EXAMINATION

3 June 2022 (am)

Subject F105 — Finance and Investment Fellowship Principles

Time allowed: *Three hours and fifteen minutes, plus an additional five minutes to allow for scrolling in the ASSA Exam Platform*

Total marks: *100*

INSTRUCTIONS TO THE CANDIDATE

1. *Ensure that you are logged in and authenticated through Examity before you attempt the examination.*
2. *The question paper is only available in the ASSA Exam Platform as a PDF download and may not be printed. Copy/paste of questions or parts thereof is allowed from the question paper to your Word answer document only.*
3. *You are required to submit your answers in Word format ONLY using the answer template provided. No answers in any other format (e.g. handwritten) will be accepted.*
4. *Ensure that your Candidate Number appears in the "header" of your Word answer document. [Double-click on the header at the top of the Word document, input your candidate number only in the header, then press "Esc" to close the header.]* ***Do not use your name or member number anywhere in your Word answer document.***
5. *You may not access any file from your computer, use any other computer program (e.g. Email or Excel), or open any other browser during the examination.*
6. *You may not use any other material (e.g. a Formulae and Tables book) during the examination. Any such information that may be required will be provided to you within the examination.*
7. *You are strongly encouraged to use the first 15 minutes as reading time only, however, you may start answering the paper whenever you are ready.*
8. *Mark allocations are shown in brackets.*
9. *Attempt all ten (10) questions.*
10. *Show calculations where appropriate. You may use blank paper to carry out rough work calculations. You may use a calculator from the approved list only.*
11. *Upload your Word answer document only into the ASSA Exam Platform. Once you have uploaded your document, you must click on* ***Finish Attempt*** *to save your document. You will still be allowed to go back and make changes (****Review Attempt****) if you have time.*
12. *Once you are satisfied with your uploaded document, click* ***Finish attempt*** *and* ***Finish all and Submit****. Once you have submitted you will not be able to make any changes.*
13. ***You must submit your Word answer document BEFORE the end of the allotted examination time.*** *Take this into account when planning your review and submission. There will be no time announcements.*

Note: The Actuarial Society of South Africa will not be held responsible for loss of data where candidates have not followed instructions as set out above.

END OF INSTRUCTIONS

QUESTION 1

i.

a. Describe, using the principles of behavioural finance, four types of biases that can affect an investor's view of the probability of a market crash.

[4]

b. Describe how an investor can, through puts and calls on an index, protect an equity fund from a market crash, with zero upfront cost.

[2]

ii.

a. Describe three biases, other than those stated in part (i)(a), that can be present when an active investor makes tactical decisions.

[3]

b. Describe how an active investor can, through puts and calls, attempt to profit if she thinks the price of a share will fluctuate around its current level for the foreseeable future.

[2]

[Total 11]

QUESTION 2

A South African investor is saving for a holiday in the USA in three years' time, and has ringfenced funds for this purpose. 30% of his ringfenced funds are invested in US stocks, and 70% are invested in SA stocks.

i. Briefly explain how forward derivative contracts can be used to manage the investor's currency risk.

[1]

ii. Discuss the merits and demerits of the strategy set out in (i).

[6]

The investor attempts to match his likely holiday expenses by investing in the shares of travel companies and hotels.

iii. Discuss the merits and demerits of this strategy.

[3]

[Total 10]

PLEASE TURN OVER

QUESTION 3

A developing country is experiencing an increase in private sector participation in infrastructure provision.

i. Explain the merits of private company involvement in the construction and operation of infrastructure assets.

[3]

ii. Outline how government policy could encourage the participation of private companies in infrastructure.

[2]

An actively managed fund investing in listed equity is for the first time researching companies that operate economic infrastructure assets.

iii. List 4 assets that are regarded as economic infrastructure assets.

[2]

iv. Describe the economic and other influences on the level of profits generated by an operational economic infrastructure asset.

[5]

Companies that operate economic infrastructure assets are often described as ‘defensive’.

v. Explain what is meant by the term ‘defensive’ and list two other defensive types of companies.

[2]

The manager of the fund points out that operational economic infrastructure companies form 3% of the fund’s benchmark index and that the fund should therefore invest the same proportion of funds in these companies.

vi. Evaluate the manager’s proposal.

[3]
[Total 17]

QUESTION 4

The trustees of a defined contribution (DC) pension fund are contemplating committing to adopt the Principles for Responsible Investment (PRI) as backed by the United Nations.

i. Explain briefly what the fund will be committing to by adopting the PRI.

[2]

Some of the trustees have raised the concern that investment performance might be negatively affected if they adopt the PRI and that fund members may hold them liable for such poor investment performance.

ii. Comment on the trustees’ concern.

