

INSTITUTE OF ACTUARIES OF INDIA
EXAMINATIONS

17th May 2010

Subject SA4 – Pension and Other Employee Benefits

INDICATIVE SOLUTION

Q.1. (a)(i)

The proposed scheme differs from a normal final salary pension scheme in following respects:

Proposed Scheme	Normal final Salary Scheme	Marks
<ul style="list-style-type: none"> • Promises benefit of lump sum at retirement 	<ul style="list-style-type: none"> • Promises benefit of a monthly pension amount Payable at retirement 	
<ul style="list-style-type: none"> • The lump sum corpus payable is annuitised at the then applicable rates of an Insurance company. The scheme does not have the risk of annuitisation (annuity rates) at retirement. Such risk is borne by the members. 	<ul style="list-style-type: none"> • As the scheme promises a pension amount to the member, the same is either purchased or provided out of the scheme. The scheme thus bears the risk of future annuity rates. 	
<ul style="list-style-type: none"> • The accrual rate is expressed as 7 days' final salary for each completed year of Service. 	<ul style="list-style-type: none"> • The accrual rate is a proportion or percentage of pensionable salary for each year of service. 	
<ul style="list-style-type: none"> • Benefit is payable for curtate years of service 	<ul style="list-style-type: none"> • Complete service is generally considered for benefit including the part that exceeds completed numbers of years. Sometimes the pensionable service is taken in nearest years/half years also 	
<ul style="list-style-type: none"> • On leaving before normal retirement age no person or transfer value payable. If some one leaves one month before retirement then nothing is payable. 	<ul style="list-style-type: none"> • Benefit is payable on leaving provided the member has put in certain minimum number of years, say 10 years. 	
<ul style="list-style-type: none"> • For benefit payable at retirement member has to complete at least 15 years of service. No benefit will be payable to those who are appointed at an advanced age and have less than 15 years service left up to retirement. 	<ul style="list-style-type: none"> • No minimum service is generally required for pension payable at retirement 	
<ul style="list-style-type: none"> • There is no mention of the benefit payable on ill-health retirement or disability etc 	<ul style="list-style-type: none"> • Pension is payable on ill-health retirement or disability during service 	
<ul style="list-style-type: none"> • Pensionable salary is stated to be the final salary though not clear whether it is the salary of last month or average of last one year 	<ul style="list-style-type: none"> • Pensionable salary is generally taken as average of last one year or last few years, say last 3 years 	
<ul style="list-style-type: none"> • Probably no spouse or child pension is payable on death after retirement, though member might be having option to purchase joint life last survivor annuity out of lump sum corpus payable at retirement. 	<ul style="list-style-type: none"> • These is generally a provision of spouse and children pension where child pension is payable up to a certain age, say 21 years. In case of female Children pension may be payable up to their marriage or completion of certain age, say 21 years, whichever is earlier. In case of disabled children pension is generally payable throughout their life time. 	
<ul style="list-style-type: none"> • In case of death during service the benefit is payable to the nominee who may be other than spouse or child. 	<ul style="list-style-type: none"> • Pension is generally payable to spouse and / or children on death. 	
<ul style="list-style-type: none"> • In case of death while in service complete service till normal retirement age (subject to a maximum of 30 years) will be considered for calculating lump sum benefit which shall again be used to purchase annuity for nominee. 	<ul style="list-style-type: none"> • Family pension (pension payable to spouse / children) is generally a proportion; say 50% of the member's pension. 	
<ul style="list-style-type: none"> • No mention of annuity linked to price inflation, though the member or nominee might have an option to purchase increasing annuity. 	<ul style="list-style-type: none"> • Pension payable to the member, spouse or children is sometimes linked to price inflation. 	
<ul style="list-style-type: none"> • The scheme does not provide complete protection to a member and his / her family 	<ul style="list-style-type: none"> • The scheme generally provides compete protection to the member and his/her family provided the member puts in minimum period of service 	

<ul style="list-style-type: none"> ▪ There is a cap on contribution 	<ul style="list-style-type: none"> ▪ There is generally no cap 	
<ul style="list-style-type: none"> ▪ no commutation option 	<ul style="list-style-type: none"> ▪ Option for commutation of a part of the pension is generally offered 	

