

INSTITUTE OF ACTUARIES OF INDIA

SA7-Investment and Finance

November 2025 Examination

Indicative Solution

Introduction

The indicative solution has been written by the Examiners with the aim of helping candidates. The solutions given are only indicative. It is realized that there could be other points as valid answers and examiner have given credit for any alternative approach or interpretation which they consider to be reasonable.

Solution 1:

a)

i) Key Behavioral Biases (3 marks):

1. **Loss Aversion:** The tendency for individuals to feel the pain of a loss more acutely than the pleasure of an equivalent gain. This can lead to holding on to losing investments for too long ("get-even-itis") and selling winners too early.
2. **Herding:** The tendency for individuals to follow the actions of a larger group, even if those actions are irrational. This can lead to momentum effects and the creation of asset price bubbles and subsequent crashes.
3. **Overconfidence/Confirmation Bias:** The tendency for investors to be overconfident in their own abilities and to seek out and overweight information that confirms their pre-existing beliefs, while ignoring contradictory evidence.

ii) Structuring an Investment Philosophy (5 marks):

- **Exploiting Biases (Alpha Generation):**

1. **Value Investing:** Create a systematic process to invest in assets that are statistically "cheap" (e.g., low P/E, low P/B ratios). This exploits the tendency of other investors to overreact to negative news and herd out of unpopular stocks, creating bargain opportunities.
2. **Contrarian Strategy:** Develop investment theses that are explicitly contrary to the current market consensus. This exploits the herding behavior of others. For example, investing in a sector after a major crash when sentiment is at its lowest.
3. **Long-Term Horizon:** An insurer's ability to hold assets for the long term is a structural advantage, allowing it to ride out irrational short-term market swings driven by the loss aversion of other, more short-term investors.

- **Protecting Against Biases (Governance):**

Formal Investment Process & Committee Structure: All major investment decisions must be made by a diverse committee, not an individual. A formal, data-driven process with pre-defined criteria forces a debate and challenges individual biases. A "devil's advocate" could be formally appointed for major decisions.

Systematic Rebalancing: Implement a strict policy of rebalancing the portfolio back to its Strategic Asset Allocation (SAA) targets. This forces the committee to systematically sell assets that have performed well (combating herd mentality) and buy assets that have underperformed (a disciplined contrarian action).

Pre-Mortem Analysis: Before making a significant investment, conduct a "pre-mortem" exercise where the team imagines the investment has failed spectacularly and works backward to identify all the potential reasons why. This helps to counter overconfidence and confirmation bias.

Clear Sell Discipline: Establish and write down the conditions under which an asset will be sold *before* it is purchased. This helps to combat loss aversion by making the sell decision a matter of process rather than emotion.

b) Justification Note for Unrated Bond Investment (10 marks)

Prudent Person Principle:

The Prudent Person Principle requires insurers to invest with the care, skill, and diligence that a responsible expert would exercise, always prioritizing policyholder interests.

Indian IRDAI (Investment Regulations) implicitly aligns with PPP via governance, board oversight & 'fit and proper' AMCs.

Many of the requirements embedded in the IRDAI investment framework reflect this principle: i.e., the insurer must invest prudently in the interest of policyholders, with appropriate risk-controls, diversification, governance and alignment with liability obligations.

To: The Insurance Regulatory and Development Authority of India (IRDAI)

From: Chief Investment Officer, [Insurer Name]

Subject: Proactive Justification for an Investment in Unrated Debt under the Prudent Person Principle

1. **Introduction:** This note provides the rationale for our proposed ₹200 Cr investment in a secured bond, in line with our fiduciary duty and the Prudent Person Principle as enshrined in the investment regulations.
2. **Enhanced Due Diligence Process:** Recognizing the unrated nature of the security, we have conducted an **in-house credit assessment equivalent to an institutional rating process**. This involved:
 - A full financial model projecting cash flows under base, optimistic, and stress scenarios.
 - On-site visits to the company's manufacturing facilities and interviews with key management.
 - A legal review of the bond's security structure and covenants by a top-tier law firm.
 - Third-party reports on the company's industry outlook and competitive positioning.

Our internal assessment concludes a credit profile equivalent to a 'AA-' (or any other as per student) rating, providing a significant risk-adjusted return.

