

INSTITUTE OF ACTUARIES OF INDIA

SA4 - Pensions and Other Benefits

May 2026 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 examiners have given credit for any alternative approach or interpretation which they consider to be reasonable.

Solution 1 :**i) Comment on the trends:**

The longevity of the given population has improved significantly over the last 50 years. The improvement is noticed across all the given ages. The improvement ranges from 14% to 30% over the ages.

The improvement is moderate at younger age. But at older ages (eg from ages 65) the improvement in life expectancy is substantial (30%).

In 1950 life expectancy was zero for ages over 95. But numbers in the year 1995 & 2000 indicate growing trend of people surviving beyond 100 years.

The table indicates the increasing longevity of the given population. This is consistent with trend prevailing all over the world.

[3]**ii) Impact of increasing trends in longevity in reshaping the pensions as retirement benefit.**

For a given Normal retirement age (NRA), pension payout will be extended further due to improving longevity.

The financial burden of providing these pensions increases further if the benefits are index-linked

There is a direct cost implications to the financiers of the pension due to this trend viz., Government in terms of increased budget provisions, employers in terms of financing cost & individuals in terms of expensive annuity prices.

The impact on cost depends upon the type of pension benefits being provided in old age.

The increasing longevity trends, together with the decreasing working population, lower fertility rates will compel the providers of pension to make changes in the design (e.g offering DC schemes) & management of pension plans being provided to members.

In India, Shifting to Defined contribution schemes has been unpopular with the beneficiaries, as they will be exposed to the risk of unknown benefits in retirement.

There is a trend to offer some assured benefit during old age with measured impact on cost. Introduction of UPS for central Government employees, TAPS by Tamil Nadu Government, introduction of guarantee in NPS reflect this trend.

Sponsors may be altering the designs of pension schemes e.g. Increasing retirement age, restricting or redefining the pensionable salary, placing a ceiling on the pension benefits aims to control the cost while retaining the attractive features of the defined final salary pension plans.

But considering the cost implications, employers especially private companies will be reluctant to offer such pension benefits to the new members.

Providers of pension may consider replacing (or limiting) the pension benefits with some other “retirement benefits” for e.g Post retirement medical plan, provide with Senior citizen care homes facilities to manage the longevity risk.

Second employment following retirement, passive income from other sources like property & other asset classes are likely to supplement the restricted pension benefits of the retirees in the coming years.

More assured pension plans with flexibility in choosing the retirement age , use of properties of seniors (e.g. reverse mortgage) to generate regular income may be prevailing in Indian markets in future

More focus will be on funding the pension benefits during the active life time of the members. Initiative have been taken by Government to move away from PAYG, employers to account pension cost by adopting to accounting standards.

There will be increased contributions from the members to finance the pension cost as the burden on pension providers increases due to longevity & other risks

Management of pension funds will be more challenging due to the increasing longevity. New asset classes or new financial reinsurance strategies are to be developed (e. g longevity bonds, longevity swaps) to match the unknown liability without compromising the security of funds.

Increasing longevity will require active risk management practices & governance. The roles & responsibilities of Trustees will have to be redefined to ensure the security of the vested pensions

Existing tax concessions being offered to pension contributions/funds will also likely to change to fit into the changing trends in longevity & financial markets.(E,g direct incentive to the individuals saving for pensions or higher the age greater the tax concession)

While Government encourages more participation of market players for providing pension, its role will primarily shift from “pension Provider” to “ Pension Governance”

More focus will be on educate the individuals on pensions, encouraging more pension players in the market & ensure orderly growth of pension business.

[12]

iii)

a) Step by step process to be taken for revising the commutation factors.

Commutation factors determine the lump sum payable in exchange for a portion of pension. They are influenced by the level of benefits commuted, expected longevity, and assumed investment returns, and may be adjusted to ensure fairness and financial sustainability of the pension scheme.

General approach will be to project the pension of unit amount till the life time allowing for survival & investment return. The cash flows are to be discounted to each age to derive the commutation factor.