(Max. 4)

1 (a) (ii) **Circumstances of excess/ under provisioning of fund:**

- Actual Salary increase rates in future are lower/higher than assumed in the projections.
- Actual Withdrawal & Mortality experience over future is significantly different than that assumed in the Projections.
- Earning on the funds is lower or higher than assumed discount rate.
- Significant increase in new employees with very young or older ages at entry.
- Less or more number of employees leaving the organisation than assumed.
- Less or more numbers leaving the organization than assumed at older ages.
- Introduction of any voluntary retirement scheme.
- More or less frequent Pay Commission revisions than decennial one.
- Faster or slower promotions of employees than assumed leading to final salaries significantly higher close to Retirement.
- Increase or decrease in retirement age.
- Contribution to scheme may reduce/ increase in future if contribution for gratuity and/or medical benefits increase/reduce

Continued viability of scheme:

Scheme is most likely to remain viable for following reasons –

- Required contribution rate for new employees is very low than proposed contribution rate.
- On leaving service before retirement no benefit is payable.
- If leavers are more than those exiting due to deaths which is most likely to be the case, then net basis funds will be released in respect of them.
- However, more will depend on actual experience vis-à-vis assumptions made and hence the scheme will need continuous monitoring

(Max. 5)

1(a) (iii)

- Contributions made in respect of existing younger employees will be higher than the cost of their own benefits. Similarly, contributions made in respect of older employees will be lower than the cost of their own benefits.
- Older employees who have joined the company before 1.1.2007 are being given credit for the past service. Giving benefit of lower contribution to older than required for their age

at entry into the scheme is fair on the ground that their past contribution to the organization is recognized.

- As long as contributions don't impact employee's individual CTC and are kept in a pooled fund, it is fair.
- Employees retiring without putting in 15 years service don't get any benefit under the scheme
- Similarly those who leave the company before retirement don't get any benefit
- A generous death benefit is provided

(Max.2)

1 (a) (iv) **CFO's estimation of cost of 2 to 3%:**

CFO's estimation might be based on the following:

- Under proposed pension scheme, the benefit payable is lump sum like gratuity.
- Under pension scheme lump sum benefit is 7 day's salary for each completed year of service.
Thus the benefit payable at retirement under pension scheme is $\frac{7}{30} \times n \times S$
Where n= number of years service at retirement
S= final monthly salary
- Though the benefit payable under gratuity scheme is not given, it might be payable as per the Gratuity Act where accrual rate is 15 day's salary for each year of service subject to a maximum amount.
- Under gratuity scheme the amount payable at retirement will be equal to $\frac{15}{26} \times n \times S$ subject to a ceiling
- Thus benefit payable under pension scheme is 40.44% ($\frac{7}{30} \times \frac{26}{15}$) of the benefit payable under gratuity Scheme without considering the ceiling
- CFO might also have considered the contribution of 4.74% payable under the gratuity scheme as cost of such benefit and would have arrived at 1.92% (4.74% x 0.4044) contribution under the pension scheme
- As proposed pension scheme is going to provide benefit for past service for which there is no fund available, he might have added ½ to 1% additional contribution for the same and would thus have arrived at 2 to 3% cost of proposed pension scheme.

Explanation of our estimated cost of 6.6% of the proposed pension scheme:

- The gratuity scheme is a funded scheme and might be having a surplus or deficit. Hence Present contribution of 4.74% might be the adjusted rate considering such deficit/surplus. If gratuity scheme has a surplus the Standard Contribution Rate will be greater than 4.74%
- Gratuity scheme might have a ceiling of an amount, say Rs.3.5 lakh, whereas proposed pension Scheme does not have such a ceiling and hence benefit payable at retirement under pension scheme may be more than 40.44% of the gratuity scheme.