3. **Robust Security and Covenants:** The investment is not based on an unsecured promise to pay. It is secured by a **first-ranking charge over specific, high-quality physical assets** whose liquidation value, even under stress, exceeds 1.5x the bond's principal amount. The bond indenture also includes strong covenants (e.g., restrictions on further debt, dividend payments, and a cash sweep mechanism) that provide significant downside protection.
4. **Strategic Rationale and Portfolio Fit:** This investment offers a substantial **illiquidity and complexity premium** of 400 bps, which is a prudent way to enhance returns for our policyholders. It represents a small, well-managed position within our diversified "Other Investments" bucket and does not concentrate our risk. The long-term nature of this investment is well-aligned with our long-duration liabilities.
5. **Valuation and Ongoing Monitoring:** We have established a clear valuation policy for this asset, using a discounted cash flow (DCF) model cross-referenced against observable credit spreads from comparable (though not identical) rated companies. The position will be subject to quarterly review by our Investment Committee, with monthly monitoring of the company's financial performance against covenants.

6. **Conclusion:** While the bond is unrated, our extensive due diligence and the robust security structure ensure this investment is prudent and in the best interest of our policyholders. We believe our process demonstrates the skill, care, and diligence required under the Prudent Person Principle, going beyond a simple reliance on external ratings.

[18 Marks]

Solution 2:

a) ALM Assessment and Hedging Strategy (10 marks)

1. Critical Assessment of ALM Position :

The insurer's current ALM position is high-risk and requires immediate corrective action.

- **Significant Duration Gap:** There is a large positive duration gap of **4 years** ($DL=12, DA=8$). This means the liabilities are far more sensitive to interest rate changes than the assets. In the context of an annuity block, the primary risk is **falling interest rates**. A fall in rates would cause the present value of liabilities to increase substantially more than the present value of assets, leading to a rapid and significant decrease in the insurer's economic surplus and solvency ratio.
- **Large Convexity Mismatch:** The convexity gap is also large and positive at **90** ($CL=180, CA=90$). Convexity measures the curvature of the asset/liability value response to interest rate changes. A lower asset convexity means that for large rate movements, the asset portfolio will underperform relative to the liability portfolio, *even if the durations were matched*. For a large rate drop, the liabilities will increase in value by more than predicted by duration, while the assets will increase by less, exacerbating the loss of surplus. The current position is not robust to large shocks or non-parallel shifts in the yield curve.

2. Proposed Hedging Strategy :

A two-step strategy using derivatives is required to address both duration and convexity.

- **Step 1: Close the Duration Gap using Interest Rate Swaps.**
 - **Instrument:** The insurer should enter into **receiver interest rate swaps** (receiving a fixed rate, paying a floating rate). A receiver swap has a positive duration, which will *increase* the overall asset duration to match the liability duration.
 - **Rationale:** Swaps are capital-efficient instruments for managing duration. They do not require a large upfront investment and can be customized to the exact needs of the insurer. This is more efficient than trying to buy very long-duration physical bonds, which may not be available in sufficient size or at a good price. The required notional would be calculated to add 4 years of duration to the asset portfolio.
- **Step 2: Close the Convexity Gap using Options.**
 - **Instrument:** The insurer should **buy long-dated options**, such as **receiver swaptions** (the right to enter a receiver swap) or call options on long-dated Government of India bonds.
 - **Rationale:** Swaps add duration but have very little convexity. After implementing the swap overlay, a significant convexity gap of approximately 90 would remain. Options are "long gamma" instruments, meaning their value has positive convexity. Buying options will add the necessary curvature to the asset value

profile. This makes the hedge effective for large interest rate movements, protecting the surplus in a way that a duration-only hedge cannot. The amount of options purchased would be calibrated to increase the asset convexity to at least 180.

3. Risks of the Proposed Strategy :

- **Counterparty Credit Risk:** The insurer is exposed to the risk that the swap/option counterparty could default on its obligations. This is managed by dealing only with highly-rated banks, using standardized ISDA agreements, and enforcing collateral posting requirements.
- **Basis Risk:** The hedging strategy assumes that the interest rates used to value the derivatives (e.g., the swap curve) move in perfect correlation with the discount rates used to value the liabilities (e.g., the G-Sec curve). If these curves diverge, the hedge will be imperfect, leading to residual risk.
- **Cost of Hedging (Premium Decay):** The options purchased to add convexity have a cost (the premium). This premium will decay over time (known as "theta decay"), creating a small but certain drag on portfolio performance. This is the price of securing protection against large adverse market movements.

