

# **Institute of Actuaries of India**

## **Subject SA7-Investment and Finance**

### **November 2023 Examination**

#### **INDICATIVE SOLUTION**

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) Bank finance offers numerous benefits relative to raising finance in the capital markets.

The advantages include:

- the development of a relationship between the company and the bank which can bring about stability of finance costs, known depth of access and flexibility to change terms
- costs of finance can be lowered by companies that use the bank for other services (*e.g.* paying fees for managing bond issuances)
- advice on finance due to a regular contact with the bank
- no need for credit rating agency involvement in management time

The disadvantages, include:

- the restrictions imposed by banks can be far more penal than those demanded by capital market investors
- generally, the term and size of debt available for bank finance is significantly shorter and smaller than capital markets
- the relationship between capital market investors is generally more 'arm's length' than banks, freeing up management time

[Max 3]

ii) The banking sector's profitability increases (decreases) with interest rate hikes (cuts). Institutions in the banking sector, such as retail banks, commercial banks, investment banks have massive cash holdings due to CRR (Cash Reserve Ratio requirement) of customer balances and business activities. Changes in the interest rate directly affect the yield on this cash, and directly alter earnings.

Higher interest rates tend to reflect a period of greater economic growth, with the Banking regulator raising rates to slow expansion. In these conditions, consumer and business demands for loans spike, which also augments earnings for banks.

The spread between long-term and short-term rates also expands during interest rate hikes because long-term rates tend to rise faster than short-term rates. Profitability increases as longer-term loans earn more interest than shorter-term interest cost on deposits.

If interest rates rise too high, it can start to hurt bank profits as demand from borrowers for new loans suffers and / or refinancing drops and increases deposit competition. Depositors may seek other banks providing higher returns putting pressure on funding cost. To attract and retain customer deposits, banks must be able to offer competitive deposit rates.

To manage the impact of rising interest rates on loan demand and cost of funding, banks must be able to adjust their strategies on lending and deposit policies. Banks that rely heavily on lending for revenue can diversify into areas, such as wealth management or investment banking. Banks should maintain enough liquidity to deal with any changes in deposit levels.

Banks can differentiate themselves from competitors by offering innovative products and services like high-yield savings accounts, mobile banking apps, and other digital services and retain their customer base.

Banks also have large amounts of bonds in their portfolios. Bond prices typically fall (rise) when interest rates rise (fall). To avoid significant losses / uncertainty, banks must manage their bond portfolios effectively.

Interest rate risk is the risk to a bank's earnings and capital that occurs when interest rates change. It arises primarily because the rates and prices of assets and liabilities change by different amounts or at different times. It is comprised of four types of risk:

- Re-pricing risk occurs when assets (loans and investments) mature or re-price at different times than liabilities (deposits and other borrowings).
- Basis risk arises when interest rate changes lead to a difference in how a bank's assets are re-priced versus its liabilities.
- Yield curve risk arises from non-parallel changes in the yield curve. The rate change on a two-year government bond, for example, may differ from that on a 10-year government bond.
- Option risk arises when the timing or amount of a bank's cash flows changes because of a decision by a customer on interest rate change; bank borrower (e.g., a loan customer) or lender (e.g., deposit customer).

For many banks, re-pricing risk is of the most concern. They must regularly monitor the mix of fixed-rate and floating-rate assets and liabilities on their balance sheets, as well as when those assets and liabilities mature or re-price and to what magnitude.

[Max 5]

iii) Issues to be considered in product design / pricing / re-pricing of RDs:

In Recurring Deposits, the customer has to first choose the tenure and monthly deposit amount. Once the investment starts, the customer must deposit the amount every month over the tenure. RD interest rates are applied based on the tenure and deposit amount.

Generally, the tenure varies from a minimum of 6 months and thereafter in addition of 3 months to a maximum tenure of up to 10 years and senior citizens are offered a higher rate of interest.

Product design includes preparing RD terms and conditions which must cover the procedure to be followed under various scenarios like discontinuance of scheduled deposits, Pre-Matured Withdrawal (PMW) of RD, revival / renewal of discontinued RDs, any loan facility against RDs, any TDS (Tax Deducted at Source) applicable etc.

RD opening form should specify minimum amount to be deposited and for higher deposits as multiples of some whole amounts, lock-in period during which no interest is given on PMW, KYC (Know Your Customer / Client) documents required, mode of monthly payments like ECS (Electronic Clearance Service) or online banking or fund transfer etc.