- The proposed pension scheme is applicable with effect from 1-1-2007 and hence more than 3 years have already elapsed. Benefit under proposed pension scheme will be payable for those retired or died during this period. This amount might be quite substantial as will be payable for the entire past service (including unexpired service of those died) of such employees.
- It is not clear over what period the past service cost of scheme is being spread over, i.e. whether over future service of employees or some fixed number of years, say 10 or 15. If it is being spread over 10 to 15 years, then the estimated contribution for past service will be more than that spread over future service (if future service is more than 15 years).
- Proposed pension scheme does not provide benefit on leaving service, whereas the gratuity scheme will provide if the member leaves after at least putting in 5 year's service. To that extent estimated contribution under proposed scheme should be lower.
- In case of death of an employee, the proposed pension scheme considers benefit up to expected service till normal retirement age of employees. The gratuity scheme might be considering just service up to death. Hence benefit payable in case of death under pension scheme might be more than 40.44% of the benefit payable under gratuity scheme.
- There may further be some points for which benefit payable under proposed pension scheme might be less or more than 40.44% of gratuity scheme such as
 - Pension scheme does not provide benefit at retirement if the service put in is less than 15 years.
 - Pension scheme considers curtate service whereas gratuity scheme might be considering service in nearest years.
 - Pension scheme might not be paying any benefit on disability or ill-health retirement or might be paying higher benefit, say considering full service up to normal retirement. There is no mention about it.

(Max 6)

1 (a) (v)

Company should retain the powers:

- To modify the benefit structure for existing eligible employees
- To discontinue or modify the scheme for new employees
- To modify the eligibility conditions for existing & new employees
- To modify simultaneously the existing Medical Scheme to contain its cost at current level
- Incorporating ceiling on medical expenses per retired employee if the scheme is applicable for them & for certain specified diseases etc.

(max.2)

1(a) (vi)

- Valuation of the scheme at regular intervals to ascertain/test the continued viability of the scheme
- At each valuation date & at the start of the scheme to have quarterly cash flows of expected income & outgo.
- If actual cash flows are too divergent than expected then to have full viability valuation done.
- On salary reviews with employees in future take care that increases in pensionable salary are kept minimum to the extent possible.

(Max.2)

1(a) (vii)

Administrative ministry can point out the amount available to retiring employees is directly related to final salary and salaries shall be increasing in future years as such the scheme is DB scheme & not a DC scheme.

(Max. 1)

1 (a) (viii)

- Set different contribution rates for employees based on their age and/or curttate duration of past service as on the start date of the scheme keeping the benefit level approximately at current proposed level and see whether it is within 7% for scheme as a whole.
- For new employees contribution rate can be common for all entry ages. These contribution rates will vary for each entry age.
- The benefits may be approximately on the average similar to that defined above for employees at each age and/or duration of past service on the scheme start date.
- Then maintaining individual accounts of the employees contributions & earnings thereof will make it strictly defined contribution scheme.
- Since the contribution rates will be higher for older employees & lower for younger employees, it can create an impression or feeling of inequity among employees.
- Variance in contribution rates will also be due to providing benefit for past service rendered by existing employees and is equitable.
- In this modified format, funds will be released on employees leaving the employment & shall not pertain to any specific continuing member and can be pooled in the scheme's miscellaneous account.
- In case of death while in service, amount to be provided for purchase of annuity for dependants has to be more than that stands in deceased employee's individual account as on the date of death. Shortfall can be met from the above miscellaneous pooled fund account. Alternatively the benefit may be insured with a life insurance company and funded from pooled fund.
- Since no benefit is payable on leaving employment, it is possible that miscellaneous pooled fund account could increase substantially over the period. If it happens so then partially this fund can be used to reduce the pension costs or improve the benefits.
- It may lead to less or more than 30% contribution for different employees, though for company as a whole, it may still be within 30%.

(Max. 5)

1 (a) (ix) Conditions for exemption form EPS

- Exemption from EPS can be granted to an establishment by the Central Government as per Para 39 of the Employees' Pension Scheme, 1995.
- Following are the main conditions for such exemption:-
 - All employees including part-time employees of the establishment are covered or proposed to be covered under a pension scheme
 - The benefits available under such pension scheme are either at par or more favourable than the benefits available under EPS

Why exemption from EPS may not be availed?

