INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

November 2025

SA7 - Investment and Finance

Time allowed: 3 Hours 15 Minutes

Total Marks: 100

Q. 1)

a) The Efficient Market Hypothesis (EMH) forms the bedrock of traditional finance. However, the field of Behavioral Finance offers a significant critique.

i) Describe three key biases from behavioral finance that challenge the assumptions of EMH. (3)

ii) Critically evaluate how a long-term institutional investor, such as a life insurer, should structure its investment philosophy and governance to exploit these biases for alpha generation while simultaneously protecting itself from their negative influence on decision-making. (5)

b) The Investment Committee of an Indian insurer is considering a ₹200 crore investment in a secured, unrated bond issued by a promising but new manufacturing company. The yield offered is 400 basis points above comparable rated bonds. This investment would fall within the insurer's overall internal limit for unrated debt and the "Other Investments" category specified by IRDAI. As the Chief Investment Officer (CIO), you are asked to prepare a note for the regulator (IRDAI) proactively justifying this investment under the "Prudent Person Principle". Explain Prudent Person Principle and draft the key arguments for this note, addressing potential regulatory concerns around credit quality, valuation, and due diligence. (10)

[18]

Q. 2)

a) An Indian life insurer manages a large, closed block of guaranteed annuity products. The liability portfolio has a Macaulay Duration of **12 years** and a Convexity of **180**. The current asset portfolio backing these liabilities has a Macaulay Duration of **8 years** and a Convexity of **90**. The company uses 10-year Government of India bonds (Duration 7, Convexity 60) and interest rate swaps to manage its ALM position.

Critically assess the insurer's current ALM position. Propose a comprehensive hedging strategy using a combination of physical bonds and derivatives to not only close the duration gap but also to manage the convexity mismatch. Explain the rationale for your choice of instruments and the risks associated with your proposed strategy. (10)

b) The concept of Factor Investing has gained prominence over traditional market-cap weighted indexing. Explain the investment thesis behind two of the following equity factors: Value, Momentum, and Quality. Discuss the primary challenges an insurer would face in implementing a multi-factor investing strategy for its equity portfolio, particularly in the context of ALM. (6)

[16]

Q. 3)

a) Artificial Intelligence (AI) and Machine Learning (ML) are increasingly being adopted in investment management.

i) Propose two distinct applications of AI/ML that could enhance an insurer's investment process – one for alpha generation and one for risk management. (2)

ii) Your Chief Risk Officer (CRO) is concerned about the "black box" nature of these models. Develop a governance framework for the approval, implementation, and ongoing monitoring of AI/ML models in the investment function. (6)

b) A large General Insurer with significant exposure to earthquake risk in India is exploring Catastrophe (CAT) Bonds as an alternative to traditional reinsurance.

i) Explain the structure of a CAT bond and the mechanism through which it transfers risk from the insurer to the capital markets. (4)

ii) Evaluate the key advantages and disadvantages of using CAT bonds compared to traditional reinsurance from the perspective of the insurer's overall balance sheet management (considering assets, liabilities, and capital). (6)

[18]

Q. 4) The global economy in late 2025 unexpectedly enters a severe **stagflationary** period (persistently high inflation combined with negative GDP growth). Simultaneously, a crisis of confidence leads to a sudden **15% depreciation of the Indian Rupee (INR)** against the US Dollar. Asset class correlations break down: equities fall, and bond yields rise sharply (prices fall) due to inflation fears, offering no diversification benefit.

a) As the CIO of a large insurer, your immediate priority is crisis management. Outline the first five actions you would take within the first 24 hours of this combined shock, explaining the rationale for each action. (5)

b) This new economic regime invalidates the long-term assumptions underpinning your current Strategic Asset Allocation (SAA). Develop a revised SAA framework designed to be resilient in this stagflationary environment. Justify your proposed changes, focusing on real assets, alternative credit, and international diversification. (7)

c) Discuss the critical second-order effects of this scenario on an insurer's balance sheet, beyond the direct impact on asset values. Consider the impact on both liabilities and the solvency capital required. (5)

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Q. 5) "United India General," a conservative General Insurer, has just merged with "Dynamic Life," a fast-growing life insurer specializing in Unit-Linked Insurance Plans (ULIPs) with complex guaranteed return features (e.g., guaranteed maturity benefits). The merged entity, "United Dynamic Assurance," must now operate under a new, risk-sensitive **Risk-Based Capital (RBC) regime**.

a) The merged entity has two vastly different legacy investment portfolios and cultures. Design the terms of reference for the new Board Investment Committee, outlining its primary responsibilities in overseeing the distinct investment strategies for the General and Life businesses while ensuring a consistent, group-level risk appetite under the new RBC framework. (4)

b) The RBC model reveals a punitive capital charge for the equity market risk associated with the ULIP guarantees. The Board has approved a Dynamic Hedging Program using Nifty index futures and options. Explain the concepts of Delta and Gamma risk in this context. What are the primary operational and financial risks of running such a program, and explain how should they be managed? (6)

c) The legacy United India General portfolio has a large, concentrated holding of corporate bonds from the Indian infrastructure sector. While these are currently performing well, the RBC model assigns a high capital charge for concentration risk. Propose and explain justification of two different capital-efficient strategies the firm could implement to mitigate this concentration risk without resorting to a fire sale of the underlying bonds. (6)

[16]

Q. 6) An Indian life insurer has received Board approval for its first-ever allocation to the **Private Equity** asset class, specifically targeting Indian venture capital (VC) and growth equity funds. The allocation is **₹750 crore** to be deployed over three years across 2-3 different fund managers. As the Head of Alternative Investments, you are responsible for designing the manager selection process and a framework for monitoring performance.

a) Traditional manager selection often relies on past performance. Critically evaluate why this approach is particularly problematic and insufficient when selecting a **first-time Venture Capital fund manager** in India. Propose **four key alternative qualitative factors** you would prioritize in your due diligence process. (8)

b) The performance of private equity funds cannot be measured using standard metrics like the Sharpe Ratio. (i) Identify and briefly explain **two appropriate performance metrics** for this private equity mandate. (ii) Describe **three significant challenges** the insurer will face in accurately measuring and interpreting the performance of these fund investments during their lifecycle. (7)

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