RD Administration systems must be able to cope with the complexity of designs.

A system must exist to pay PMW / maturity amount and record a lot of information about each RD account such as dates of deposits, corresponding amount deposited, any discontinuance periods and revivals, RD rates applicable based on RD term structure at the inception of RD account etc.

The expense loadings must cover the administration costs involved. How to load expenses (both overhead and marginal) either explicitly like for initial documentation / set up of RD account and subsequent regular maintenance expenses or implicitly in the margin built in pricing the RD rates term structure.

Loading of profit margin implicitly in the margin built in pricing the RD rates term structure. Profitability will be impacted if actual expenses overshoots expenses loaded in pricing the RD rates.

The RD rates quoted should be marketable / attractive to prospective RD customers. Addition of innovative options and guarantees in design features may make RD accounts more attractive like option to increase / decrease / skip certain number of monthly deposits.

Structure and level of RD rates should be competitive and should not depart too far from those of competitors, depending on how the bank is going to market it.

Since the market is very price (rate)-sensitive, banks might set expense loading for certain products that are only slightly greater than that required to cover the marginal costs, thereby making an apparently insufficient contribution to fixed overheads.

This is then justified because there is still some contribution to expense overheads, as opposed to the zero contribution, which would result from not selling an uncompetitive product with a "correct" contribution built in.

What really matters to the bank is the *total* contribution to overheads (and profit) that results from selling the product *as a whole*, not per single account. This total contribution can be represented broadly by:

total contribution = per-account contribution X number of accounts;

Here the per-account contribution is the profit from a single account net of marginal costs (but ignoring overhead costs). The bank's total *profit* can then be thought of as:

Total profit = total contribution from all types of accounts - overheads

We need to find the level of expense loading that will maximize total contribution from a given product. In a very competitive market, this is achieved only by having very low per-account margins thereby ensuring sales. With less competition, higher per-account margins will be possible without jeopardizing volume

The level of risk that may be acceptable will depend upon the bank's ability or willingness to absorb risk. The key risk is Interest Rate Risk (IRR). Other risks include expense overrun and uncertain behaviour of customers like volatile PMW rates and discontinuance rates.

IRR can be reduced by making the RD rates reviewable periodically, say after every two / three years. That is not guaranteeing the RD rates for the whole term of the RD account.

Bank may consider using swaps / swaptions to mitigate IRR.

Alternatively, bank could allow cross subsidies across old and new RD accounts while Re-pricing RD rates for new accounts / customers.

Bank should consider burden of any guarantees not only for maturing accounts but also for accounts opting PMW and discontinued accounts maturing. For the latter ones, bank may wish to apply Market Value Adjustments (MVA) to reflect any loss to the bank and apply some penalty for any liquidity risk taken by the bank.

The burden of PMW on profitability can be assessed by modeling / estimating the association of PMW rates and interest rates. Unfortunately, interest rate rise (implying fall in asset values) are related with higher PMW rates.

Sensitivity of profit: The most important variable that affects profitability is interest rates. Since RD accounts usually guarantees the accumulation rate for the whole term of the account, any fall in future interest rates would imply lower earnings on future deposits.

Bank needs to decide on the extent of any cross-subsidies between for example large and small accounts. The marketing advantage of a simple RD rate structure may conflict with a desire to avoid cross subsidies. This issue involves expense loadings, what extent should accounts cover their marginal per-account administrative costs.

Setting expense load fairly that covers cost for RD accounts individually may prove uncompetitive for small accounts. Bank may set a lower fixed level of per-account expense load, recouping the difference over all the RD accounts portfolio by a corresponding increase in the expense load expressed as a proportion of monthly deposit.

Bank must adhere to any regulatory requirements, e.g. maximum (capped) margins in pricing / re-pricing RD rates, or minimum RD rates, minimum PMW payout etc.

In this regard, regulators may consider maintaining parity between RDs and monthly SIPs (Systematic Investment Plans) in debt mutual funds investing in government securities only.

Bank should consider how frequently it should re-price or review pricing of RD rates, to bring them in line with prevailing yields. In addition, consider to re-price if yields change by pre-specified amount.

For example, re-price frequency quarterly and re-price if yields vary by 0.25% from previous re-price date. Therefore, monitoring of yields is required on daily/weekly basis to see whether there is a need to re-price RD rates or not.

