INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

20 April 2021 (am)

Subject SA7 – Investment and Finance Specialist Advanced

Time allowed: Three hours and fifteen 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.

1 The in-house Portfolio Manager of an insurer looks after its annuity fund. The target return of the fund has been increased and the Portfolio Manager has been asked for their views on how the investment strategy should be changed to meet the new target.

The Portfolio Manager has recommended increasing the fund's allocations to the following asset classes:

- ground rents
- supranational debt
- corporate loans.

[**Hint:** Ground rents are rent paid under the terms of a lease by the owner of a building to the owner of the land on which it is built. Supranational bonds are bonds issued by international organisations such as the World Bank or International Monetary Fund.]

The Portfolio Manager has asserted that these asset classes are attractive for annuity funds to hold, because Solvency II permits a large proportion of the expected return on these assets to be used for regulatory capital calculation purposes.

The Chief Actuary has responded to the Portfolio Manager as follows:

'I understand that capital requirements are calculated differently for annuity funds. However, the regulatory environment is such that the expected excess return above the risk-free rate for these assets can only be used to discount liability cashflows where the nature and size of asset cashflows closely resembles that of the liabilities with a high degree of confidence'.

(i) Comment on the Portfolio Manager's statement. [6]

(ii) Comment on the Chief Actuary's response. [5]

The Portfolio Manager is considering setting up a ring-fenced portfolio containing assets that provide income to the annuity fund. This portfolio's objective would be to match key asset and liability characteristics over time, which would enable a beneficial regulatory capital calculation.

(iii) Explain the key steps to be undertaken to set up this portfolio under the Portfolio Manager's recommended investment strategy. [9]

The Chief Risk Officer (CRO) of the insurer has stated that it would be difficult to construct an appropriate portfolio if the allocations to the three asset classes are increased.

(iv) Comment on the CRO's statement. [3]
[Total 23]

2 Windhurst Associates Ltd. (WAL) is a small family-run asset manager based in a country with a mature economy and investment market. WAL is considering creating an open-ended fund with the following key features:

- The fund will invest in a mix of residential properties that include houses, individual apartments and apartment blocks.
- Investors are guaranteed to receive a minimum fixed coupon amount that commences after 2 years.
- Coupons are paid indefinitely after the initial period.
- A minimum of 90% of the income net of costs is distributed to investors each year.
- Coupons can be increased – but not decreased – at the discretion of the asset manager.

(i) Give, with a reason for each, two examples of investors for whom this fund may be suitable. [2]

(ii) (a) Describe the main risks that WAL faces as a result of the features listed above.

(b) Explain how each risk identified in part (ii)(a) could be mitigated. [10]

A Senior Portfolio Manager's colleague has indicated that the rental yield on typical rental properties is higher than the return offered by the fund. They have also stated that they believe that, for individuals, investing directly into rental properties would be more beneficial than investing in WAL's property fund.

(iii) Set out the points the Senior Portfolio Manager should make in response. [5]

A low interest rate environment and a depressed economic outlook have meant that market returns have been low on most asset classes. WAL is considering launching a fund that invests in lifetime mortgages, due to their attractive return profile. A lifetime mortgage is a loan provided to a homeowner for their lifetime with their property used as collateral. The capital value of the loan increases at a rate specified in the mortgage contract. The borrower can repay the loan at any time during their lifetime. On the death of the homeowner, the loan falls due. In this case, the repayment due will be the lower of the capital value of the loan and the value of the property.

(iv) Describe the investment risks associated with this product. [10]
[Total 27]

3 An Investment Manager is considering introducing algorithmic trading – automated computerised electronic trading based on quantitative rules.

(i) Discuss, in your own words, the potential benefits to the manager. [7]

(ii) Explain the problems that algorithmic trading by **other market participants** may cause for the manager. [5]

(iii) Explain a method of measuring the efficiency of an algorithmic trading methodology for dealing and execution. [5]

The Investment Manager is drawing up a plan to introduce an algorithmic trading function into its investment process.

(iv) Discuss the key factors that would need to be considered in the design and implementation of a new algorithmic trading system by the manager. In your answer, you should consider all relevant factors including technical and psychological factors. [14]
[Total 31]

4 (i) Describe how a breakeven inflation curve can be constructed from the yields on government inflation-linked and fixed interest bonds. [5]

The government of a country with a large economy is in the process of transitioning from one inflation measure (OldCPI) to another measure (NewCPI). There will be a period of 'dual running' of the two measures side by side. The government is keen to issue bonds linked to the new measure.

An insurance company has liabilities linked to both OldCPI and NewCPI. To date, it has marked OldCPI liabilities to market valuations and NewCPI liabilities to model-based valuations.

(ii) Set out the issues the insurance company will need to consider as a result of the government issuing NewCPI-linked bonds, from both a hedging and a liability valuation perspective. [10]

The government has recently issued its first NewCPI-linked bond, a 5-year zero coupon bond with a 3-month inflation lag. The bond is currently trading with a real yield of −0.5% p.a. The comparable 5-year zero coupon fixed interest bond is trading with a yield of 1.5% p.a.

(iii) Estimate the 5-year breakeven rate for NewCPI, assuming bond yields are quoted with semi-annual coupons. [4]
[Total 19]

END OF PAPER