In this process the actuary has to take the following initiatives:

Examine the existing commutation tables being used-rationale for using the tables- whether a separate table prepared for the company or industry table was simply adopted

Examine the standard(base) longevity table used, how it was modified to reflect the trends in the longevity experience of the group, how different longevity experience of different regions, gender have been taken care off,

Analyze the longevity experience of the group over the last 20 years. Analysis has to be done in terms of age, gender, different regions, income groups etc & compared with the existing longevity factors for each year. This will help to understand the improvement in longevity experience of the group across all segments over the years

The trends in the longevity should be projected forward using suitable survival models to allow for further improvement in longevity. Care has to be taken to tweak the model to reflect the scheme experience. The results should be compared with trends in general population for each region for consistency.

The improvement in longevity for the group can be expressed as a percentage of existing table or a new industry table for each age group or as a modification to the age.

Cash flows are to be projected for unit pension using the derived longevity factors using a suitable investment return. The investment return should reflect the long term trends on pension funds & allow for the inherent investment risks.

The returns should be consistent with the investment strategy adopted, nature & quality of the assets prevailing in each region

Cash flows are to be discounted to each of the present age to get the revised commutation factors.

The revised factors are to be set for each separate categories of gender, work group, if the company is having sufficient past data. This will help to understand the significance of improvement in longevity across several groups.

Commutation factors should be graduated and rounded to simplify administration and communication.

In Defined Benefit (DB) schemes, commutation factors may not always be actuarially equivalent or cost-neutral, as the primary objective is to provide employees with predictable pension benefits; therefore, these factors are revised infrequently. This aspect is to be considered while smoothing.

The updated tables should also be compared with industry tables if available for consistency

A single consolidated commutation table can also be prepared for the company to serve as benchmark.

[7]

b) Discussion on the factors to be considered by Trustees before adopting a single table

A single commutation table for the entire group will be simple to administer, & easy to communicate. Members easily understand the fairness of having a single rate.

The factors could be considered as a fair price of pension (of unit value) for this group. This could be used as reference for other purpose e.g transfer value calculations, compare the annuity prices etc

However a single rate is unlikely to reflect the commutation experience of each group of members across different regions having different longevity.

For instance, investment yields differ across regions, using a single commutation table based on one discount rate can create inequities — favoring some geographies while disadvantaging others. Such disparities can influence members' option-availing behavior (e.g., commutation, transfers) and even affect enrollment decisions in pension schemes

The different investment climate, different risk exposure of each region will also having an impact on commutation factors.

Due to this, there is a risk to the Trust that the commutation factor may not fairly reflect the value of pension foregone resulting in cost implications.

The impact on cost depends upon amount of pension commuted, permitted age, exit conditions (e.g. retirement), proportion of members exercising the option

While higher payout will result in cost implications to the company, lower commuted pay out will lead to members dissatisfaction

However in practice commutation option is exercised by members at retirement to pay off their commitments(e.g housing loan) or to avail the tax concessions available on such amounts. Therefore there is lesser scope for anti selection.

Tables are prepared based on long term trends on investment & longevity in such a way that they are cost neutral & will remain stable for long period. It means short term fluctuation in commutation experience will likely to smoothen over time.

A single commutation table for the company will be out of line with the tables prevailing in each region. This may lead to unfair comparisons with the industry trends especially if it is lower.

In many countries Commutation factors require approval of pension regulators or Tax authorities before its use; Getting approval for a single table across each region may require lot of paper work, justifications & may face hurdles

[6]

iv) Points to be included in the presentation highlighting the impact on short term & long term employee benefits

1. Introduction of 4 labour code consolidating the various existing legislations. 1)Wage code 2) industrial Relation code (IR code) 3) Occupational safety, Health, Working conditions code (OSH code) 4) Social security code (SS code)- effective from 21.11.2025
2. Definition of wages has been redefined uniformly- Wages comprise 1) Basic Pay 2) Dearness Allowance 3) Retaining allowance. If allowances (excluding PF, gratuity, HRA etc) exceed 50% of total remuneration, the excess amount will be added back to the wages for calculating PF, ESI, gratuity.
3. Definition of "employee" now includes supervisory, managerial, administrative personnel, & senior management personnel – it means they get statutory protections under these new codes.
4. Definition of work force excludes sales promotion employees, apprentices & working journalists
5. Definition of employer modified for each code now includes contractors
6. Governance of establishment under these codes by central & state governments has been set.
7. Transparent, enforcement mechanism of the codes has been set. These include decriminalization of minor offences, appointment of facilitator/inspector, opportunity to rectify, penalty for non compliance etc.