Bank can take any of the two approaches for pricing / re-pricing RD rates. First is to apply margins for expense load and profit in the yield curve itself and then derive RD rates implied by the reduced yield curve.

Second is to derive gross RD rates implied by the yield curve and then apply margins for expense load and profit in gross RD rates to get net RD rates for quoting with customers.

In summary, while designing / pricing / re-pricing RDs, the following factors need to be considered (as discussed above):

Designing Terms & Conditions; Administration systems; Profitability – expense loading and profit margin; Marketability; Competitiveness; Risk characteristics; Burden of any guarantees; Sensitivity of profit; Extent of cross-subsidies; Regulatory requirements; Re-pricing or reviewing RD rates etc.

These factors may not necessarily be independent, meeting one may prejudice the meeting of another, and so a compromise between factors is required. In addition, the factors are not necessarily mutually exclusive. Sometimes they will be difficult to resolve.

All other things being equal, simplicity in product design is preferable to complexity.

[Max 10]

iv)

$$M = R \frac{[(1 + i)^n - 1]}{\left[1 - (1 + i)^{\left(\frac{-1}{3}\right)}\right]}$$

M= maturity value of RDs;

- R = monthly deposit (installment);
- n = term of the RDs expressed as number of quarters ;
- i = effective quarterly interest rate;
- where, 4i is the RD rate quoted by bank with quarterly compounding

The formula for maturity value of RDs is given by the product of monthly deposit (R) and accumulated value of annuity due factor ( $\ddot{S}_{3n|}$ ) for term = 3n months with interest rate =  $(1 + i)^{\left(\frac{1}{3}\right)} - 1$  per month i.e. effective monthly rate.

- $\ddot{S}_{3n|} = \frac{(1 + \text{int.rate})^{3n} - 1}{d}$ ; Where  $d = \frac{\text{int.rate}}{(1 + \text{int.rate})}$
- $\ddot{S}_{3n|} = \frac{\left(1 + (1+i)^{\left(\frac{1}{3}\right)} - 1\right)^{3n} - 1}{\frac{(1+i)^{\left(\frac{1}{3}\right)} - 1}{1 + (1+i)^{\left(\frac{1}{3}\right)} - 1}} = \frac{(1+i)^n - 1}{1 - (1+i)^{\left(\frac{-1}{3}\right)}}$

[Max 3]

v)

The formula for maturity value of RDs can be calculated as the product of monthly deposit (R) and accumulated value of annuity due factor. However, calculation of accumulated value of annuity due factor is not straightforward since installments are deposited on a monthly basis and compounding occurs on quarterly basis.

Moreover, in banks accounts, compounding happens through capitalization of interest at quarterly rests i.e. compounding at Calendar Quarter (CQ) ends and within a CQ interest is accrued on a simple interest basis. For simplification, we can assume compounding at RD account quarterly instead of CQ-ly.

To tackle this, we accumulate the monthly deposits within a RD a/c quarter up to RD a/c quarter end using simple interest basis and generate a new set of quarterly cash flows that can be accumulated using accumulated value of annuity arrear factor.

Monthly interest rate =  $i/3$  and accumulated monthly unit deposits in a quarter is given by  $1 + 3i/3 + 1 + 2i/3 + 1 + i/3 = 3 + 2i$  where  $i$  = effective quarterly interest rate

Original	1	1	1	1	1	1	1	.....	1
Cash flows									
Months	0	1	2	3	4	5	6	.....	3n
Modified									
Cash flows				3+2i			3+2i		3+2i

Accumulated value of annuity arrear factor for 'n' quarters is given by

$$S_{n|} = \frac{(1 + i)^n - 1}{i}$$

The formula for maturity value of RDs (notation used is same as in previous part) is given by

$$M = R \frac{[3 + 2i][(1 + i)^n - 1]}{i}$$

[Max 4]

- vi) Simple interest used in the derived formula for deposits within compounding period always gives higher accumulated value than using effective rate accumulation. For example, let the quoted RD rate be 12% p.a. compounding quarterly. Then  $i=3\%$  is effective quarterly rate.

Accumulated monthly unit deposits in a quarter using simple interest basis in the derived formula =  $3 + 2(3.00\%) = 3.0600$ .

