INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

29 September 2017 (am)

Subject SA5 – Finance
Specialist Applications

Time allowed: Three hours

INSTRUCTIONS TO THE CANDIDATE

1. *Enter all the candidate and examination details as requested on the front of your answer booklet.*

2. *You must not start writing your answers in the booklet until instructed to do so by the supervisor.*

3. *You have 15 minutes of planning and reading time before the start of this examination. You may make separate notes or write on the exam paper but not in your answer booklet. Calculators are not to be used during the reading time. You will then have three hours to complete the paper.*

4. *Mark allocations are shown in brackets.*

5. *Attempt all four questions, beginning your answer to each question on a new page.*

6. *Candidates should show calculations where this is appropriate.*

AT THE END OF THE EXAMINATION

Hand in BOTH your answer booklet, with any additional sheets firmly attached, and this question paper.

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

1 An institutional investor is considering an investment in a global macro hedge fund. The hedge fund aims to generate returns from active trading in global interest rate, currency, commodity and equity markets primarily using futures and currency forward contracts.

The hedge fund manager claims that his trading around UK interest rates and currency moves is based on his interpretation of the "forward guidance" provided by the Bank of England.

(i) Describe the policy of "forward guidance" launched in August 2013 by the Bank of England, including the further guidance issued in February 2014 on the setting of monetary policy. [4]

(ii) Assess the potential implications for the UK economy of the Bank of England raising interest rates quickly from current low levels. [8]

(iii) Suggest, with reasons, three examples of difficult market environments for this hedge fund manager to generate returns. [3]

The hedge fund manager is considering introducing the use of options to implement trades and manage the portfolio.

(iv) Describe the potential benefits that could arise from the use of options in the fund, relative to the current approach of trading futures and forwards. [5]

An emerging market country's economy has grown quickly, overseen by a stable but controlling government. The country has a large manufacturing industry. The country's government restricts foreign ownership of assets and investment into local financial markets.

Recently, the rate of economic growth in the country has slowed. The hedge fund manager believes that the extent of the slowdown will be *more* severe than what has been priced by the markets.

(v) Propose five distinct portfolio investments the hedge fund manager could make to reflect this view, that do NOT involve direct ownership of the country's assets or securities. [5]

The hedge fund manager currently has a positive view on the UK economy and has taken long positions in UK equities, the British pound and long-dated UK Government bonds as a result.

(vi) Describe how the actions of the UK Government, in each of the main areas of its economic policy, could represent a risk for the hedge fund manager's current portfolio. [5]

[Total 30]

2 A company that delivers baggage handling services for the airline industry across Europe undertook some financial planning before the UK voted on whether to stay within the European Union (EU).

(i) (a) Explain why the company was likely to have wanted to hedge its exposure to a vote to exit the EU.

(b) Suggest hedging approaches that it could have taken. [2]

(ii) List the information the company would need to provide to a broker in order to purchase an options contract. [3]

The UK Government is proposing to redevelop one of its major airports and is intending to make use of public-private partnerships (PPP) for this.

(iii) List four key features of a PPP. [2]

The baggage handling company has been approached to become a PPP partner. It has been working on an innovative automated baggage handling system, which it expects to implement within the redeveloped airport.

(iv) Describe how the company could make use of project finance to support its participation in the PPP. [3]

(v) Describe three areas of operational risk specific to this project that would need to be managed. [3]

(vi) Describe three embedded options within the project. [3]

(vii) Discuss the problems that may arise when using the net present value method of project value appraisal for this particular project. [4]

The company decides to borrow funds for further research and development. The borrowing requirement is too large for its bank so the company's treasurer decides to use a syndicated loan facility.

(viii) Describe how a typical syndicated loan facility operates. [1]

(ix) Explain why the borrower may prefer to use this type of facility rather than raising finance on the bond market. [2]

[Total 23]

3 FixedInc is a company that sells equity release mortgages (ERMs). These are products where FixedInc lends homeowners a lump sum which is secured against their property and which is repaid in full when the property is sold, typically on the death of the homeowner.