Wage code

1. Discrimination in matter of pay especially on the grounds of gender prohibited; Principle of same pay for same/similar wages retained
2. Floor wage will be set by Government based on standard of living of workers & their geographical locations
3. Payment of wages & statutory deductions will cover all employees without "minimum salary eligibility" conditions.
4. Eligibility conditions for statutory bonus remain unchanged until new conditions are set

IR code

1. Definition of retrenchment exclude termination as a result of completion of tenure of fixed term employment. Minimum retrenchment compensation set as 15 days of average pay for each year of service. Prior permission of Government for retrenchment now relaxed (numbers increased to 300).
2. Establishment of "reskilling fund" to provide monetary, reskilling to retrenchment workers. & statutory funding by employers

OSH code

1. Engagement of contract labour by principal employer in core activities of the establishment prohibited
2. Principal employer now have secondary obligation to provide "welfare facilities" to the contract labour.
3. annual leave @ 1 day for every 20 days with a maximum of 18 days. Encashment/carry over of unavailed leave is also proposed

SS code

1. Applicability of PF, ESI, Gratuity, maternity benefits, social security cess to establishments has been reset in SS code.
2. Government proposes to replace existing EPF, EPS, EDLI with new schemes under SS code. However till such times, these schemes will remain in force but with wages as defined in SS code.
3. Eligibility conditions of ESI, contributions to the ESI remain largely the same until new rules are set.
4. Gratuity calculations, present ceiling of Rs 20 lakhs remain unchanged; but new definition of wages as per SS code will apply.

5. Insurance of Gratuity schemes is mandatory to most of the establishments. Exemption to this rule, the power to give exemptions remain unaltered.
6. Maternity benefits remain largely the same. SS code allows multiple employers to set up common crèche facilities for its workers.
7. SS code empowers central government to establish life, disability, health, old age pension schemes to gig & platform workers. It proposes to establish a fund financed by levy from aggregators.
8. Fixed term employment workers are entitled to all statutory benefits of a permanent worker on proportionate basis. The eligibility criteria for receiving gratuity is set as 1 year.
9. Earlier termination of FTE workers will be considered as retrenchment

[8]

v)

- a) Possible reasons for the company X to retain the pension liabilities in the sale process & reasons as to why the Trustees are reluctant of managing the pension fund closed to further accrual .(5 +5)

In selling process of a company, pension liabilities poses challenges in arriving at sale price. This is due to the long term nature of pension liabilities & the uncertainties associated with pension cost.

Company Ind X is having significant pension liabilities under 5 different categories.(55% of liabilities are relating to active members)

Placing a market value on the benefits & on the risks associated with benefits, consensus on such value will be challenging & Excluding the pensions from the negotiations on sale of the company makes the process easier & quicker.

The Trustees are buying annuities to provide the pension benefits as & when they fall due. The liabilities of the Trust will therefore be limited managing the active & deferred pension benefits only.

The Scheme is having 15% of its liabilities to provide discretionary pension to the vested pensioners. The power to pay these discretionary benefits vests with Trustees. This power & the funding of these benefits provides cushion to the Trustees to manage the pension funds.

The short term volatilities arising in managing the funds of active & deferred pensioners can be managed by the surplus (10%) in Trust.

By retaining the liabilities, the company & the trust can avoid the risk of selling the assets at an inopportune time when market conditions are not favorable.

The parent company X is already having Trustee arrangement for pension benefits of other regions in which it continues to operate. It continues to provide support to the Trustee in discharging their duties & responsibilities. It may aim to provide similar support for Ind X Trustees also even after closure.

This proposal provide continuity to the pension arrangements for the accrued benefits. Employees especially those closer to retirement may feel secured about the accrued pension benefits.

Compliance requirement for closure of Trust may be time consuming & may delay the sale process.