b) Factor Investing (6 marks)

Explanation of Equity Factors :

- **Value:** The Value factor is the thesis that stocks which are "cheap" relative to their fundamental metrics (e.g., low price-to-earnings ratio, low price-to-book ratio) tend to outperform "expensive" or "growth" stocks over the long term. This is often attributed to investor overreaction to negative news, creating opportunities to buy good companies at a discount.
- **Quality:** The Quality factor is the thesis that companies with strong, stable, and sustainable business models—characterized by high profitability (e.g., high return on equity), low leverage, and stable earnings growth—tend to deliver superior risk-adjusted returns. These are resilient companies that can withstand economic downturns better than lower-quality peers.

Challenges for an Insurer in Implementation (4 marks):

1. **Cyclical and Deviation from Benchmark:** Factor returns are cyclical. A factor like 'Value' can underperform for many years (as it did for much of the 2010s). This can lead to a large tracking error relative to the market-cap weighted benchmark (e.g., the Nifty 50), which can be difficult to explain to the Board and may not align with liabilities that are more sensitive to broad market movements.
2. **Increased Complexity and Governance:** Implementing a multi-factor strategy requires sophisticated quantitative skills, data infrastructure, and robust governance to avoid "factor-timing" (which often fails) and to manage the interactions between different factors. It moves the insurer from a simple asset allocator to a more complex risk factor allocator.
3. **Potential for Higher Transaction Costs:** Factor strategies, especially one like Momentum, can have higher portfolio turnover than a passive index strategy. This leads to higher transaction costs which can erode the potential excess returns (the "factor premium").
4. **ALM Disconnect:** The drivers of factor returns are not necessarily linked to the drivers of an insurer's liabilities (which are primarily interest rates and inflation). A portfolio

optimized on equity factors might introduce new sources of risk to the balance sheet surplus if not carefully integrated within a holistic ALM framework. For example, a pro-cyclical factor like Momentum could perform poorly in a market crash, exactly when the insurer's balance sheet is already under stress.

[16 Marks]

Solution 3:

a) AI/ML in Investment Management (8 marks)

i) Applications of AI/ML (2 marks):

- **Alpha Generation:** Using **Natural Language Processing (NLP)** models to analyze vast amounts of unstructured text data in real-time. For example, an NLP model could scan thousands of news articles, broker reports, and social media posts to generate a "sentiment score" for a stock. A sudden negative shift in sentiment could act as an early-warning signal to sell, or a positive shift could be a buy signal, potentially generating alpha before the information is fully priced into the market.
- **Risk Management:** Developing a **dynamic credit risk model** using machine learning. Instead of relying on static credit ratings from agencies, an ML model can analyze dozens of real-time variables for a corporate borrower (e.g., daily stock price volatility, changes in management sentiment from earnings calls, supply chain disruption data) to produce a forward-looking "probability of default" score. This allows the insurer to identify deteriorating credits far earlier than the official rating agencies.

ii) Governance Framework for AI/ML Models (6 marks):

1. **Independent Model Validation:** Establish a dedicated, independent team of quants and data scientists (who are not part of the investment team) responsible for validating any new AI/ML model. They must rigorously test the model's logic, data integrity, performance, and robustness before it can be deployed.
2. **Clear Ownership and Accountability:** Each model must have a designated "Model Owner" who is responsible for its performance, documentation, and ongoing monitoring. This ensures clear accountability.
3. **Explainability and Interpretability Thresholds:** The "black box" problem must be addressed. For critical decisions, models must meet a minimum threshold of interpretability (e.g., using techniques like SHAP - SHapley Additive exPlanations). A purely black-box model should not be used for a decision like selling a major portfolio position.
4. **Data Governance:** A strict policy for the sourcing, cleaning, and usage of data for training models. This includes an ethical review to ensure that the data is not biased (e.g., gender or race bias) which could lead to skewed and unfair outcomes.
5. **Ongoing Performance Monitoring & "Circuit Breakers":** The model's live performance must be continuously tracked against its back-tested performance. If performance deviates beyond a pre-defined corridor, or if market conditions change drastically from the training environment, an automated "circuit breaker" should suspend the model's use pending a full review.