Accumulated monthly unit deposits in a quarter using effective interest rate

$$= \frac{(1+i)^n - 1}{1 - (1+i)^{\left(\frac{-1}{3}\right)}} = \frac{(1+3\%)^1 - 1}{1 - (1+3\%)^{\left(\frac{-1}{3}\right)}} = 3.0598$$

Comparing with formula derived above,  $3.0600 > 3.0598$ . Hence, formula derived above will give higher maturity value for RDs. The formula suggested by team member uses effective rate accumulation within the compounding period and gives lower maturity value for RDs.

[Max 3]

- vii) Order-driven markets

In an *order-driven* system, there is a rules-based matching system that is used to execute trades based on orders submitted to the system. Buyers will enter buy orders into an order queue (a particular quantity at a particular price) and sellers do likewise with their sell orders.

If a buy order specifies a price that is higher than the lowest sell order price in the system, a trade is executed. Similarly, if a sell order's price is lower than the highest bid order, a trade is executed. The systems therefore give priority to the highest priced buy orders and lowest priced sell orders.

When there are multiple orders at the same prices, precedence is usually given to orders that are displayed (rather than hidden) and precedence given to earlier orders over later ones, *i.e.* the first order submitted at a particular price is filled first.

Order-driven markets can be run by exchanges or by brokerages or by what are referred to as alternative trading systems. Such alternative trading systems have grown rapidly in the last decade.

Order-driven markets have the advantage that buyers and sellers are able to see the order book and decide for themselves whether to trade with an existing displayed order or to enter their own order and hope it will be executed at a later time.

Types of market order

There are usually a variety of different types of buy or sell orders that can be given – either directly in the market or indirectly via the intermediary. The most common types of orders are given below:

- *market order* – to execute the transaction immediately at the best market price
- *limit order* – similar to a market order, but limited to a specific high price when buying or a specific low price when selling
- *stop orders* – an order to be filled immediately when a specific price trades in the market
- *hidden orders* – are orders exposed only to brokers which cannot be disclosed to other traders.

The validity of these orders is also usually specified. The main types of validity are:

- *good-till-cancelled* (GTC) – an order that is valid until it is cancelled
- *good-till-xxx date* – an order that is valid until a specified date and/or time
- *fill or kill* – an order that has to be transacted immediately in full, or is cancelled
- *immediate or cancel* – an order that has to be transacted immediately, in part or full, after which any unfilled parts of the order are cancelled
- *good on close* – can only be filled at the close of the market
- *good on open* – can only be filled at the open of the market.

In addition, it is possible to specify whether the trade can be completed in part or whether it must be completed in full.

For example, if a limit order was specified as being a full order only, then a potential matching trade must be of sufficient size to complete the whole order. Otherwise, the trade must look elsewhere for a match, and the limit order will stay on the screen.

If the order is not specified as being full or nothing, then there is the possibility that only a part of the deal will trade, and the remaining part will appear on the system to be filled.

[Max 7]

**viii)** Strategy's Calculations:

Let  $S$  be the settlement price of ABC Share at end of 45 days;  
Investment horizon is 45 days. Therefore, we can assume every position is cash settled at end of 45 days. For Short put expiring in 15 days, two cases arise.

Case 1: Consider share price  $< 800$  at end of 15 days:

Short put is exercised: we get premium; shares at 800; and dividend 20 per share  
 $= 40 + 20 + (S - 800)$

Case 2: Consider share price  $\geq 800$  at end of 15 days:

Short put expires worthless: we get premium = 40

Long put =  $-20 + \max(0, 725 - S)$

Short call =  $50 - \max(0, S - 800)$

Long call =  $-30 + \max(0, S - 850)$

Case 1:

$S < 725$  Payoff =  $40 + 20 + (S - 800) - 20 + (725 - S) + 50 - 30 = -15$

$725 \leq S < 800$  Payoff =  $40 + 20 + (S - 800) - 20 + 50 - 30 = S - 740$

$800 \leq S < 850$  Payoff =  $40 + 20 + (S - 800) - 20 + 50 - (S - 800) - 30 = 60$

$S > 850$  Payoff =  $40 + 20 + (S - 800) - 20 + 50 - (S - 800) - 30 + (S - 850) = S - 790$

Case 2:

$S < 725$  Payoff =  $40 - 20 + (725 - S) + 50 - 30 = 765 - S$

$725 \leq S < 800$  Payoff =  $40 - 20 + 50 - 30 = 40$

$800 \leq S < 850$  Payoff =  $40 - 20 + 50 - (S - 800) - 30 = 840 - S$

$S > 850$  Payoff =  $40 - 20 + 50 - (S - 800) - 30 + (S - 850) = -10$

Strategy's Profitability Range:

For case 1:

- Strategy is profitable when ABC share price is above 740;
- breaks-even at 740; and
- turns into loss making below 740. Lower Breaks-Even Point (BEP) is 740.