- It is not clear whether all employees of company A including part-time employees will be members of the proposed pension scheme. If all employees will not be members, then exemption may not be granted.
- In following respects the benefits under the proposed scheme may be inferior than the benefits provided under EPS:
 - The proposed scheme will provide for a lump sum corpus at retirement instead of a pension which will be annuitised at the then applicable annuity rates. The benefit may be less than the amount of pension payable under EPS.
 - On leaving service before normal retirement age no pension or transfer value is payable irrespective of the number of years' service put in by the employee. EPS provides for short service or retirement or reduced pension. It also provides a withdrawal benefit or a scheme certificate for accrued pension.
 - The proposed pension scheme will not provide any benefit if the employee has not rendered at least 15 years' service at superannuation. The EPS provides short service pension if the employee has rendered at least 10 years' service.
 - In case of death of the employee while in service the proposed scheme will provide for a lump sum benefit considering 7 days' final salary for each complete year of service and taking full expected service up to his/her normal retirement age subject to a maximum of 30 years. This amount will probably be used to provide for pension for the nominee. This benefit may be less than the family pension payable under EPS which is paid to the spouse (50% of members') and two children (25% of spouse's pension for each child) at the same time.
 - EPS provides for immediate pension on permanent and total disablement of the employee without any reduction. There is no mention of such benefit under the proposed scheme.
 - EPS provides for commutation of one-third of pension at the rate of 100 times the monthly pension of employee. There is no mention under the proposed scheme for commutation.
 - EPS gives those options to the member to avail return of capital on reduction of original pension at a given rate. There is no mention of such option under proposed scheme.

- There is a provision under EPS as per Para 32 of the EPS whereby increases in member's pension will be granted after retirement on the basis of surplus emerging on valuation of the scheme. The proposed scheme does not have such a provision.
- Benefit under the proposed scheme should be at par or better than EPS to each and every employee of the company. As this test is not satisfied, company A may not get exemption from EPS on the basis of the proposed scheme.

(Max 5)

(b)(i) Actuarial gain/loss arises due to following reasons:

- Valuation assumptions assumed at current valuation being different from those assumed as on last valuation. Any change in any assumption such as discount rate, salary increase rate, attrition rate, leave availment rate, leave lapse rate etc causes change in liability which is not attributable to liability arising due to service put in during inter valuation period.
- Actuarial gain/loss also arises because of actual experience of the plan during inter valuation as to investment income on funds, attritions, salary increases, mortality, leave availment, leave lapses etc being different than expected according to assumptions made at the last valuation date.

Differences in recognition of actuarial gain/ loss:

IAS 19:

- IAS 19 recognises that valuation assumptions made at different valuation date are not static and are only best estimates as on those dates and any resultant impacts on plan liability due to their variance are for all the past years service and can be smoothed out over future average working life of the employees. Any actuarial gain/loss existing at one valuation date may or may not be there on next valuation date. It can be gain on some valuation dates and loss on other valuation dates and as such its impact needs to be deferred & smoothed over the period.
- So it provides that recognition of actuarial gain or loss in P&L accounts of the companies : (i) can be deferred and not recognised in the year it first occurs (ii) accumulated actuarial gain or loss of past years need not be recognized up to 10% of PBO or fair value of assets, whichever is higher at the end of previous year (iii) Can be spread over future working life of the employees or for shorter period. " an option opted once should be followed over the years for consistency".
- No wide fluctuations occur in P&L A/C of the companies due to actuarial gains/losses from one year to another due to such an approach

AS 15 (Rev.):

- Indian GAAP AS 15 (R) has not recognized the above nature of actuarial gain or loss. It provides for actuarial gain or loss on any valuation date to be fully recognized in the profit & loss account of the company (i e in income recognition)
- It causes wider fluctuations in P&L of companies. It vitiates the true picture of P&L of the accounting period.
- The reasons given are:
 - Width of corridor is arbitrary. Further it is complex, artificial and difficult to understand
 - ICAI does not want to give alternatives as far as possible- straight jacket approach
 - Earlier AS 15 also provided immediate recognition

→ Actuarial gain/ losses are items of income and expenses and should be recognized through P & L Account

(Max.4)