6. **Board and Senior Management Reporting:** The CRO must provide regular, clear reports to the Board and Investment Committee on the aggregate risk exposure from all AI/ML models, their performance, and any validation findings.

b) Catastrophe (CAT) Bonds

i) Structure of a CAT Bond (4 marks): A CAT bond is a form of insurance-linked security that transfers a specific, high-severity risk from an insurer to capital market investors.

1. **Creation:** The insurer (the "sponsor") creates a separate, ring-fenced company called a Special Purpose Vehicle (SPV).
2. **Issuance:** The SPV issues bonds to investors (e.g., hedge funds, pension funds).
3. **Collateral:** The cash raised from investors (the principal) is placed in a secure collateral account and invested in highly-rated, liquid securities like government T-bills.
4. **Premium/Coupon:** The insurer pays a regular premium to the SPV. This premium, plus the interest from the collateral, is passed on to the investors as a high coupon payment.
5. **Trigger Event:** If a pre-defined catastrophe event occurs (e.g., an earthquake of magnitude 7.5 or higher in Mumbai), a "trigger" is activated.
6. **Payout:** Upon a trigger, the principal in the collateral account is paid to the insurer to cover its claims. The investors lose their principal and receive no further coupons. If no event occurs by the bond's maturity, the principal is returned to the investors.

ii) Evaluation vs. Traditional Reinsurance (6 marks):

○ Advantages of CAT Bonds:

1. **Zero Counterparty Risk:** The bond is fully collateralized. The insurer's claim payment comes from the secure collateral account, not from the reinsurer's balance sheet. This eliminates the risk that a reinsurer could be unable or unwilling to pay after a major event.
2. **Access to Deeper Capital Pool:** It diversifies the insurer's source of risk capital away from the relatively small and concentrated global reinsurance market, giving it access to the vast global capital markets. This can lead to more stable pricing and capacity.
3. **Multi-Year Certainty:** CAT bonds are often issued for three to five years, providing protection at a locked-in price for a longer term than a typical one-year reinsurance treaty.

○ Disadvantages of CAT Bonds:

High Transaction Costs: The legal and structuring fees for setting up an SPV are very high, making CAT bonds uneconomical for small or medium-sized risks.

Basis Risk: This is a key disadvantage. The CAT bond's payout is based on its specific trigger (e.g., the physical parameters of the event). This trigger might not perfectly match the insurer's actual financial losses. The insurer could suffer huge losses but if the trigger isn't met, the bond doesn't pay out. This mismatch is called basis risk.

Lack of Flexibility: A reinsurance contract can often be tailored and renegotiated. A CAT bond is a standardized security; once issued, its terms cannot be easily changed.

Solution 4:**a) Immediate Crisis Management Actions (5 marks)**

1. **Convene the Crisis Management Team:** Immediately get the key decision-makers from Investments, Risk, Treasury, and ALM on a call to ensure a single source of truth, coordinated actions, and clear communication channels.
2. **Confirm the Real-Time Liquidity Position:** The top priority is survival. Get an instant report on all cash, collateral, and repo-able assets. We must ensure we can meet any margin calls on derivative positions and pay claims without being forced to sell illiquid assets into a falling market.
3. **Quantify the Solvency Impact:** Instruct the risk team to immediately re-run the solvency capital model with the new, stressed market parameters (equities down, bond yields up, INR depreciated). This provides an instant, quantified estimate of the damage to the solvency ratio, which is critical for reporting to the Board and regulator.
4. **Execute Pre-Approved Hedges:** If the firm has a pre-approved crisis hedging plan (e.g., for currency risk on unhedged foreign assets), execute it immediately to prevent further losses. The goal is to stabilize the portfolio, not to predict the next market move.
5. **Halt all Non-Essential Trading:** Issue a firm-wide directive to cease all non-essential, discretionary trading. The focus must shift from seeking returns to preserving capital and managing risk until the situation is clear.

b) Revised SAA for a Stagflationary Environment (7 marks)

The old SAA, based on a positive correlation between growth and inflation and a negative correlation between stocks and bonds, is broken. The new SAA must be built for resilience in a world of high inflation and low/negative growth.

