# INSTITUTE AND FACULTY OF ACTUARIES

# EXAMINATION

20 September 2022 (am)

## Subject SA7 – Investment and Finance
## Specialist Advanced

Time allowed: Three hours and twenty minutes

In addition to this paper you should have available the 2002 edition of the Formulae and Tables and your own electronic calculator.

If you encounter any issues during the examination please contact the Assessment Team on T. 0044 (0) 1865 268 873.


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**1** The pensions regulator in a developed country is launching a new compulsory defined contribution pension scheme for working age citizens who are not already members of an existing pension scheme. Members will contribute a minimum proportion of their earnings to the scheme each year, which is invested until retirement.

The regulator is offering a range of investment strategies to those joining the new scheme and will provide scheme members with investment projections before they join.

Recent research in the country has shown that forestry investment has produced higher historical returns than passive equity returns over most historical periods. It showed historical equity returns to be 8.95% p.a. and that forestry returns were 10.25% p.a. over the last 150 years.

On the basis of the research, and because of concerns about climate change, the regulator has chosen to include a forestry investment option for members of the scheme.

The regulator wishes to produce projections for the following sample members:

| *Member* | *A* | *B* |
|---|---|---|
| Age of joining the scheme | 30 | 30 |
| Retirement age | 70 | 70 |
| Annual contribution | \$3,000 | \$2,000 |
| Increases to annual contribution | None | 3% p.a. compound |

(i) Estimate the accumulated fund at age 70 for Member A, assuming the funds are invested as follows:

(a) In the forestry investment option

(b) In the passive equity fund.

You should state any assumptions you make. [7]

(ii) Repeat the calculation in part (i) for Member B, stating any assumptions made. [5]

(iii) Comment briefly on the results in parts (i) and (ii). [3]

The regulator's chief actuary is concerned about the proposal to offer the forestry investment option. The chief actuary has asked an investment actuary to prepare a report on the risks associated with this type of investment, and how these risks may be mitigated.

(iv) Set out the points to be included in the investment actuary's report.

[**Hint:** Consider market risks (e.g. timber prices), hazard risks for the trees, along with other forestry management risks, broader economic and regulatory risks and broader actuarial investment risks.] [16]

The chief actuary is also concerned about rising inflation.

(v) Discuss the likely impact that high inflation would have on equity and forestry investments. [5]

(vi) Comment on the suitability of forestry in a pension investment strategy. [4]

[Total 40]

**2** (i) List three commonly used methods for assessing portfolio performance, comparing their relative merits. [6]

The investment manager of Fund A is responsible for setting the fund's asset allocation. You have been provided with the following information on allocation and returns on Fund A over a 2-year period.

| | *Year 1 (%)* | *Year 2 (%)* |
|---|---|---|
| Benchmark asset allocation for Fund A: | | |
| Equities | 60 | 40 |
| Bonds | 40 | 60 |
| | | |
| Actual asset allocation of Fund A: | | |
| Equities | 50 | 50 |
| Bonds | 50 | 50 |
| | | |
| Investment returns: | | |
| Average return for similar funds | 6.0 | 5.5 |
| Equity index return | 10.0 | 8.0 |
| Bond index return | 3.0 | 4.0 |
| Equity return in Fund A | 9.5 | 9.0 |
| Bond return in Fund A | 3.5 | 3.5 |

(ii) Analyse the past performance for Fund A over the 2-year period, using each of the three methods in part (i). [5]

(iii) (a) Explain which of the three methods in part (i) is most appropriate for assessing the skill of the investment manager.

(b) Outline how your answer to part (iii)(a) would change if the asset allocation was set by another entity.

[2]

The investment manager of Fund A has noted the performance analysis and responded with the following comment.

'The analysis is overly simplistic and does not take account of the fact that environmental, social and governance principles are integrated into the active management process, leading to some stocks or bonds being excluded and others being represented at higher weights. Additionally, the fund needs to maintain cash for liquidity purposes, and performance should be measured on a net of fees basis throughout'.

(iv) Suggest how performance measurement calculations could be amended to take account of the manager's comments. [7]

[Total 20]

**3** Unique Alpha (UA) is a finance company that was set up to provide funding to UK community organisations that manage social projects, where organisations are eligible for government grants in the future. UA will provide project finance, to be drawn when funds are required and to be repaid when the grants are received.

UA generates returns by lending an amount that is smaller than pledged grants for projects. The difference between the amount lent and the grant funding – which will be used to pay back UA – will be the return on the amount lent.

(i) Explain why organisations managing social projects may seek finance from UA. [3]

The directors of UA are considering the merits of the following options with respect to generating returns:

- Option 1 – Using its own equity capital to lend to the organisations
- Option 2 – Using funds borrowed from other financiers to lend to the organisations
- Option 3 – Acting as an intermediary, by matching lenders with the organisations, in return for a commission.

(ii) Discuss the advantages and disadvantages of each of the different options being considered by UA to generate returns. [11]

UA's directors have decided on Option 2 and are proposing to borrow from global firms in order to reduce the cost of capital, and to provide finance in respect of UK projects only.

(iii) Discuss the potential issues and risks UA will need to consider before deciding the level of return required for these loans.

[**Hint:** Consider the following: source of funding; loan structure and payment timing.] [13]

UA have been operating successfully for 3 years and are now looking to expand this business model to provide finance for global projects, in addition to those based in the UK. UA's Chief Risk Officer (CRO) has indicated that in order to justify this expansion, it would be better to re-structure the loans issued to the projects, in order to achieve returns that are more stable and predictable, and with lower credit risk. The CRO has suggested the following structures:

- Structuring the loans as a portfolio of repos (where UA generate their return by entering into repo agreements with the government agencies who are providing grant funding instead of awaiting repayment from community organisations)
- Bundling a number of homogenous loans and entering into a total return swap agreement (the returns on the loans are paid out to a third party via a total return swap, in return for a fixed/floating rate).

(iv) In your own words, describe a repo and a total return swap. [2]

(v) For each of the structures described above:

(a) explain how the structure would achieve the CRO's objective.

(b) outline the challenges UA may face in implementing the structure.

[11]

[Total 40]

**END OF PAPER**