(b)(ii)

- On proposed increase in ceiling of gratuity limit from Rs 3.5 lacs to Rs 10 lacs, gratuity liability in respect of old serving employees as well those having very high salaries and had already earned accrued gratuity over Rs 3.5 lacs on or before the last valuation date, will immediately increase.
- In fact it will be increase in past service liability & shall have to be fully recognized in the year in which ceiling increase becomes effective.
- It will impact P&L account of the year in which it is first provided for.
- It will increase cost of accrual of liabilities for future also

(Max.2)

(c) Corridor limit – 10% of opening PBO	750434.6
Net cumulative unrecognised loss less corridor limit (1747066-750434.6)	996631.4
Minimum loss recognized (996631/18)	55368.4
Net unrecognized loss as on 31.12.2009 (1747066-30270-55368.4)	1661427.6

(Max.2)

(d) (i)

- In Final Salary (FS) scheme majority of risks with employer
- In defined contribution (DC) generally with member
- In FS benefits are generally fixed but costs are unknown
- Opposite generally true under DC
- Cost of FS depends upon experience not assumptions
- Low investment returns in FS will increase costs
- Higher returns than expected may be used to reduce contributions
- Although there may be pressure for benefit improvements
- Under DC members benefits directly depend upon investment returns
- Higher than expected salary increases will increase costs in FS because applied to all of past service benefits
- In DC it will only increase contributions in current and future years
- But expected pension will be of less relative value
- Pre-retirement mortality risk can be reduced by insuring lump sum and/or any dependants pension
- FS scheme has risk of members living longer than expected
- Risk reduced if it buys annuities
- In DC generally annuities purchased at retirement and risk transferred
- Member options in FS scheme may not be cost neutral
- FS scheme can affect company accounts due to accounting standards and possible ability to pay dividends
- For DC you just show the amounts paid
- DC has risk of complaints if emerging benefits much lower than anticipated
- FS scheme may be subject to additional regulatory intervention/ requirement such as more disclosures
- Periodical valuation required in FS scheme whereas no valuation needed under DC

(maximum 5 marks)

(ii)

- Could wind up the scheme- only way to remove all risks
- But could have significant immediate cash requirements due to debt on wind up being based on buy out costs
- Could switch to money purchase for future service for current members and/or new entrants
- Need to check employment contracts
- Could amend future benefit structure e.g. accrual rates, member contribution rates etc.
- Alternative structures, say control salary increases for pensionable purposes particularly long serving higher paid members, say introducing a cap on pensionable salary
- Encourage trustees to switch investments to bonds/gilts
- Will give less volatility
- Better matched particularly if cash flow matching policy
- But increased funding needed
- Could inject cash sum to improve funding to reduce short-term cash requirements
- Review member options
- Restrict trustees ability to increase liabilities (future service only)
- Outsource administration
- Encourage trustees to have more aggressive strategy
- Possibly to reduce long term cost
- Possibly carry out asset liability modeling exercise
- Reduce/remove mortality risk by buying annuities which transfers risk to insurance company
- Review insurance policies
- And controls/governance procedures
- Monitor experience periodically
- Communicate with members at entry and then periodically

(maximum 5 marks)

- 2 (i)** Actuarial control cycle involves various stages such as consideration of general commercial, economic and legal environment; specifying the problem; developing the solution; monitoring the experience and professionalism. It can provide a useful framework to solutions of different problems.

Gratuity is a final salary statutory benefit in India with a ceiling on maximum gratuity which is reviewable from time to time.

In advising the trustees on managing the risks we need to consider following points:

a) The cost of benefits:

Specifying the problem: The cost of providing defined benefits is not known in advance, but depends on the experience of the scheme. This is a key risk when managing a gratuity scheme.

Developing the solution: We need to model the expected benefits payable using our understanding of the scheme design and expected decrements.

A stochastic model is also sometimes used.

The appropriate level of contributions will depend on expected benefit payments and also the expected returns that will be achieved on the assets held. The expected benefit payments will further depend on the salary rises.

Our models therefore need to consider the salary rises and the returns achieved on different assets.