Why Trustees are reluctant?

The data given in the question indicates 55% of total liabilities are relating to active members. & 30% to the deferred pension benefits. & 15% to the pensioners.

When the scheme is closed to the new entrants & for further accrual , average age of the scheme increases, the term of the liabilities will become shorter. The matching of these liabilities to the potential annuity prices becomes a challenge to the Trustees.

The Company is having both DB & DC arrangements for the members who left the services earlier. These funds are parked with insurance companies. Although the liabilities (18 + 12) exactly match with parked fund(30), the parked funds may not be sufficient to pay the guaranteed pensions in future.

Although there is no guarantee of benefits for DC benefits, the responsibility on ensuring the security of the funds till purchase annuities for these members rests with Trustees only.

The decision to provide discretionary pensions are mainly influenced by the past practices of the company. Though the Trustees retain the control on these benefits, pensioners expect the practices to continue.

The assets of the Trust is having variety of assets to provide the benefits under the scheme. The Trustees are exposed to the volatile returns(equities), default risk (corporate bonds) & interest rate risk (government bonds).

The scheme is 15% of its assets in equities as compared to 25 % of its liabilities which are real in nature. The fixed interest securities may not provide a match for the guaranteed benefits in terms nature & duration.

We have no information on the performance of the asset classes, the duration & quality of assets.

Due to the factors there is a significant asset liability mismatch risk to the Trustees. The risk is that the market value of these assets may not match with annuity prices at the time when the members exit from the scheme.

There is also risk of selling the assets at a time when markets are depressed.

The scheme may be having surplus initially. There is a risk of deficit arising in the scheme in future & the Trustee need the financial support of the company to manage the deficit.

The investment & operational risk of managing the scheme is significant for the Trustees. They need the services of actuarial , investment & legal professional to manage the Trust.

In the absence of the principal sponsor, the Trust is likely face serious challenges in terms of unknown cost, expenses, member dissatisfaction & closure scrutiny of regulators.

[10]

b) List Other ways of managing the pension benefits of Ind X:

Active category I members with final salary pay must be encouraged to transfer the liabilities to the new group. Or immediate accrued benefits of these members are to be provided using annuities.

If the members are transferred to other regions of company X, they can be easily admitted in the respective pension funds

Category members II, having only assured pensions, may be integrated with the pension scheme of buyer company if they have DB benefits. Generous transfer value may be offered to them if the buyer is having DC arrangements.

It is fair to provide surrender value of the parked funds to deferred pensioners. Or deferred annuities can be purchased for these members.

Discretionary pensions- are to be replaced with fixed increases or altogether to be stopped

DC accumulations for the members who left the services long before are to be discharged. Their accumulations are to be transferred to the individual pension accounts such NPS, existing employer DC schemes.

Provide support to Trustees in managing the Trust for shorter period till pension liabilities are discharged & all Tax, Legal formalities are completed.

Services of Trustees of pensions of other regions may be used if it takes a longer time for winding up.

[4]
[50 Marks]

Solution 2 :

i) Provisions of IAS 19 related Attributing Benefits to period of services

Para 70. In determining the present value of its defined benefit obligations and the related current service cost and, where applicable, past service cost, an entity shall attribute benefit to periods of service under the plan's benefit formula. However, if an employee's service in later years will lead to a materially higher level of benefit than in earlier years, an entity shall attribute benefit on a straight-line basis from:

(a) the date when service by the employee first leads to benefits under the plan (whether or not the benefits are conditional on further service) until

(b) the date when further service by the employee will lead to no material amount of further benefits under the plan, other than from further salary increases.

Explanation as to how benefit is to be attributed for the given member

Attribution of benefits to period of service arises due to the use of projected unit method to calculate DBO & CSC as per IAS 19.

For the given employee the benefits are increasing, depending on the service up to 20 years & no further benefit will accrue after 20 years of service(except salary increases)

In line with IAS 19, the total benefit is attributed **uniformly across the 20-year service period**. This means that each year of service earns the employee an entitlement equal to **one month's salary**, and the defined benefit obligation at any point in time reflects the cumulative service to date.

