Company's existing systems with the new online marketplace. Given that there is no proposal for the Company to discontinue its existing policy administration and claims settlement systems / procedures and migrate completely to the online marketplace, there is a risk that the proposal may adversely impact the Company's overall cost structure.

- Given that the customer data across the industry may be available on the new marketplace, the Company may be exposed to the risk of breach of confidentiality of its customers' data due to hacking attacks etc.
- The Company may not have any control over the new online marketplace design / user interface etc. Considering this, there is a risk that the customer experience may be sub-optimal, adversely impacting the persistency experience of the Company.

[2.5 marks for each relevant point covering both the benefits and risks suitably discussed, **Max 7]**

ii) Implications of closing the participating fund to new business –

a. **Expenses** - If the Company decides to close the sales of all participating endowment business, the number of in-force policies would decrease over the years, mainly because of surrenders, maturities and other types of exits. There may also be increased withdrawals from the fund, if policyholders do not wish to continue in a fund that is 'closed to new business'.

- This may lead to an increase in the 'per-policy' expense as fixed costs and overheads would get distributed over fewer policies.
- Insurers typically do allow for an inflation assumption in projecting the 'per policy' expenses whilst pricing the products. For an efficiently managed and growing participating fund, such 'per policy' expenses tend to fall over time. However, if the increased 'per-policy' expenses due to 'closure to new business' are higher than what they could have been in an 'open to new business' scenario, it may not be in line with the policyholders' reasonable expectations (PRE) given that it may have an adverse impact of future bonuses to the policyholders.
- The Company may be able to explore strategies to reduce this burden of additional expenses on the policyholders' asset shares, for example, by outsourcing of some activities which are allowed under the regulations.
- Alternatively, to continue to declare bonuses as if the 'per policy' expenses are based on 'open to new business' scenario, the Company may explore the possibility of charging any additional expenses arising due to 'closure to new business' scenario to the shareholders' fund rather than to the policyholders' asset shares.
- **Accounting implications of expenses of management (EoM)** - Given the low proportion (5% to 10%) of new business volumes in the participating fund over the past two decades, if the participating fund has not yet reached a stage wherein the actual expenses are in line with the maximum permitted as per the EoM regulations, the Company might have been funding the excess expenses through transfers from shareholders' fund. If the Company closes the fund for new business, it is possible that such future transfers into the participating fund might not be required, if the historical expense gap was mainly arising due to acquisition expense overruns. This could help the Company conserve its capital.
- **Accounting implications due to reserving** – The Company may have already considered the closure to new business scenario whilst assessing the need to set any additional reserves to meet the increased expense outgoes in such a scenario. However, depending on the approach adopted in calculating such reserves (e.g. whether a run off approach is adopted or if reserves are set for additional expenses only over a limited period assuming the business will be acquired etc.), the reserves actually held may or may not be sufficient in a scenario that the Company actually closes the fund to new business. The Company may need to assess the reserving requirements carefully again considering the planned approach to manage the fund.

b. **Investment strategy –** If the Company decides to close the new business in participating fund, the fund size may decrease over the years due to surrenders, maturities and other exits. The in-house fund

management expenses (as a percentage of assets under management within the participating fund) may also increase as a result. The outstanding duration of the liabilities may also shorten.

- This may require changes in the investment mix for the participating fund. For example, the proportion of investments in riskier assets such as equities, property etc. may need to come down as the Company may need to invest to pay out the maturity benefits.
- At some point of time, the cash outflows from the fund may exceed the cash inflows into the fund. This may lead to increased liquidity risk. The Company may need to hold sufficient assets in liquid form to be able to meet the increasing payouts.
- Unless the Company has been actively managing the level of estate in the participating fund, a closed to new business scenario might result in the assets backing the estate forming a significant proportion of the total investments in the participating fund. This may also necessitate the Company to reconsider the investment strategy for the assets backing the estate, especially if asset shares turn out to be lower than the guarantees due to high bonus declarations.
- The change in investment strategy may impact the overall investment return on the participating fund. Given that the policyholder benefits may have been illustrated assuming a flat 4% & 8% investment return assumption, a lower / decreasing investment return over the remaining duration of the in-force policies in the fund may not be seen to be in line with the PRE.
- **Accounting implications -** To the extent any Funds for Future Appropriations (FFA) is used to meet the minimum solvency requirements of the Company (i.e. 150%), its investment strategy might be less impacted by the fact that the fund may be closed to new business, and more driven by the Company's investment strategy for assets backing solvency requirements.

c. **Distribution of estate and PRE –** This is arguably, the most difficult issue to handle in a new business closure scenario. Unless the Company has been actively managing the level of estate as a percentage of asset shares, closure to new business may lead to an increase in the level of estate in the participating fund.