For case 2:

- Strategy is profitable when ABC share price is below 840;
- breaks-even at 840; and
- turns into loss making above 840 i.e. Upper BEP is 840.

Overall, irrespective of which case (1 or 2) happens at 15 days from now, the strategy gives profits within the range of 740 to 840.

Beyond this range, it may give limited losses or unlimited gains depending up on case 1 or 2 happens

Strategy's Maximum profit / loss:

For case 1:

- Maximum profit is unlimited when  $S \gg 740$
- Maximum loss is 16,500 ( $= 1100 * 15$ ) when  $S \leq 725$

For case 2:

- Maximum profit is 841,500 ( $= 1100 * 765$ ) when  $S = 0$
- Maximum loss is 11,000 ( $= 1100 * 10$ ) when  $S \geq 850$

Maximum profit / loss from case 1 is the maximum profit / loss for the overall strategy since range of payoff of case 1 includes all payoffs of case 2

Strategy's Initial capital / margin requirement:

S.No.	Details	Amount
1	Long Put = (20)(1100)	22,000
2	Long Call = (30)(1100)	33,000
3	Short Put Case 1 = (800 - 40)(1100)	836,000
Total		891,000

We need to add transaction costs / taxes in the tabulated figure to get the total capital required. Transaction costs vary from broker to broker.

Short put and short call margins would be in the range of 20% - 40% each, of notional value 880,000 ( $= (800) (1100)$ ), depending up on expected future volatility of the underlying stock.

Initially, for both short options, margin required is in the range of 352,000 – 704,000, well within capital required (836,000) to take delivery in case 1.

If case 1 happens, i.e. short put is exercised with physical delivery of shares then there will be no margin required for short call as it would have become covered call. The shares could be pledged with the broker as collateral for any margin required in the short call. Moreover, the premium of short call 55,000 ( $= (50) (1100)$ ) is held with broker as cash margin.

If case 2 happens, i.e. short put expires worthless, margin requirement would fall in the range 176,000 – 352,000 as there will be only one short call option position. This margin can be catered by 836,000 capital held as contingency for case 1..

Views of a person implementing the strategy:

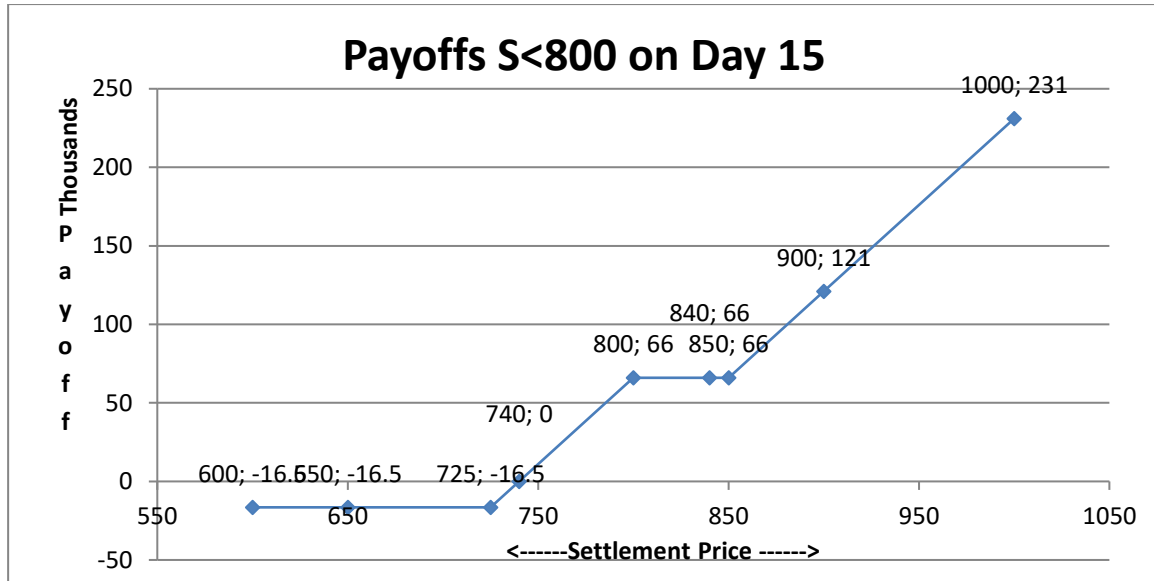
A person might implement the Strategy if he thinks ABC share price is going to stay close to current price where profit will be optimal.