Monitoring the experience: We need to monitor the situation periodically assessing any sources of surplus and deficit to determine whether our model and assumptions are appropriate.

The legal and regulatory provisions are also monitored such as raising ceiling amount which can enhance cost of benefits

Professionalism: In setting an appropriate level of contribution, we need to be aware of any conflicts of interest, employer and trustees commonly have different aims.

b) Optimal investment strategy:

The trustees are responsible for investment decisions.

Specifying the problem: The scheme needs to ensure that there are sufficient assets to meet the benefits payable and given that constraint the trustees need to achieve the maximum return possible.

The trustees also need to consider the type and nature of liabilities the scheme has including how these are likely to change in future and the assets that are available in the scheme.

Developing the solution: An asset liability model will help in deciding the investment strategy of the scheme.

Monitoring the experience: The Trustees need to monitor the investment strategy periodically to ensure that our models are appropriate.

Environment: The trustees will need to consider the changes allowed in investment restrictions and constraints of approved gratuity scheme and the assets available from time to time.

c) Meeting funding requirements, if any:

Environment and specifying the problem: The trustees will need to ensure that the scheme meets funding requirements, if any

Developing the solutions: To do this they need to undertake valuations of assets and liabilities.

Monitoring the experience: Again this needs monitoring as legal and regulatory requirements such as raising of ceiling amount

Professionalism: Trustees need to comply with the legislation, professional advice and guidance and use of appropriate models and bases.

d) The overall security of benefits:

Specifying the problem: If insufficient assets are held, there is a risk that the scheme members will not receive their benefits.

Developing the solution: Trustees need to undertake valuations regularly to ensure that the scheme holds sufficient assets.

Monitoring the experience: The environment is dynamic in nature and it may require method and bases to change over time as the scheme matures. It therefore needs monitoring.

Environment and professionalism: The appropriate assumptions and method will depend on changes in benefits, if any; legislation (e.g. changes in the limit of gratuity) and professional guidance.

There may be other issues as well such as fraud, operational risks etc. which also need to be managed

(Max. 10)

2 (ii) (a) Trustees needs to consider following issues while setting the scheme's investment policy:

Liability profile-nature:

- The proportion of fixed and salary inflation linked liabilities is important for determining the matching assets. The fixed liabilities may be in respect of members reaching the maximum gratuity as per the Gratuity Act.
- The proportion of fixed and salary inflation linked liabilities will change over time as the scheme matures.

Liability profile- term:

- Duration of liability is important as we need to see how sensitive the liability value is to changes in interest rates.
- Initially the term of liability will vary with the maturity of the scheme. Once the scheme achieves maturity, the variation in liability term is likely to be small.

Expected future cash flows – liquidity:

- During first five years Act Gratuity is not payable on leaving. Hence the outgo may be small in the initial years.
- After 5 years the outgo may increase.
- However, it will depend on the proportion of employees having 5 or more year's service.
- Once the scheme matures, the outgo from the scheme may exceed the contribution and investment income of the scheme.
- Timing of cash flows is important so need to consider the withdrawal rates.
- Also the mortality, disablement etc. rates and the changes in rates in future.
- Assets need to be liquid and marketable
- As also assets with sufficient investment income to meet any benefit outgo
- The withdrawal and mortality rates may differ according to the employee class.

Funding position:

- Scheme's funding position is important in deciding investment strategy. If well funded, then investment risk may be taken by trustees.
- Impact of change in investment strategy on scheme's funding target may need to be considered.

Employer covenant:

- Trustees need to consider employer's covenant besides funding position
- If employer's covenant is weak, then the trustees will need to adopt less risky investment strategy and vice-versa.
- In view of fixed contribution to the scheme, trustees need to adopt less risky investment policies.