Accordingly, the benefits will be attributed as follows:

Service Period	Benefits attributed to PV DBO	Benefits attributed to Current Service Cost
Up to 20 years i.e. up to age 45	One month salary for each completed year of service	One Month Salary per year of service
More than 20 years i.e. from age 45-60	Fixed at 20 Months' Salary and no further accrual.	NIL

[6]

ii) For FY 2025, the reconciliation of DBO & asset is as follows:

Particulars	Value in million USD	Marks
Opening Balance 01.01.2025	300	0.5
Increase in Liability due to Transfer in	120	0.5
Interest Cost $(300 \times 0.05 + 120 \times 0.05 \times 0.5)$	18	1
Current Service Cost $(27 + 14 \times 0.5)$	34	0.5
Benefit Paid	(22)	0.5

Actuarial Loss	75	1
Closing Balance 31.12.2025	525	0.5
Asset as on 31.12.2025	250	0.5

[5]

iii) Key differences between IAS 19 and ASC 715 of US GAAP in terms of the four components are as follows:

Component	IAS 19	US GAAP
Past Service Cost	The cost has to be recognized as an expense/income as service cost in P&L Account immediately when the amendments are recognized.	It requires prior service costs, including costs related to vested benefits, to be initially recognized in Other Comprehensive Income and then amortised through net income in the P&L Account. The amortisation will be based on the active participants' average remaining service periods or period benefited , Prior service cost not yet recognised in net periodic cost is included in Accumulated Other Comprehensive Income.
Actuarial Gains/Loss	Actuarial gains and losses (remeasurements of the net defined benefit liability/asset) are recognized immediately in Other Comprehensive Income (OCI). They are never recycled (i.e., reclassified) into the Profit or Loss (P&L) statement in subsequent periods.	The actuarial gain/loss can be recognized immediately as a component of net periodic benefit cost in P&L Account as long the same method is applied consistently and applied to all gains/losses. OR The actuarial gain/loss can be deferred in OCI and amortized to net periodic gratuity cost over a period of time using Corridor Approach (only gains/losses exceeding 10% of the greater of plan assets or obligations are amortized over the average remaining service period)
P&L Statement	The components of defined benefit cost to be recognized in P&L Account are Service Cost and the net interest on the net defined benefit liability. Service Cost- Current service cost+ Past service cost (vested & unvested) including curtailment+ Non routine settlements. Net Interest cost- Interest on NET benefit liability/ (asset). (Discount rate to be multiplied to Net liability/ asset after asset ceiling).	The components of DB Cost called Net Periodic Benefit cost= Service cost + interest cost - expected return on plan assets +/- net actuarial loss or gain amortized (If any) +/- prior service cost amortized recognized +/- curtailment and settlement effects.
Other Comprehensive Income	The components of expenses recognized in OCI are Re-Measurement cost- Gain/loss on DBO (including routine settlements) + difference between Actual return on plan assets (After deducting the costs of managing the plan assets and any tax payable by the plan itself) and interest income on plan assets using assumed	All the Past Service Cost and Actuarial Gains/Losses will first be recognized in AOCI then amortised through Income systematically. However, the actuarial gains/losses may be recognized immediately in the P&L Account

	discount rate + and changes in asset ceiling.	based on the accounting policy of the entity.
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Calculation of the components for the period ending 31.12.2025:

Past Service Cost:

As per IAS19

The plan amendment has happened at 31.12.2025 and the entire cost of 150 million USD will be recognized as a past service cost and will be recognised as expenses in the P&L Account.

As per US GAAP,

The prior service cost of 150 million USD has to be recognised in AOCI immediately and the cost will be taken into net periodic benefit cost through amortization of total prior service cost over the average future working life time of current employees which is 15 as at 31.12.2025

Amortized Past Service Cost = $150 / 15 = 10$ million USD

The above cost of 10 million USD will be taken into net periodic gratuity cost

Actuarial Gain/Loss:

As per IAS 19, the actuarial loss of 75 million USD will be recognized in Other Comprehensive Income

Accounting Standard ASC 715 provides the following two options to the company related to recognition of actuarial gain/loss:

1. The actuarial gain/loss can be recognized immediately as a component of net periodic gratuity cost as long the same method is applied consistently and applied to all gains/losses.
2. The actuarial gain/loss can be deferred in OCI and amortized to net periodic gratuity cost over a period of time using Corridor Approach.