- **1. Dramatically Increase Allocation to Real Assets (Target 25-30%):**
 - **Rationale:** The primary objective is to protect against inflation. Real assets have intrinsic value and cash flows that are often linked to inflation.
 - **Assets:**
 - **Infrastructure:** Focus on assets with inflation-linked revenue streams (e.g., toll roads, ports, data centres).
 - **Commercial Real Estate:** Prime properties with rental agreements that have inflation escalation clauses.
 - **Commodities:** A direct allocation to gold as a store of value and industrial commodities that benefit from supply constraints common in stagflation.
- **2. Restructure Fixed Income (Target 30-35%):**
 - **Rationale:** Nominal bonds are the worst-performing asset in stagflation. The portfolio must be de-risked from interest rate and inflation risk.
 - **Actions:**
 - **Sell Long-Duration Nominal Bonds:** Drastically reduce holdings of long-term government and corporate bonds.
 - **Buy Inflation-Indexed Bonds (IIBs):** This becomes the core of the "safe" asset portfolio, providing a direct hedge.

- **Increase Allocation to Private Credit:** Floating-rate private loans provide a yield pickup and are protected from rising base rates. Focus on senior secured loans to defensive sectors.
- **3. Overhaul the Equity Portfolio (Target 20-25%):**
 - **Rationale:** Broad equity market returns will be poor in a no-growth environment. The focus must shift from broad market exposure to specific, resilient characteristics.
 - **Actions:**
 - **Reduce Overall Beta:** Lower the total allocation to equities.
 - **Focus on Quality and Pricing Power:** Sell cyclical and "growth" stocks. Reallocate to companies with low debt, high margins, and the ability to pass on cost increases to customers (e.g., consumer staples, healthcare, dominant technology firms).
- **4. Enhance International Diversification (Target 15-20%):**
 - **Rationale:** The domestic economy is in trouble. Geographic diversification is critical.
 - **Actions:**
 - **Allocate to Regions with Better Fundamentals:** Invest in countries or regions that are commodity exporters or have stronger growth prospects.
 - **Maintain Strategic Currency Hedging:** While the initial INR depreciation was large, the environment will remain volatile. A policy of hedging a significant portion (e.g., 50-75%) of the foreign currency exposure is prudent to reduce volatility.

c) Second-Order Effects on the Balance Sheet (5 marks)

1. **Liability Under-Reserving (General Insurance):** Stagflation means high claims inflation on all lines of business (motor repairs, building materials, medical costs). The existing claims reserves, which were set using lower inflation assumptions, will prove to be deficient, requiring a significant top-up that will directly hit the P&L and reduce surplus.
2. **Dynamic Policyholder Behavior (Life Insurance):** In a severe economic downturn, policyholders will be under financial stress. This will lead to a spike in **lapses and surrenders**, especially for savings-oriented products. This can trigger a liquidity crisis if the insurer has to sell illiquid assets at a loss to meet these surrender requests.
3. **Credit Risk Deterioration:** The "low growth" aspect of stagflation means a recession. This will cause a wave of corporate credit rating downgrades and defaults. The value of the insurer's corporate bond portfolio will fall not just because of rising interest rates, but also due to widening credit spreads and actual defaults, leading to realized losses.
4. **Increased Capital Requirements:** Risk-Based Capital (RBC) models are pro-cyclical. The increased market volatility will increase the Market Risk charge. The rising defaults will increase the Credit Risk charge. This means the **Required Capital** of the insurer will increase at the exact moment its **Available Capital** (the value of its assets) is falling, creating a severe capital squeeze.
5. **Reinsurance Market Hardening:** A global stagflationary shock would cause large losses for the entire insurance industry. This will lead to a "hard" reinsurance market, where reinsurers drastically increase their prices and reduce the amount of coverage they are

willing to offer, making it more expensive and difficult for the insurer to hedge its underwriting risks.

[17 Marks]

Solution 5:

a) Board Investment Committee - Terms of Reference (4 marks)

The terms of reference for the merged "United Dynamic Assurance" Board Investment Committee (BIC) should be:

1. **Group-Level Governance:** To establish, review, and approve the group-wide Investment Policy Statement (IPS), which includes the overall investment philosophy, risk appetite, and risk tolerances under the new RBC framework.
2. **Strategic Asset Allocation (SAA) Oversight:** To review and approve the **separate and distinct SAAs** for the General Insurance (GI) and Life Insurance (Life) businesses. The BIC must ensure the GI SAA is focused on liquidity and capital preservation, while the Life SAA is optimized for long-term ALM and managing ULIP guarantees.
3. **Consolidated Risk Management:** To monitor and control investment risks on a **consolidated group basis**. This includes setting and monitoring group-level limits for credit concentration, exposure to illiquid assets, currency risk, and derivative counterparty risk, ensuring the group's total risk profile is consistent with the RBC framework.
4. **Capital Allocation & Efficiency:** To provide oversight on the allocation of the group's "risk budget" between the GI and Life investment portfolios, ensuring that investment strategies are capital-efficient under the RBC rules. This includes approving strategies designed to mitigate specific, high-charge risks (e.g., equity risk, concentration risk).
5. **Performance and ALM Review:** To review the performance of both investment portfolios against their specific liability-driven benchmarks. The BIC will assess not just the return generated but also the effectiveness of the ALM strategies in managing surplus volatility for both GI and Life segments.
6. **Oversight of Specialized Programs:** To provide specific approval and ongoing oversight for high-risk, complex strategies, such as the Dynamic Hedging Program for ULIP guarantees, ensuring the necessary expertise, systems, and risk controls are in place.

b) Dynamic Hedging Program - Risks and Management (6 marks)

- **Explanation of Delta and Gamma:**
 - **Delta:** This measures the sensitivity of the ULIP guarantee's value to a small change in the underlying Nifty index. A delta of -0.4 means that for a 100-point increase in the Nifty, the value of the insurer's liability (the guarantee) decreases by 40 points. The goal of delta hedging is to short Nifty futures with a notional value equal to the portfolio's delta to create an offsetting position.
 - **Gamma:** This measures how much the delta itself changes when the Nifty index moves. The insurer's guarantee liability is like a sold option, so it has **negative gamma**. This means that as the market falls, the delta becomes more negative, and as the market rises, the delta moves towards zero. This non-linearity is the core challenge of hedging.
- **Primary Risks and Management :**

1. **Financial Risk (Gamma Risk):** The key risk is a large, sharp market move. Because of negative gamma, if the market crashes, the liability's delta becomes much more negative, very quickly. The existing futures hedge becomes too small, leading to large, unhedged losses. This is managed by **buying options (e.g., Nifty put options)**. Purchased options have positive gamma, which neutralizes the negative gamma of the liability, making the portfolio's delta more stable and reducing the frantic need to rebalance in a volatile market.
2. **Operational Risk:** A dynamic hedging program requires thousands of calculations and potentially daily trades. The risk of a fat-finger error, a model bug, or a system failure is immense. A single missed trade could expose the company to billions in unhedged losses. This is managed by having **automated, robust trading systems with multiple pre-trade checks and controls**, system redundancy, and a dedicated, highly-skilled team to oversee the program.
3. **Transaction Cost Risk:** The constant buying and selling of futures to rebalance the delta incurs significant transaction costs (brokerage, taxes, bid-ask spreads). In a very volatile ("choppy") market, the program can "bleed to death" from these costs. This is managed by establishing a **rebalancing corridor**. The hedge is only adjusted when the portfolio's delta moves outside a pre-defined range (e.g., +/- 5% of the target), creating a trade-off between perfect hedging and cost efficiency.

c) Mitigating Credit Concentration Risk (6 marks)

Here are two capital-efficient strategies to mitigate the high concentration risk from the infrastructure bond portfolio without a fire sale:

1. Portfolio Credit Default Swap (CDS) Overlay:

- **Strategy:** The insurer can enter into a CDS contract where it pays a regular premium to a counterparty (a large bank). In return, the counterparty agrees to pay the insurer for any credit losses (defaults) that occur within that specific portfolio of infrastructure bonds.
- **Justification:** This strategy surgically transfers the credit risk of the portfolio to the CDS seller. Under the RBC framework, the high capital charge for the concentrated corporate credit risk is replaced by the much lower capital charge for counterparty risk against the (typically highly-rated) bank providing the CDS. The insurer keeps the bonds on its books, continues to earn the coupon income, but has effectively removed the default risk in a capital-efficient manner.

2. Credit-Linked Note (CLN) Issuance:

- **Strategy:** The insurer can work with an investment bank to issue a Credit-Linked Note. The cash flows of this note are linked to the credit performance of the infrastructure bond portfolio. The insurer effectively sells this note to outside investors. If a default occurs in the reference portfolio, the principal of the CLN is written down, and the investors bear the loss.
- **Justification:** This is another form of risk transfer. The insurer is synthetically "selling" the credit risk of its portfolio to investors. By transferring the first-loss or mezzanine risk to the CLN investors, the insurer significantly reduces its own exposure. This reduction in risk would be recognized by the RBC model, leading to a lower capital requirement, while allowing the insurer to keep the underlying assets.