He has no directional view i.e. neutral view since he gets profit even if share price rises (falls) slightly up to upper (lower) BEP.

The short put option expiring in 15 days is the only option that is ITM. It seems the person intends to take delivery of the shares 15 days from now and eat the dividends (as ex-dividend date is 30 days from now) before closing all positions on day 45.

[Max 10]

ix)



[Max 5]

[50 Marks]

**Solution 2:**

i)

**a) Information required**

1. Provide the trust deed and statement of investment principles for a comprehensive understanding of the objectives.
2. Furnish financial statements from the past several years for review.
3. Detail any limitations on purchasing or selling specific asset classes.
4. Share existing management arrangements to evaluate potential change costs.
5. Clarify if the trust deed mandates specific holdings, especially the Stellar Electronics Inc.
6. Indicate the total value of trust assets.
7. Outline the current mandates to managers and specifics of the present portfolio.
8. Explain the valuation approach for unlisted assets.
9. Present the current funding status of the trust.
10. Depict the funding pattern over the previous five years.
11. Identify additional revenue sources apart from investment returns, such as regular donor contributions, and assess their reliability and nature.
12. Provide a breakdown of expenditures, including the total cost per student and whether it covers textbooks and extracurricular activities.
13. State the current school fee structure.
14. Illustrate the historical and anticipated future school fee inflation.
15. Specify the number of students the trust is responsible for funding and whether this number

varies.

16. Disclose administrative expenses and other operational costs related to the trust.
17. Clarify the tax status of the fund.
18. Outline any applicable regulatory requirements.

[3]

**b) Choice of asset allocation:**

1. **Currency of Liabilities:** Understanding the currency of liabilities is paramount. Confirming whether all schools are located in India or internationally is essential. Investments should align with the currency of liabilities, even if exclusively INR-denominated, while global equity and bonds offer diversification advantages.
2. **Liability Term:** Although the duration of high school education spans around five years, the trust's perpetual existence allows for the allocation of assets towards higher risk options like equity, considering the enduring nature of the trust.
3. **Taxation Considerations:** The tax implications in India should guide the asset allocation strategy, factoring in income tax and capital gains tax differentials. This helps in crafting a tax-efficient portfolio.
4. **Income Requirements:** Given the annual commitment to cover school fees, a consistent income stream is vital. Projecting future cash flows helps determine the necessary income. Bonds could be a suitable choice to fulfill this income need.
5. **Liquidity Demands:** Apart from annual school fee disbursements, funds are required for administrative expenses. Beyond these obligations, liquidity requirements are modest, enabling the adoption of a long-term investment approach.
6. **Risk Tolerance:** Due to the crucial service provided, maintaining a low risk tolerance is imperative. Avoiding situations where fee payment obligations can't be met is critical. Achieving equilibrium between real assets for growth and stable assets for secure income is essential. The trust's risk tolerance is heavily influenced by its current funding position.

[3]

**c) Benchmark:**

1. The trust's assets should consistently exceed its liabilities to ensure financial stability and meet its obligations to financially disadvantaged high school students.
2. School and admin fees increase annually with inflation.
3. Bonds (45%): Generate income for yearly fee payments. Mix of government and higher-yield corporate bonds.
4. Inflation-linked bonds offer inflation-risk protection.
5. Equities (40%, including Stellar Electronics Inc): Preserve trust assets' purchasing power.
6. Global equities (10%): Despite INR liabilities, diversification and exposure to unique sectors.
7. Money market/cash (5%): Liquidity for administration expenses.
8. No allocation to global bonds due to low yields and unwarranted currency risk.
9. Local property could provide increasing annuity income, preferring listed property funds for liquidity and diversification.
10. In a less favorable funding scenario:
  - a. Increase allocation to less volatile, income-generating assets like government bonds.
  - b. Decrease equity allocation.