Size of assets:

- The size of assets is important in deciding investment strategy.
- In case of bigger fund size, more diversification on asset classes as well as in industries/companies may be achieved.
- If the scheme is small, then it is better to invest in an insurer's scheme

Trade off between risk and reward:

- While deciding the investment strategy risk and reward of different asset classes (particularly of the equity investment, duration of fixed interest securities etc.) need to be considered.
- Trustees need to consider the employer's attitude towards risk

Miscellaneous:

- Trustees need to consider any legislature constraints, e.g. minimum proportion in government securities, approved investments etc
- Any further constraints / restrictions put in Trust Deed and Rules of the scheme.
- Expenses/charges of investment
- other services such as actuarial valuation, administration, documentation etc.
Investment returns Performance benching & review thereof

(Max. 10)

2(ii) (b)

- The purpose of the ALM is to assist the trustees in their decisions on the changes required to the current strategy in the light of their objectives and attitude to risk
- The results will help the trustees to analyse how the different investment strategies might affect the funding level and contribution rate over time
- The projection can be carried out on different funding bases e.g. AS-15 (Revised)
- For this scheme the funding level is an important measure as the ongoing contributions to the scheme are fixed
- The range of results is important relative to the suitable mean result
- Bigger the spread higher the volatility associated with that particular strategy under different economic conditions
- Need to consider the implications of the best outcome e.g. a large surplus which may induce employees asking for increase in benefits
- Also need to consider the implications of the worst outcome e.g. employer may need to pay additional contributions
- ALM will be able to determine the least risky portfolio of matched assets
- Although matched assets portfolio minimizes the investment risk, the other risks such as withdrawal, legislation, mortality etc may not be eliminated
- ALM process may help in projecting funding levels under different bond portfolios and hence determining the

mix of bonds to best match the scheme's liability profile once allocation between return seeking and liability matching assets has been decided.

- By best match we mean minimizing interest rate and salary inflation rate risks by an appropriate mix of bonds and equities
- Within the return seeking assets the trustees need to consider the impact of diversification
- ALM is only a tool and the results are highly dependent on the underlying model and assumptions
- Therefore the results of the ALM will not identify one particular strategy as the optimum strategy

(Max- 8)

2 (iii) (a) Comments on CIO's views:

- CIO has opined that Gratuity Contributions of each employee is accumulated in his separate account, then the fund value of his account will always be more than the Act Gratuity of such employee
- The Gratuity (G) as per Gratuity Act is calculated as under:-

$$G = \frac{15}{26} \times \text{final monthly salary} \times \text{number of year's service}$$

$$= \frac{15}{26} \times \frac{s}{12} \times n = \frac{5ns}{104}$$

Where s = Final yearly Salary

n = number of years' service before exit

- However, Act Gratuity(AG) will be different from G,
 - When $n < 5$ AG = 0, in case of a leaving member
 - When $G > 3.5$ lakh AG = 3.5 lakh

Otherwise AG=G

- Accumulated value (AV) of a member's contributions ($4 \frac{21}{26}$ % of annual salary) towards Gratuity Scheme will be

$$AV = \frac{125}{26} \times \frac{S}{100} \times \left\{ 1 + \left(\frac{1+i}{1+r} \right) + \left(\frac{1+i}{1+r} \right)^2 + \left(\frac{1+i}{1+r} \right)^3 + \dots + \left(\frac{1+i}{1+r} \right)^{n-1} \right\}$$

$$= \frac{55}{104} \left\{ 1 + \left(\frac{1+i}{1+r} \right) + \left(\frac{1+i}{1+r} \right)^2 + \dots + \left(\frac{1+i}{1+r} \right)^{n-1} \right\}$$

Where, i = average p.a. yield on gratuity fund

r = average p.a. salary rise

- Now, when $i = r$ $(1+i/1+r)^m = 1$
- when $i > r$ $(1+i/1+r)^m > 1$
- and when $i < r$ $(1+i/1+r)^m < 1$

Where $m = 1$ or more

It shows that

$$1 + \left(\frac{1+i}{1+r}\right) + \left(\frac{1+i}{1+r}\right)^2 + \dots + \left(\frac{1+i}{1+r}\right)^{n-1} = n \quad \text{when } i = r$$

$$1 + \left(\frac{1+i}{1+r}\right) + \left(\frac{1+i}{1+r}\right)^2 + \dots + \left(\frac{1+i}{1+r}\right)^{n-1} > n \quad \text{when } i > r$$

$$\text{and } 1 + \left(\frac{1+i}{1+r}\right) + \left(\frac{1+i}{1+r}\right)^2 + \dots + \left(\frac{1+i}{1+r}\right)^{n-1} < n \quad \text{when } i < r$$