FixedInc has built up a portfolio of ERMs, all of which had a maximum initial loan-to-value (LTV) ratio of 15% (i.e. the loan is not more than 15% of the property value at the time it is taken out). The loans accrue interest at 2% per annum, which is added to the outstanding loan and repaid with the initial loan amount, rather than being repaid in regular instalments. FixedInc guarantees that the loan repayment will never be greater than the value of the property. All of these in-force ERMs were sold to homeowners aged 70 and over.

The assumptions made by FixedInc when computing its regulatory capital requirements include an expected loss in those cases where the outstanding loan exceeds the value of the house at repayment. FixedInc assumes that the average loss from properties sold for less than the value of the loan is 2% of the outstanding loan amount.

(i) Explain why the regulatory capital required to back the current portfolio may be very low. [2]

FixedInc's finance director has made the following comment: "For this book of business, I believe that the amount of regulatory capital required is the *only* relevant capital consideration."

(ii) Assess the validity of the finance director's statement. [4]

FixedInc is now introducing a new ERM product with the following features:

- There is no limit on the LTV.
- The interest rate on the outstanding loans is the maximum of 5% and the annual increase on a specified housing price index.
- Additional loan amounts can be taken out at any time.
- There are no age restrictions.
- FixedInc will still guarantee that the loan repayment will never be higher than the property value.

The finance director has stated: "We should use the same loss assumption for the new ERMs as for the existing business, and I expect that our new ERM products will have similar regulatory capital requirements as the previous version of the product."

(iii) Comment on the validity of the finance director's statement regarding the expected level of the regulatory capital requirements for the new ERM product. [4]

FixedInc's risk department wants to calculate a market consistent value for the embedded option (i.e. the value of the maximum loan repayment guarantee) in the new ERM product. The following two alternative methods have been suggested:

- A risk-neutral Monte Carlo simulation framework, where listed option prices are used to calibrate the model.
- A real-world Monte Carlo simulation framework, where historic market index data in conjunction with expert judgement is used to calibrate the model.

(iv) Compare the concepts of "risk-neutral" and "real-world" in relation to simulation models. [2]

(v) Explain why traded property index put options may be suitable for calibrating a market consistent risk-neutral simulation model for the ERM product. [2]

(vi) Outline the difficulties in selecting appropriate traded options when trying to calibrate a market consistent risk-neutral simulation model. [2]

An indicative calculation has been performed, using the Black-Scholes formula, to obtain a value for the embedded option in the new product. This has produced a value that is much lower than a quote received from an investment bank for providing an over-the-counter derivative to hedge the guarantee.

(vii) Suggest possible reasons why the investment bank's quote is higher than the internal calculation. [4]

(viii) Propose other actions that the company could take which would reduce the risks inherent in the new product, other than buying an over-the-counter derivative.

[3]
[Total 23]

4 Prompted by low market interest rates, the finance director of a listed UK insurance company proposes that the company should issue a large quantity of new debt and use the proceeds to carry out a share buyback programme.

(i) Explain why the finance director has made this proposal. [2]

(ii) Determine the likely impact on the company's weighted average cost of capital (WACC) of this action. [3]

(iii) Outline the potential risks or issues that the company may face if it proceeds with this proposal. [3]

(iv) List four types of restrictive covenant that may be contained within debt issues. [2]

The company sells whole life assurance policies which pay the higher of a fixed benefit and the sum of premiums paid in the event of death. Interest rates fall further, so that short term rates are now negative (i.e. bank deposits will now incur a cost rather than generate a positive return).

(v) Assess the potential impact of this scenario on the company's whole life assurance portfolio. [4]

(vi) Suggest four actions that the company could take in order to mitigate this impact. [4]

The company also sells a range of immediate annuity products. The sales department has complained that it is struggling to make new sales because potential customers are unhappy with the current annuity rates being offered. In response, the product development team proposes to mismatch its future annuity business by investing premiums into long duration high-yield bonds.

(vii) Describe three key risks that the company would be exposed to if it implemented this proposal. [3]

(viii) Outline how the company could *measure* each of the risks in part (vii). [3]
[Total 24]

END OF PAPER