[6]

**d) Given all students attend school in India (with liabilities in INR):**

1. Understand the trusts objectives – achieving capital growth over the long term and sustaining educational support.
2. Trustees' risk tolerance to fluctuations in returns
3. Time horizon – long-term support for students could mean short-term volatility can be tolerated.
4. Assess the potential benefits of equities in achieving long-term capital growth and whether the trustees are comfortable with the associated risks.
5. Bonds provide income and capital preservation benefits. Evaluate their role in providing stability to the portfolio and generating cash flow to cover ongoing tuition expenses.
6. Analyze current market conditions, including interest rates and inflation expectations. Higher interest rates might make bonds more attractive for income, while lower rates might push investors toward equities for potential returns.
7. Consider the benefits of diversification across asset classes. A balanced allocation can help mitigate risks and reduce the impact of extreme market movements.
8. Assess the historical correlation between equities and bonds.
9. Regularly rebalancing the portfolio back to the target allocation. This ensures that risk levels and exposure to different asset classes remain aligned with the trust's goals.
10. Evaluate the yield of the bond component. If the yield is sufficient to cover tuition expenses and provide stability, it could influence the allocation.
11. Perform stress tests on the portfolio under different economic scenarios. This can help assess the portfolio's resilience and whether it can continue supporting the educational expenses even during adverse conditions.
12. Consider how long-term historical trends align with the trust's goals and whether they suggest any shifts in the allocation.

[5]

**ii) a)**

1. Stellar Electronics Inc.'s financial health is deteriorating, facing significant challenges.
2. High debt-to-equity ratio, increasing over time, possibly exceeding industry norms.
3. Potential distress borrowing for working capital or dividends.
4. Interest coverage crucial; ability to service interest payments.
5. Need insight into debt nature and access to additional funding.
6. Decreasing sales in real terms, indicating challenges.
7. Declining net profit margin, indicating reduced profitability.
8. Unsustainable trend of dividends surpassing earnings.

[3.5]

**b)**

1. Essential to review income statement, balance sheet, and cash flow statement.
2. Assess quality of earnings, focusing on cash flow sustainability.
3. Examine Return on Assets (ROA) and its trend to gauge capital efficiency.

4. Determine if profit margin is above or below industry average, and its causes like rising input costs or debt servicing.
5. Analyze future industry and business prospects, considering management, industry, and analyst viewpoints, as well as Stellar Electronics Inc.'s competitive position.
6. Evaluate management quality and experience in potential turnaround.
7. Ascertain if this marks the cycle's end or if the business is in a terminal decline.

[3.5]

iii)

1. Regular Financial Analysis:
  - Continue monitoring the financial condition of Stellar Electronics Inc. by analyzing key metrics such as sales, net profit margin, dividend payout ratio, and debt/equity ratio.
  - Establish thresholds for these financial indicators, triggering a reassessment or potential divestment if they deviate significantly from historical averages or industry benchmarks.
2. Assessment of Dividend Payout Ratio and Liquidity:
  - Given the increasing trend in the dividend payout ratio, assess the impact on the trust's liquidity and its ability to meet routine expenditures.
  - Develop contingency plans for potential liquidity challenges, considering alternative income sources or adjustments to expenditure planning.
3. Debt Management and Industry-Specific Risks:
  - Monitor the rising debt/equity ratio and evaluate the potential impact on Stellar Electronics Inc.'s financial stability.
  - Consider the broader industry-related challenges and assess how these may exacerbate risks to the trust. Develop strategies to navigate industry-specific risks, such as diversification into more stable sectors.
4. Scenario Analysis and Distressed Asset Management:
  - Conduct scenario analyses based on potential industry downturns or specific challenges faced by Stellar Electronics Inc.
  - Develop a comprehensive distressed asset management plan, outlining specific actions to mitigate the risk of a 15% asset loss on the trust's portfolio.
5. Due Diligence on Private Equity Proposal:
  - If the buyout-oriented Private Equity (PE) fund's proposal progresses, conduct thorough due diligence on the fund's reputation, track record, and the specifics of the proposed swap.
  - Assess how the trust's interests align with the goals of the PE fund and whether the swap represents a viable alternative to reduce exposure to Stellar Electronics Inc.
6. Exit Strategies and Legal Considerations:
  - Explore exit strategies such as mergers or management buyouts, considering the trust's position as a controlling stakeholder.
  - Potential limitations imposed by the unlisted nature of Stellar Electronics Inc., including illiquidity, potential high transaction costs, and capital gains tax liability.
  - Review the trust deed to understand any restrictions on share sales, possibly due to familial connections, and seek legal advice on potential avenues for compliance.