Without Corridor Approach:

Under this method, the entire actuarial loss of 75 million USD will be recognized in net periodic benefit cost.

With Corridor Approach:

Plan DBO as at 31.12.2025 – 675 million USD

Plan assets as at 31.12.2025 – 250 million USD

Maximum of 10% of DBO and Assets – 67.5 million USD

Actuarial gain/loss – 75 million USD

Amortized gain/loss – $(75 - 67.5)/15 = 0.5$ million USD.

Statement of Profit and Loss Account:

Accordingly, the expenses recognized in the P&L under IAS 19 is

= Service Cost + Net Interest Cost

= 34 + 150 + 18 = 202 million USD

The Net Periodic Benefit Cost recognized in the P&L Account under US GAAP

= Service cost + Interest Cost – Expected Return on Plan Assets + Amortized gain/loss + amortized past service cost

Without Corridor Approach:

Under this method, the entire actuarial gain/loss of 75 million USD will be recognized immediately.

Net periodic gratuity cost = Service cost + Interest Cost – Expected Return on Plan Assets + Unamortized gain/loss + amortized past service cost

= 34 + 18 + 0 (as contribution paid on 31.12.2025) + 75 + 10 = 137 million USD

With Corridor Approach:

Amortized gain/loss = 0.5 million USD.

Accordingly, the net periodic gratuity cost will be calculated as follows:

= 34 + 18 + 0 + 0.5 + 10 = 62.5 million USD.

Other Comprehensive Income:

Under IAS 19, the income/expenses arising from remeasurement of net defined benefit liability will be recognized in OCI and the amount recognized in the OCI will never flow back to P&L Account.

OCI Recognized as per IAS 19 – 75 million USD

Under ASC 715, the past service cost and the actuarial gains/losses will be recognized immediately in OCI first and then amortized over a period of time in the net periodic gratuity cost and recognized as an income in the P&L Account.

OCI Recognized as per ASC 715 without corridor approach – 150 million USD (prior service cost)

OCI Recognized as per ASC 715 with corridor approach – 150 + 75 – 10 - 0.5 = 214.5

[20]

iv) Comment on the FD's proposal:

The proposal of making contributions equivalent to the CSC aim to align the funding plan of the company with the future accrual cost of benefits. The additional contribution based on amortized cost is expected to cover the increase in past service cost over the period of 15 years.

By these two contributions, FD may aim to bring more certainty in financing the benefits & stability in the funding status.

PU method CSC reflect the accruing benefit cost over one year (control period) due to the additional service put in by the members. It is based on certain long term financial & demographic assumptions over the future period.

Similarly the additional fixed contributions to cover the increase in past service cost will also be based on certain assumptions (e.g investment return).

These assumptions for accounting purpose are market derived best estimates based on professional judgements & guidelines as provided by accounting standards to reflect the market cost.

The funding status of the scheme depends upon how these assumptions are met in practice. The actual experience of the scheme is likely to vary with assumptions for a number of reasons.

- Investment performance of the scheme: This depends upon the types of assets backing the benefits, return on these assets, the investment philosophy of the scheme, timing of contributions and benefit payments, applicable taxes and expenses.
- Membership profile: The stability in the membership profile depends upon age/gender/salary/Past service distributions of the members & how it is likely to vary over the period. The stability could be impacted by large level entry or exit of members (e.g. mergers, acquisitions etc.,).
- Salary cap or ceiling on the benefits, limitation of the (arbitrary) nature of the amortization period & timing of payment of contributions & benefits.
- The existing deficit in the schemes before the plan amendment

Further the FD's financing plan will also be impacted by (2)

- Changes in benefits triggered by company initiated activity or due to regulatory/Tax authority interventions.
- Changes in the assumptions in measuring the liabilities to reflect the actual experience more closely with scheme experience or market conditions.
- Covenant of the Company to finance may be impacted due to poor business performance or adverse trend in the business climate.