- The level of estate may already be high considering that the fund has been in existence for over two decades, especially if the Company's bonus distribution philosophy did not recycle any historical lapse / surrender profits back into the asset shares. If the number of surrenders increase due to closure of the fund to new business, the estate may increase even further.
- It is possible that the bonus management philosophy of the Company did not consider any support from the estate in providing bonuses to the policyholders. However, even in such a scenario, the Company may still need to consider how it wishes to distribute the estate in a closed fund, as all policies are expected to exit sometime in the future. The Company may approach the regulator to consider a complete (100%) transfer of the estate to the shareholders fund if it can demonstrate successfully that the historical policyholder bonuses have been paid in line with the Company's bonus distribution philosophy, meeting any PRE in that respect.
- Alternatively, with the approval of the regulator, the Company may also explore other possibilities of managing the estate – e.g. relaxation on the EoM regulations allowing the Company to charge more expenses to the participating fund estate than the maximum permitted under the regulations or the actual expenses incurred in the fund.
- However, it is also possible that despite this, the regulators and / or the policyholders may still expect the Company to distribute at least a share of its emerging estate to the policyholders. The persistency of the remaining business may actually improve, if the policyholders believe they may get a share of the estate in the form of higher future bonuses.
- Given this, the Company may need to issue clear communication to the policyholders, so that any distribution of estate is seen to be in line with PRE. This is also important considering that there have

been complaints from the policyholders regarding lower maturity values and lack of transparency in the determination of bonuses.

- If the Company decides to distribute the estate (either partly or fully) to the policyholders in the form of increased bonuses, it may need to decide which customers to distribute the estate to. For example, a large proportion of the estate may actually have arisen due to policyholders that have already exited (died / matured etc.) in the past rather than the currently in-force policyholders. In such a scenario, it may not be reasonable for the Company to distribute the entire estate only amongst the remaining in-force policyholders. The Company would have to find a balance to ensure that all customers (existing as well as historically exited) are treated fairly.
- The Company may also need to decide on the pace of distribution of the estate. If it is distributed too quickly in the short term (e.g. through increased regular bonuses to all), it may have adverse impact on the overall strength of the fund due to increased guarantees. On the other hand, if it is distributed too slowly (e.g. in the form of terminal bonus as policies mature), there is a risk of "tontine effect", whereby a small number of remaining policies may receive a disproportionately high share of the estate distribution.
- The Company may also need to consider whether the distribution should be weighted more towards the policies which have been in force for a longer period or which have a longer outstanding duration.
- **Accounting implications on FFA** – To the extent that the Funds for Future Appropriations ('FFA') has been providing solvency support to the Company, any distribution of it may have an impact on the available capital to meet the required solvency margin of the Company.

[4 marks for each of the topics appropriately discussed, **Max 12]**

iii) The non-participating endowments are likely to have been invested mainly in Government bonds and other fixed interest instruments. Considering this, the main market risks that the Company is exposed to is related to future interest rates. [0.5 marks for identifying the main market risk]

The approached that can be adopted in managing the market risks in non-participating endowments are discussed below–

a) **Review of pricing / product structure and level of future new business**

- The Company has been offering high IRRs to policyholders. If the resulting exposure to market risks is considered to be high by taking into consideration the Company's capital resources and risk appetite, it may limit any additional future exposure to such market risks by re-pricing its non-participating endowment business and lowering the policyholder IRRs.
- Similarly, it may explore restricting its future new business volumes by offering only say single premium endowments, where the reinvestment risk is minimal instead of regular premium endowments where it is exposed to both investment as well as re-investment risks.
- The Company can determine its risk budget, i.e. how much risk to accept and how much capital to expose in doing this. Based on this, it may be able to limit the level of future new business volumes to manage any future exposure to market risks. [1.5 marks]

