

INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

23rd November 2023

Subject SA7 – Investment and Finance

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

Total Marks: 100

INSTRUCTIONS TO THE CANDIDATES

1. *Please read the instructions inside the cover page of answer booklet and instructions to examinees sent along with hall ticket carefully and follow without exception.*
2. *The answers are expected to be India Specific application for the syllabus and corresponding core reading. However, substantially the core reading material is still taken from material supplied by Actuarial Education Company which is meant for UK Fellowship examination. The core reading also contains some material which is India Specific, mostly the IRDA regulation. In view of this, it should be noted that focal point of answers is expected to be India Specific application. However, if application specific to any other country is quoted in the answer the candidate should answer the question with reference to Indian environment.*
3. *Attempt all questions beginning your answer to each question on a separate sheet.*
4. *Mark allocations are shown in brackets.*
5. *Please check if you have received complete Question Paper and no page is missing. If so, kindly get new set of Question Paper from the Invigilator.*

AT THE END OF THE EXAMINATION

Please return your answer book and this question paper to the supervisor separately. You are not allowed to carry the question paper in any form with you.

- Q. 1)** You are an investment consultant having banks, mutual funds and hedge funds as clients. One of your bank client, XYZ Bank Ltd., seeks your help in introducing a new product; monthly RD (Recurring Deposits) to its customers. In Bank RD, normally the interest is calculated on a quarterly compounding basis where customer deposits a fixed amount every month and receives a lump sum amount on maturity. Generally, Banks quote RD rates as X% p.a. compounding quarterly.

From the RD, XYZ intends to provide bank finance to small/medium scale companies that are currently struggling to rely on borrowing from capital markets.

Banking Regulator uses varying interest rates as a tool to control inflation and economic growth that in return changes yields in bond markets.

For illustration purpose, assuming all deposits are done in time and all months have same duration, your team member has suggested a formula for maturity value of RD as:

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

Exact maturity value of RD paid to customer is calculated in RD administration system based on actual dates of deposits and actual number of days in any month/quarter/year.

One of your hedge fund client, DEF Hedge Fund, seeks your help in assessing a strategy using stock (equities) options trading in an order driven market structure. The options strategy is similar to the following example:

ABC Ltd. company has declared dividend of 20 per share; ex-dividend date is 30 days from today. ABC share is currently trading at 790.

Strategy

Short a European put at strike price 800 (option premium = 40).

Long a European put at strike price 725 (option premium = 20).

Short a European call at strike price 800 (option premium = 50).

Long a European call at strike price 850 (option premium = 30).

- Put option short position expiry is 15 days from today.
- Put option long & Call options long/short positions expiry is 45 days from today.
- Contract (Market lot) size is 1100 units.
- All ITM (In-The-Money) options are settled at expiry by physical delivery of shares.
- Investment horizon is 45 days and any positions held will be closed by 45 days from today.

- i)** Mention the advantages and disadvantages of bank finance compared to borrowing in the capital markets. (3)
- ii)** Discuss the impact of change in interest rates on Bank's profitability and risks. (5)
- iii)** Discuss the issues to be considered in product design and pricing / re-pricing of RD. (10)
- iv)** Explain the formula for maturity value of RD suggested by your team member. (3)

- v) Derive a formula for maturity value of RD. (4)
- vi) Explain whether the formula suggested by your team member or the formula derived by you will give higher maturity value for RD. (3)
- vii) Write a note on order driven market structure. Your answer should include types of orders and their validity. (7)
- viii) Prepare a report on the DEF's options strategy. Consider all possible future scenarios in the report and include statements / comments on the following. (10)
- The level (or range) of ABC share price where the strategy is profitable or loss making or breaks-even; consider all break-even points,
 - The strategy's maximum profit and maximum loss.
 - Initial capital / margin requirement.
 - Views, of a person implementing the strategy, on ABC share price movements in coming 45 days.
- ix) Plot a rough diagram for the options strategy that shows the total payoff at investment horizon (45 days from today) against the settlement price of ABC share (over a range 600 – 1000). The diagram should represent a future scenario where share price < 800 at end of 15 days. (5)

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- Q. 2)** As the recently appointed investment Actuary for a significant private trust that supports the educational expenses of financially disadvantaged high school students, you are tasked with evaluating the trust's existing investment approach and recommending potential enhancements. The trust presently sponsors the tuition fees of 2,500 students and aims to sustain this assistance indefinitely.

Your directive from the trustees is to assess the current investment strategy of the trust and propose viable avenues for improvement.

- i)
- a) State the information you would need for your analysis. (3)
- b) Discuss the considerations that would influence your choice of strategic asset allocation benchmark. (3)
- c) Propose a benchmark stating any assumptions you make. (6)
- d) What factors would you consider while determining the appropriate weight between equities and bonds in a benchmark for a long-term investment strategy that aims to support educational expenses for financially disadvantaged high school students? (5)

Thorough your analysis, it has come to light that a notable portion of the trust's assets, specifically 15%, is allocated to the unlisted shares of Stellar Electronics Inc., a regional technology firm previously owned by a former trustee. Comprehensive financial information for Stellar Electronics Inc. is at your disposal, as demonstrated as follows.

	2019	2020	2021	2022
Sales (INR lakhs)	498	503	511	520
Net profit margin	2.4%	2.1%	1.9%	1.7%
Dividend payout ratio	85%	105%	115%	120%
Debt/equity ratio	42%	48%	52%	57%

ii)

a) Discuss the financial condition of Stellar Electronics Inc. (3.5)

b) State what further information you would require to make a more complete analysis of the investment in Stellar Electronics Inc. (3.5)

iii) Describe how the potential risks to the trust posed by the Stellar Electronics Inc. holding might be managed? (6)

The managers of a buyout-oriented Private Equity (PE) fund have approached the shareholders of Stellar Electronics Inc. with a view to purchasing the company. They are proposing a swap of shares for an interest in the private equity fund for a 10% equity stake in the PE fund.

iv) Discuss the key information that you require in order to assess the merits of this proposal from the perspective of the trust. (10)

The listed equity portion of the trust's assets are managed to a Nifty50 Index benchmark by Actuarial Asset Management (AAM). During your investigation, you have received from the trustees the following statistics relating to the equity portfolio which AAM manages for the trust.

5-year performance: 18% annually (benchmark return: 12% annually).

1-year performance: -3% (benchmark return: +2%).

IT sector exposure: 3% of listed equity portfolio.

Historic annualized tracking error: 8%

Average stock P/E ratio: 12

Portfolio turnover: 25% annually.

v)

a) Describe the management style of AAM and the other characteristics that you would expect to observe in the portfolio of a manager such as AAM. (5)

b) Explain how you would communicate the investment performance to the trustees in a clear and meaningful manner, considering their diverse backgrounds and expertise levels. Provide examples of visual aids or reports you might use. (5)

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