[5]
[Total 7]

PLEASE TURN OVER

QUESTION 5

i. Outline why fixed income derivatives are more difficult to value than equity derivatives.

[2]

A one-year European put option with a strike price of R78 (per R100 nominal) is available on a zero-coupon bond with a current term of 5 years. The forward bond price volatility is 5%, and the 1-year and 5-year annual effective spot rates are 4% and 5% p.a. respectively.

You may use the approximation $\Phi(\mathrm{z}) \approx {}^{1}/_{(1+e^{(-1.7\times z)})}$.

ii. Calculate the price of the put option.

[6]
[Total 8]

QUESTION 6

Mercury is a leading provider of property indices.

i. Explain the difference between portfolio-based indices and barometer indices for property investments, and comment on the suitability of each of these types of indices for assessing the performance of a direct commercial property portfolio.

[3]

ii. Outline the difficulties that Mercury might face in constructing an index to be used as a benchmark for direct commercial property in a particular geographical area.

[3]

A large national retail bank approaches Mercury to help them construct a house-price barometer index using the bank's database of residential property sales. The database contains various data points for each sale, including price, date of sale and size of house.

iii. Suggest briefly how Mercury might use the database to construct the required barometer index.

[2]
[Total 8]

QUESTION 7

A member of a defined contribution (DC) pension fund has approached you, as trustee, complaining about the returns he earned on his savings in the fund. His fund credit has grown by 6% over the last year, while he has noticed that a popular "High Growth" offshore unit trust has advertised a return of 12% over the same period. He asks how his retirement fund could have underperformed by such a large extent.
The member joined the fund a year ago, and the fund offers members a choice of investment portfolios.

Outline the points you would make in your response.

[Total 7]

PLEASE TURN OVER

QUESTION 8

i. Define the following portfolio management risks:

   a. Strategic risk
   b. Active risk
   c. Structural risk

[3]

An insurance company sells inflation-linked annuities and its in-house asset manager manages the associated investment portfolio. The asset manager has no insights about the liabilities and in the absence of a formal investment mandate was informed that the strategic asset allocation is 80% inflation linked-bonds and 20% local listed equity, allowing for an active money position of up to 10% per asset class.

ii. Suggest a portfolio that the insurance company could have constructed if they had a very low risk tolerance.

[1]

A recent valuation indicated that the investment portfolio, which was fully funded a year ago, is now underfunded by 10%.

iii. Identify reasons related to the investment strategy that could have contributed to the shortfall and for each reason discuss what action can be taken to prevent a recurrence.

[6]

As a first step before implementing any other changes, it is agreed that a formal investment mandate must be signed with the asset manager.

iv. List restrictions to be included in the investment mandate.

[3]
[Total 13]

QUESTION 9

The trustees of a South African defined benefits (DB) pension fund have just received their triennial valuation report. The report shows that the value of the scheme's assets has deteriorated from 120% to 95% of the liabilities over the three-year period. The trustees note from the report that factors contributing to this deterioration include:

- A fall in interest rates;
- Inflation was higher than expected; and
- Pensioners experienced lighter than expected mortality.

The trustees are concerned about a further deterioration in solvency.

i. Describe the main principles of a Liability Driven Investments (LDI) approach to setting an investment strategy for the fund, and discuss possible LDI strategies for managing each of the factors highlighted in the valuation report.

[5]

PLEASE TURN OVER

The trustees have requested that a stochastic asset-liability modelling (ALM) exercise be carried out to investigate a suitable strategic benchmark. The trustees indicate that their objective is that in ten years' time the solvency level should reach 100% without increases to contributions, with a confidence level of 90%.

ii. Outline the steps that you would follow, and information needed, to carry out the requested ALM exercise.

[4]

iii. Outline the information from your investigation that you will likely include in your report to the trustees to help them decide on a suitable strategic benchmark.

[3]

[Total 12]

QUESTION 10

The tax authority in a country that has not, to date, applied capital gains tax (CGT) on share sales is now considering introducing such a tax. Two different approaches are being considered:

A: apply a tax rate on the difference between the sale price and an adjusted purchase price, where the adjusted purchase price is the original purchase price increased in line with an inflation index to the date of sale.

B: apply the same tax rate on 60% of the difference between the sale price and original purchase price.

For both A and B there will be an annual CGT allowance, so that if the amount calculated above (aggregated for all sales by an investor) is below the allowance, then no CGT is payable, and if the amount is higher, the tax payable will be the difference between the calculated amount and the allowance.

i. Discuss the relative merits of each approach from the perspective of the tax authority.

[5]

ii. Describe how differences in the taxation of income versus capital gains can influence investor behaviour.

[2]

[Total 7]

END OF PAPER