b) **Asset-liability management (ALM) and investment strategy**

- The Company can carry out an ALM exercise to understand how its assets and liabilities are matched and identify the extent of mis-match.
- As a first step, it may consider duration matching, which would help the Company from small changes and parallel shifts in the future yield curve. The Company may invest in Government bonds that have the same outstanding durations as the duration of the liabilities.
- However, for managing itself against non-parallel shifts and large movements in the future yield curve, the Company may need to aim to have a cashflow matching approach. It may not be possible

to match all the future cashflows perfectly, but the Company may want to aim at doing so as closely as possible, given its risk appetite and budgets.

- To better manage the future investment and reinvestment risks, the Company may explore investing in recurring deposits (RDs) of some banks provided the yields are attractive, and the period of RDs are in line with the outstanding duration of its liabilities. Alternatively, the Company may also explore investment in partly-paid bonds issued by corporates of high credit standing. [2 marks]

c) **Hedging of market risk**

- The Company may consider entering into derivatives arrangement as allowed by the IRDAI. For example, a Forward Rate Agreement (FRA) may be used to hedge the future interest rate risk arising due to the need to invest renewal premiums in the future at unknown yields. For this, the Company may need to project its liability cash flows in the future, to determine the amounts it may need to hedge.
- The Company may need to consider the exact accounting approach to be adopted for such derivative instruments so that they do not have an adverse impact on the solvency position of the Company when interest rates increase in the future.
- The Company may also explore if there are any internal hedging arrangements that are possible. For example, if the Company has a sufficiently large volume of single premium decreasing term insurance business, it may be able to combine the liability cash-flows from this business with that from the non-participating endowment business (which may have a longer liability duration), to lower the overall duration of the liabilities, which can hopefully be matched by the available assets. [2 marks]

[Max 6]

iv) The proposed product design and suggested changes (if any) therein are set out below:

a. **Distribution channel**

- Given that the Company is planning to sell only through its own website, there may not be a need to pay any commission to the distributor. This may be the reason to have zero premium allocation charge.
- However, selling the product only through own website may limit the reach of the product. The Company may explore to offer this product through other channels as well.
- If offered, this may require either a different charging structure (to cater to any commission payments that may become necessary) or management of risks that may arise due to differing levels of distribution channel mix if the charging structure is identical across all channels.

b. **Policy term, premium payment term, premium payment frequency**

- The proposed product is only a regular premium payment product, for policy terms from 20 years to 25 years. Some customers may prefer to pay premiums over a shorter duration – say as a single premium or with premium payment term of 5 or 10 years or so. Offering these options can increase the marketability of the proposed product.
- The policy terms from 20 years to 25 years may also be restrictive for the customers who wish to invest for a shorter period. Similarly, customers aiming to invest for specific objectives (e.g. funding for children's higher education or for retirement) may need to have a choice of other terms. The Company may explore widening the range of policy terms offered to make the product more marketable.
- The product offers only annual mode of premium payments. Although this may be preferred by the Company as it helps lowers administrative costs and also keep lapse rates under control, this may be

restrictive for customers who want to invest on a monthly basis as they earn their salaries, or at other frequencies than only annual. The Company may wish to offer other premium payment modes to enhance the appeal of the product.

c. **Issue age**

- The maximum age at entry is proposed to be capped at 40 years. This is proposed, presumably, to ensure that the mortality charge deductions (assuming this will be charged – given that the question does not explicitly state this), which increases significantly at higher ages, does not lead to a very low returns on the policyholder's investment. It may be more important to ensure this under this product design as the proposed death cover is fixed at a high level - 50 times the initial premium.
- However, 50 times premium may be significantly higher than the regulatory minimum requirement of 7 times premium. Hence, in order to provide an investment avenue for policyholders older than 40 years, the Company may consider offering the product beyond 40 years, albeit with a lower level of death cover.
- If the Company is not planning to have explicit deductions for mortality charge (although it may be a rather unusual charging structure), there would be more reasons for the Company not to restrict the maximum issue age to 40 years.