[6]

iv)

- Establish the legal structure (e.g., limited partnership) of the PEF, as this determines the rights, obligations, and tax treatment for involved parties.
- Understand the existing investor profile.

- Determine the remaining term of the PEF, indicating when the trust can anticipate capital returns.
- Ensure fund objectives align with the trust's ethos.
- Scrutinize the fund's operation, competitive advantages, and exploited market niche.
- Analyze current and projected portfolio composition, diversification by company and sector, and exit strategies.
- Assess the risks the PEF undertakes, failure percentages, likelihood of achieving hurdle rates, and anticipated returns.
- Evaluate income distribution from the portfolio; determine if the trust can manage substantial reductions in income from current Stellar Electronics Inc. levels.
- Ultimately, compare the PEF to shares in Stellar Electronics Inc., considering factors like risk, nature, cash flow, liquidity, and taxation.
- Examine management credentials, experience, and track record in deal securing and company management, possibly indicative of future success.
- Investigate the past performance of this fund and comparable funds managed by the same team.
- Review the fee structure encompassing basic fees, hurdle rates, and carried interest, ensuring their justification.
- Understand the PEF's size and the proportion it would hold in Stellar Electronics Inc.
- Inquire about deal terms:
  - For assessing the fairness of the swap ratio.
  - Independent/audited valuation of Stellar Electronics Inc.
  - Valuation basis for PEF's assets.
  - Deal structure (sale and purchase, potential cash payment, timing).
- PEF's interest in Stellar Electronics Inc., evaluating if it aligns with the trust's spirit.
- Consider whether it's an asset-stripping endeavor and its alignment with the trust's ethos.
- Ascertain the PEF's exit strategy for Stellar Electronics Inc.
- Determine the trust's potential participation in PEF's future drawdowns.

[10]

## v) a)

- Evidently active through substantial turnover and an atypical portfolio composition.
- Contrarian stance demonstrated by notable performance divergence from the benchmark across various timeframes.
- Contrarian position, with a notable lack of investment in the IT industry, a major segment of the Indian market index (Nifty).
- Deviates from benchmark significantly, yielding high tracking error.
- Adopts a value style, featuring low Price-to-Earnings (P/E) ratios relative to the market.
- Exhibits a non-trading approach, with an average holding period of around 4 years, deemed reasonable.

[5]

**b) Effective Communication of Investment Performance:** Given the diverse backgrounds and expertise levels of the trustees, clear and meaningful communication is crucial. Visual aids and reports can help convey information effectively:

- Executive Summary: Provide a concise overview of performance, highlighting key achievements and challenges.
- Performance Summary Report: Offer a comprehensive report that includes performance metrics,

risk indicators, and explanations of deviations from benchmarks.

- Graphical Representation: Use line charts to compare the trust's performance against benchmarks over time. Bar charts can illustrate asset allocation changes.
- Attribution Analysis: Break down the sources of performance by asset class or sector, showing which components contributed to or detracted from returns.
- Risk Assessment: Visualize risk measures like volatility and drawdowns to help trustees understand the portfolio's risk profile.
- Narrative Commentary: Include a narrative section that explains investment decisions, changes in allocation, and market dynamics affecting performance.
- Future Outlook: Discuss future strategies, potential adjustments, and how they relate to the trust's objectives.
- Peer Group Analysis: Provide a comparison of the trust's performance with a relevant peer group or similar funds. This can help trustees understand how the trust fares in comparison to others with similar objectives or strategies.
- Educational Workshops/Seminars: Conduct periodic educational sessions or seminars tailored to the trustees' level of financial expertise, fostering a deeper understanding among trustees.
- Sensitivity Analysis: Include a sensitivity analysis that demonstrates how changes in key variables (interest rates, inflation, etc.) may impact the trust's portfolio.
- Social Impact Infographic: Create an infographic that visually represents the positive social impact of the trust's investments. Use icons, graphics, and concise text to illustrate how the chosen investment strategy directly contributes to supporting financially disadvantaged high school students.

[5]

[50 Marks]

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