

**INSTITUTE OF ACTUARIES OF INDIA**  
**EXAMINATIONS**

**24<sup>th</sup> May 2024**

**Subject SA7 – Investment and Finance**

**Time allowed: 3 Hours 15 Minutes (14.45 - 18.00 Hours)**

**Total Marks: 100**

**Q. 1)** You are the Chief Investment Officer (CIO) of a medium-sized pension fund that has recently committed to fully integrating sustainable investment principles into its investment strategy while maintaining its obligations to its beneficiaries.

The board of trustees has tasked you with developing a strategic investment plan that aligns with the fund's sustainability goals, addresses the long-term liabilities, and navigates the current global economic uncertainties.

The first part of the plan is to develop Investment Policy Statement (IPS).

- i) Explain the key components of the IPS that incorporate sustainable investment principles and how they will guide the pension fund's investment decisions. (5)
- ii) Explain how the IPS addresses the fund's long-term liabilities, risk tolerance, and expected rate of return. (5)

The next stage involves formulating the Strategic Asset Allocation (SAA) to align with the IPS.

- iii) Discuss the three approaches of ESG investment decision making: integration, thematic, and screening. (5)
- iv) Considering the fund's commitment to sustainability, outline a strategic asset allocation strategy that balances traditional asset classes with green bonds, renewable energy investments, and other ESG-focused assets. (7)

After a lot of deliberation the board has approved the below SAA recommendation made by you:

	A	B	C	Total
Private Equity	0%	0%	10%	10%
Private Debt	0%	15%	0%	15%
Public Equity	2%	5%	10%	17%
Public Debt- Investment Grade	15%	20%	15%	50%
Public Debt- Sub investment Grade	3%	5%	0%	8%
	20%	45%	35%	

Where:

A	Normal Industries excluding Coal, tobacco, gambling and similar classes.
B	Transitional industries actively working to move away from environmentally harmful products
C	Industries actively contributing to sustainable goals

- v) Analyse the expected impact of the chosen SAA on the fund's long-term performance, risk profile, and ability to meet its liabilities. Provide a rationale for including each asset class. (9)

ESG ratings have been chosen as a method to strike a balance between ESG impact and investment returns. The IPS requires finding the right equilibrium between sustainability goals and investment returns.

- vi) Discuss how this balance can be achieved through the use of ESG ratings. (4)

- vii) Discuss potential issues related to using ESG ratings and governance for long-term performance monitoring. (5)

[40]

- Q. 2)** As a senior fund manager at a large traditional fund house, you have observed a decline in public trust due to increasing costs and reported cases of cybercrimes in the financial market. Recently, you attended the "FinTech and Blockchain Summit 2024" in New Delhi, where experts discussed the future of finance and investment.

One important topic at the summit was how new technologies could revolutionize the management of investment portfolios in India, leading to enhanced consumer confidence and reduced fund management costs.

Sessions such as "Tech-Driven Finance" and "Secure Investing with Blockchain" explored the potential changes these technologies could bring to portfolio management.

- i) Discuss specific technologies or platforms that could be integrated into the fund's operations to improve efficiency, transparency, and security. (7)

- ii) Considering the rapid growth of digital assets like cryptocurrency and NFTs (Non-Fungible Tokens), analyse the feasibility and implications of including these emerging asset classes in the pension fund's portfolio. Assess the associated risks, returns, and regulatory considerations. (6)

Recent analysis has revealed that the Price-to-Earnings (PE) ratios of Indian companies are significantly higher than their global counterparts, leading to differing opinions on the future return prospects of the Indian stock market. Interestingly, despite these high valuations, there has been a substantial influx of foreign capital into the market in the past six months.

- iii) Analyse the potential causes and highlight any imminent risks associated with investing in the Indian Equity Market. (7)

[20]

- Q. 3)** As the Chief Investment Officer (CIO) of a global life insurance company with major presence in developed country, your role involves overseeing the investment strategy for a range of insurance products, including with-profits, non-profit, and unit-linked policies. Each of these products comes with its own set of guarantees that are subject to market fluctuations. Your main responsibilities include ensuring that the duration of assets matches the liabilities, complying with capital requirements, and managing indexed liabilities with

appropriate assets. It is important to incorporate the use of derivatives for cash flow matching and to remain adaptable to regulatory changes.

**Note: the use of derivative should be considered from global perspective without any local regulatory constraints applicable in India.**

- i) Discuss the nature and type of liabilities (including Guarantees) and associated risk which Insurance company is exposed to for above lines of product. (8)

Currently, the calculation of regulatory capital for the insurance company is based on a factor-based approach. However, the regulator is interested in transitioning to a principle-based approach. In this new approach, one of the recommended methods for assessing the Asset Liability Management (ALM) risk and capital requirement is the utilization of stochastic modelling.

- ii) Explain how stochastic modelling can aid in understanding the impact of market conditions and the overall capital adequacy of the insurance firm under risk-based capital (e.g. Principle based reserving (PBR) or Solvency II(SII)) approach specifically discussing confidence level, correlation of risk and time horizon of the risk. (5)

Currently the company is projecting multiple scenarios of future Profit and loss account and Balance Sheet, where reserve for guarantees are estimated using closed form approximations.

- iii) Explain how stochastic modelling can be used to estimate the value guarantees. Discuss the consideration of using this approach compared with close form solution. (5)

- iv) Explain how P&L and Balance Sheet projections under various scenarios can be used to assess the resilience of a portfolio? (5)

Company has decided to use Liability Driven Investment (LDI) approach to reduce the market risk exposure.

- v) Without performing actual calculations, outline LDI strategies for each of below derivatives to manage market risk. (10)
- 1) Bonds + Swaps
  - 2) Swaptions
  - 3) Total return swap
- vi) Despite their benefits, LDI strategies introduce specific new risks. Detail these additional risks that emerge as a result of implementing LDI. (3)

The company has the following asset and liability exposure:

Asset	Exposure
Equities	1000
Properties & infra	600

Credit	200
Index linked bonds	1600
Cash	800
	4200

Liabilities	4000
Duration	25
Percent of liability which is inflation linked	70%
Average duration of index linked bond	17

Assume that assets than index linked bonds do not contribute to inflation and interest protection.

**vii)** Determine the current hedge ratio.

(4)  
**[40]**

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