[16 Marks]

Solution 6 :**a) Manager Selection for a First-Time VC Fund (8 marks)****Critique of Using Past Performance :**

Relying on past performance for selecting a first-time VC fund manager is highly problematic for several critical reasons:

1. **Lack of a Relevant Track Record:** By definition, a first-time fund has no prior fund-level track record to analyze. Any "past performance" would relate to the individual managers' deals at previous firms, which is not a true reflection of their ability to build a firm, create a cohesive strategy, and manage a portfolio independently.
2. **Attribution Fallacy:** Even if the managers have a great track record from their previous roles, it's difficult to attribute that success solely to them. They may have benefited from the brand, deal flow, and resources of their former, larger firm. There's no guarantee they can replicate that success on their own.
3. **Market Timing vs. Skill:** Past success might have been a result of being in the right sector at the right time (market timing or "beta") rather than genuine skill ("alpha") in picking and nurturing winning companies. The market conditions that drove past returns may not persist.
4. **"Adverse Selection" in Spin-Outs:** The best-performing partners at established firms are often well-compensated and have no reason to leave. A team spinning out to form a new fund might not always be the top-tier talent, creating a potential adverse selection problem for investors.

Alternative Qualitative Due Diligence Factors :

Given the lack of a track record, the focus must shift to a deep qualitative assessment. Four key factors to prioritize are:

1. **Team Cohesion and Pedigree:** Scrutinize the history of the founding partners. How long have they worked together? Do their skills complement each other (e.g., one is a great deal-sourcer, another is an operational expert)? A team with a long, successful history of collaboration is far less risky than a newly assembled group.
2. **Investment Strategy and Niche:** Assess the clarity and credibility of their investment thesis. Are they generalists or do they have a deep, defensible expertise in a specific niche (e.g., FinTech, HealthTech SaaS)? A well-defined strategy that leverages the team's unique experience is a strong positive signal.
3. **Proprietary Deal Flow and Network:** How will the new fund source its investment opportunities? We must see evidence of a deep and proprietary network within the Indian startup ecosystem that will give them access to the best deals, rather than just seeing the deals that are widely shopped around.
4. **Alignment of Interest and Fund Economics:** Examine the fund's structure. How much of their own personal capital are the managers investing in the fund (their "skin in the game")? A significant personal investment strongly aligns their interests with those of the limited partners (like our insurance company). The fee structure (management fee and carried interest) should also be reasonable and in line with the market for a first-time fund.

b) Performance Measurement in Private Equity (7 marks)**(i) Appropriate Performance Metrics :**

1. **Internal Rate of Return (IRR):** This is the primary metric. It's the discount rate that makes the net present value of all cash flows (capital calls from the insurer and distributions back to the insurer) equal to zero. It measures the time-weighted performance of the capital that has been invested.
2. **Multiples of Invested Capital (MOIC):** This is a simpler, non-time-weighted metric. It is calculated as the Total Value (realized distributions + the fair value of remaining unrealized investments) divided by the Total Capital Invested. A key metric is the **Distributed to Paid-In (DPI)** multiple, which shows how much cash has actually been returned to investors.

(ii) Challenges in Performance Measurement (4 marks):

1. **Subjectivity of Unrealized Valuations:** For most of the fund's life (the first 5-7 years), the majority of its reported value is based on the fund manager's own valuation of the private, unlisted portfolio companies. This is a subjective, "mark-to-model" exercise, not a "mark-to-market" one. There is a risk that these valuations are overly optimistic, leading to a misleadingly high IRR and MOIC until the assets are actually sold.
2. **The J-Curve Effect:** As explained previously, due to management fees being charged on committed capital and early-stage investments taking time to appreciate, the fund's reported IRR will be negative for the first several years. It is challenging to distinguish between a normal J-curve and genuine underperformance during this period.
3. **Lack of a Reliable Benchmark:** Benchmarking a VC fund is difficult. Public market equivalents (like comparing to the Nifty 50 + a premium) can be misleading because they don't account for the illiquidity and specific risk profile of venture capital. Finding a reliable peer group of other Indian VC funds from the same "vintage year" is often difficult due to a lack of public data. This makes it hard to judge if the manager is performing well on a relative basis.

[15 Marks]