d. **Premiums**

- The product proposes the initial premium increasing each year in the future. This might have been proposed to meet the needs of those customers who are looking to invest increasing amounts each year, as their earnings increase in the future.
- However, as per the IRDAI (ULIP) Regulations, 2019 only level premiums are allowed. Hence, the Company should re-look at this feature.

e. **Charging structure**

- The Fund Management Charge (FMC) for all funds except the fund for discontinued policies, is proposed to be fixed at 1.35% p.a. The Company may need to compare the FMCs charged by its competitors.
- Generally, liquid funds or bond funds do not require active investment management effort unlike that required for equity funds. Thus, there may be a case to differentiate the FMCs by nature of these funds.
- On its own, perhaps a 1.35% p.a. FMC (which is the maximum permissible under the IRDAI regulations) may seem high considering that the distribution channel is restricted to the Company's own website. However, the FMCs and policy admin charges seem to be the only two charges (apart from possibly mortality risk charge – which is not explicitly stated) proposed. This may suggest that the Company is proposing to adopt a 'back-end' charging structure and in which case, perhaps an FMC of 1.35% p.a. may not be uncompetitive.
- However, with the minimum allowed annual premium being Rs. 50,000, the policy admin charge of Rs. 500 p.a. (=1% p.a. of 50,000) may not be sufficient for the Company to meet its ongoing expenses, especially considering that there is no allowance for inflation in the future.
- It would be worthwhile to understand if the Company is able to meet its expenses from the FMC and policy admin charges. If not, the Company may explore having some explicit premium allocation charges and / or some fixed amount of policy administration charges per month, to meet its expenses better.
- The deduction of premium allocation charges and / or fixed policy administration charges may also make this product more 'front-end' loaded and less capital intensive.

- There is no explicit mention of surrender penalties in the question. If the Company is aiming to charge the maximum surrender penalty permissible under the regulations, upon surrender of the policy, the Company may be able to recover its initial costs considering that in the absence of any commission payment to the distributor, the Company's initial costs may be lower than its competitors. However, if the Company is not proposing to charge any surrender penalties, it may not deter the policyholders from surrendering their policies and thus may adversely impact the profitability of this business.
- The IRDAI (Unit Linked Insurance Products) Regulations, 2019 requires the ULIP product to meet reduction in yield requirements. After the charging structure is finalized, the Company may need to check this.

f. **Death benefit**

- The proposed death benefit is set at 50 times initial premium. This is not in line with the IRDAI regulations, requiring the death benefit to be either sum assured plus unit fund balance, or higher of sum assured and unit fund balance, although the minimum sum assured required as per the regulations at 7 times the annual premium, is significantly lower than 50 times initial premium proposed. The Company may consider re-defining the proposed death benefit.
- At the proposed level of death cover of 50 times premiums, the product would qualify for tax benefits under the current tax laws, provided the annual premiums paid are lower than Rs.2,50,000. However, not all the customers may need a death benefit of 50 times of premiums. The Company can explore offering an option to the policyholder to select the level of death benefit in a range (e.g. say from 10 times to 50 times annual premium) to increase the marketability of the product.

[2.5 marks for each point suitably evaluated and alternatives suggested, **Max 15]**

v) The various considerations as per Actuarial Practice Standard 10 (APS10) in setting the non-economic projection assumptions in the calculation of the Indian Embedded Value (IEV) are set out below:

a. **General considerations**

- **Regard to past, current and future experience** – The assessment of appropriate assumptions for future experience should have regard to past, current and expected future experience and to any other relevant data.
- **Best estimates** - The assumptions should be best estimate (without any margins) and entity specific rather than being based on the assumptions a market participant would use.
- **Evidence-backed changes to future experience** - Changes in future experience should be allowed for in the VIF where sufficient evidence exists.
- **Based on historical experience of the insurer** - When setting assumptions for use in the projection of cash flows, the Actuary should consider the historical experience of the insurance company, adjusted to reflect known material changes in the environment and identifiable trends up to the valuation date, to the extent such information is available.
- **Based on industry experience, if internal experience is not credible / not available** - When experience of the insurance company is unavailable, or is insufficient to provide a credible basis on which to develop assumptions, for example in the case of such life insurance companies that have not yet reached a stable state, the Actuary should consider other information sources in setting assumptions, such as the industry experience, wherever relevant.
- **Professional judgment if neither internal nor industry experience available** - If there is little credible information available either from within the insurance company or from external sources in

developing the projection assumption, the Actuary should consider using his judgement regarding expected future experience in setting the assumptions.