- It gives that

$G = AV$	$\text{when } i = r$
$G < AV$	$\text{when } i > r$
$G > AV$	$\text{when } i < r$
- Hence AG may be more than AV in case of a member where the scheme's fund has earned less than salary rise of that member. It will be more likely if such member has put in 5 or more years' service, has got high salary rises and not reached (or just reached) the ceiling of Act Gratuity of 3.5 lakh
- If each employee takes his accumulated fund then wherever AG is more than AV, company has to pay additionally. To that extent cost with increase over and above $4\frac{21}{26}\%$

(max-7)

2 (iii) (b) Factors affecting funding level:

- Gratuity is a statutory benefit and the company is obliged to pay Act Gratuity
- Gratuity is a benefit defined as per Gratuity Act. However, the company is funding the scheme with defined level of contributions. hence funding level will depend on whether actual contribution paid is less or more than recommended contributions as per the valuation
- The funding level of the scheme would depend on funding objective (e.g. ongoing, discontinuance etc) and bases
- The bases may change overtime due to various factors such as changes in economy (e.g. movement of interest rates), withdrawal, mortality etc rates
- It would also depend upon the level of contributions and the asset values held in the fund as well as the

investment return and movement of asset values in future

- If there are changes in benefits (e.g. the benefit improvement proposed) of the scheme, then funding level will change
- If there are changes in the Act Gratuity, e.g. maximum Act Gratuity increases beyond Rs.3.5 lakh, then the funding level is expected to fall
- The funding level will depend on the actual experience vis-a vis the assumptions made in valuation of assets and liabilities. If overall experience is favorable, the funding level will improve or vice-versa
- Changes in membership profile e.g. proportion of new entrants, age at entry etc.

(max-5)

2(iii) (c) Fair to the employees:

- Underpin will make scheme more attractive for employees
- Fair for employees as contribution to the scheme is part of CTC
- Gives benefit to early leavers i.e. leavers before completion of 5 years service
- May not be of much value to those staying for a longer period (long stayers)
- More fair to employees if contribution is refunded with interest
- Interest may be what is earned by the scheme, or saving bank rate or bank rate etc
- Executives with high salary may benefit as their accumulated contributions may exceed maximum Act Gratuity

Fair/ non-fair to the employer:

- Underpin will make the scheme more complex to communicate and administer
- Individual employee's contribution record needs to be maintained
- Other companies of the industry unlikely to be offering underpins
- Underpin will increase cost of the scheme and may need additional contribution over and above $4\frac{21}{26}\%$ of the salary of employees
- If it so happens then employer's cost will be more than CTC
- Once accepted, employees are likely to demand refund of contribution with interest
- Interest may be fixed or variable adding not only cost but risks also
- Employer may not like to give benefit to early leavers
- May increase attrition rate particularly in respect to those working for 3 or 4 years)

(max-5)

2(iii) (d) Estimation of the cost of underpin:

- Underpin in any case is going to add cost
- Separate modeling needed for each asset class
- Stochastic modeling of assets to understand the probability of lower returns occurring than the increases in salary of members
- Stochastic modeling is needed to assess how likely underpin is to bite
- Cost may vary by age, service put in and gender of the member as withdrawal and mortality rates would differ by age & gender
- Cost of underpin is likely to be much more if contributions are to be refunded with interest

(max-3)

2(iii) (e) Changes in funding and investment strategy

- Actuary will need to advise about the reserves required to fund underpin
- Company will need to keep sufficient fund that includes cost of underpin
- On introduction of underpin, payment of small benefits will increase e.g. refund of even one or two month's contributions. It will need change of investment strategy as more liquid

assets will be needed

- Change in investment strategy will need change in funding bases
- More riskier assets such as equities may be avoided in new investment strategy as more short term view may need to be taken due to introduction of the underpin
- More prudent funding basis may need to be adopted in view of increased liquidity requirements & expected lower investment returns

(max-2)