These future(uncertain) events will lead to another cycle of changes in the past service cost & its funding & financing.

Any change in membership profile or experience will be captured prospectively and their effect is reflected in the actuarial loss/gain of respective period. Hence the contribution schedule related amortized cost has to be continuously rebalanced every year.

For a larger scheme, the long term funding plan will remain stable if the actual experience is in line with the assumptions. But there will be fluctuations over a short term period which are to be met by active governance in investment, financing & measuring the value of benefits.

[10]

v) Key points of Guidance Notes (GN 30) on developing basis while valuing Employee Stock Option Plans are as follows:

General points

Section 8.5 of GN30 provides guidelines to actuaries while setting basis for determining the fair value of the option provided by companies.

The Key assumptions to determine the fair value include 1) Risk free interest rate 2) Expected volatility of the share price 3) Expected term of options 4) Expected dividend payout.

Other assumptions include probability of achieving performance criteria & forfeiture/lapse rates.

The guidelines provided for developing basis on 4 key parameters are given as under:

Risk-Free Interest rate

- In determining the risk-free rate of interest, the yield currently available on zero-coupon government bonds, with a term equal to the remaining expected term of the option being valued is to be used.
- If such bonds are not available, yield on Government bonds may be used with adjustment in line with approach used by other market participants.
- The approach adopted with its limitations & judgement used is to be disclosed in the report.

Expected Volatility

- This assumption should reflect the expected volatility in the share price of the company over the remaining(expected) term of the option.
- For setting the assumption, choice is available to the actuary in choosing an appropriate approach among 1) Historical volatility 2) Implied volatility 3)Volatility forecasting models (ARCH, GARCH).
- But while choosing & using the approach, the actuary should also consider the company/scheme specific factors.
- e.g. for listed companies historical volatility in share prices & how they are expected to vary over the term; for unlisted/ newly vested companies, implied volatility of similar entities
- If the share price witnessed exceptional volatility in the past over a specified period, actuary should understand the reasons for such volatility & apply judgement as to what extend such experience should be included(or excluded) while developing the basis.
- Additional factors relating to the Company such as its size, scale, turnover, type of industry etc. shall be considered.
- If the assumption is being provided by the Company and the actuary fully relied on the basis provided by the company,, the actuary should disclose this fact in his report.

Expected Term to Exercise

- Expected term to exercise should reflect an estimate of the option's expected life. For instance, for ESOPs, it is the period of time from grant date to the date on which the option is expected to be exercised by the employee.
- It shall include the length of the vesting period, as the share option cannot be exercised until the end of the vesting period.
- Exercise period (applicable post completion of vesting period) shall consider potential for early exercise, based on past exercise trends available or based on credible management input. Any past valuation approach used by the Company or where applicable, by other peer companies and market participants, shall be factored.
- Different approach may be required for listed and unlisted companies. For listed companies, the term shall be set separately for each trench; for unlisted companies an overall weighted average assumption may be set.
- Separate expected term may be set for each homogeneous group of employees to reflect the exercising pattern.

- Companies input is to be considered especially where exercise of option is linked to happening of corporate transactions.

Expected Dividends

- The consideration of the expected dividends while assessing the fair value of options is dependent on whether the employee is entitled to dividends or dividend equivalents before the options are exercised.
- If the employees are granted options and are simultaneously entitled to dividends on the underlying shares or dividend equivalents between the grant date and exercise date, then the expected dividends assumption in the option pricing model should be set to zero.
- If the employees are not entitled to dividends or dividend equivalents during the vesting period (or before exercise, in the case of ESOPs), the actuary should take the expected dividends into account as at the grant date and factor the same in option pricing.
- The expected dividend yield should be estimated based on:
 - Publicly available information about the Company's dividend policy or historical / current dividend yield.
 - Company's business plan or peer Company data. For instance, an entity that does not pay dividends and has no plans to do so, the expected dividend yield should be considered as zero.
 - For Companies with no history of paying dividends but which expect to begin paying dividends during the expected term of the option, assumption may need to be set taking into account the period by which the Company expects to start paying dividends, level of dividend yield expected, yields seen in peer companies (where available) etc.

[9]
[50 Marks]