- **Assumptions to be internally consistent and set as a going concern** - Best estimate assumptions should be internally consistent. They should, where appropriate, be based on the covered business being part of a going concern.
- **Consider assumptions separately for each product group** - projection assumptions should be considered separately for each product group.
- **Best estimate is defined to reflect the mean expectation of the variable** - The best estimate assumptions for non-hedgeable risks used in the calculation of the time value of options and guarantees and the present value of future profits should reflect the mean expectation of outcomes of that risk variable.

b. Expenses and commission assumption

- **All ongoing expenses should be considered** - Future expenses such as renewal and other maintenance expenses should reflect all the expected ongoing expense levels required to manage the in-force business. The expense assumptions should consider, for example, the following:
    - Continuing investment necessary, especially in systems, to maintain productivity levels and ensure service levels meet customer expectations in line with assumed persistency and renewal levels.
    - Expense inflation consistent with the types of expenditure (such as office space, different types of staff, I.T. systems).
- **No future expense efficiency beyond the valuation date** - Favourable changes in unit acquisition and maintenance costs such as productivity gains should not be included beyond what has been achieved by the end of the valuation period.
- **Assumptions should be based on the actual expenses incurred in the period prior to valuation date** - Therefore, the unit cost assumptions should reflect the actual expense experience in the period prior to the valuation. In deriving projected unit costs in respect of overheads, no allowance may be made for any growth in the book of business that may be assumed in the business plan.
- **Consideration for one-off costs incurred** - The nature and impact on shareholder value of any exceptional development and one-off costs excluded from the unit cost base should be separately considered.
- **Consideration for any development costs incurred** - The nature of development expenditure should be considered when deciding whether development cost should be included in the expense assumptions. To the extent that development expenditure is recurring in nature and arises to maintain the in-force book of business or acquire new business during the period and allow administration within the existing cost base, this should be reflected in the expense assumptions. Some development expenditures are to enable future new business and therefore their inclusion in the current year costs should be considered. Development expenditure may also be to improve systems and processes such that future savings are expected as a result. In this case consideration should be given to whether it is appropriate or not to reflect the development expenditure in the assumptions given that the savings cannot be anticipated until they are evidenced.
- **Overheads allocation consistent with internal practice and future expectations** - Overheads should be allocated between new, in-force business and development projects in an appropriate way, consistent with past allocation, current business plans and future expectations. Similarly operating expenses should be allocated in an appropriate way.

c. Persistency rates assumption

- **Different types of decrements should be considered based on past and expected future experience** - Appropriate allowance should be made in the value of in-force business for persistency rates (e.g. premium persistency, lapse and surrender rates, partial withdrawals, policy revivals and renewals) based on past evidence and expected future experience consistent with the assessment of other projection assumptions, the features of the existing products (including any lock-in periods and surrender penalties) and any known changes in the product mix and operating environment.
- **Dynamic policyholder behaviour should be considered** - Where the business has material levels of options and guarantees, dynamic policyholder behaviour should be considered in the allowance for the time value of those financial options and guarantees.
- **Professional judgment in case of significant change in operating environment** - Where there have been significant changes in the operating environment such that historical experience may not be a useful guide for future persistency experience, the Actuary should consider using his/her judgement in setting the persistency assumptions including considering knowledge of wider industry experience, the features of the products and the expected effect of the change in the operating environment.

d. Mortality assumption

- **Assumptions based on past experience and expected future experience** - Appropriate allowance should be made in the value of in-force business for mortality rates based on past evidence and expected future experience consistent with the assessment of other projection assumptions.
- **Future improvement or deterioration based on professional judgment - The Actuary should consider potential changes in these rates, and should use his or her judgement in deciding on assumptions of future improvement or deterioration.**

e. Valuation (reserving) assumptions

- **Reserving assumptions compliant with regulations and professional guidance -** The projected valuation basis should be compliant with regulation and professional guidance applicable to statutory valuations. [0.5 mark for each point stated, **Max 10]**

[50 Marks]

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