INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

26 September 2019 (am)

Subject SP5 – Investment and Finance Specialist Principles

Time allowed: Three hours and fifteen minutes

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. *Mark allocations are shown in brackets.*

4. *Attempt all questions, begin your answer to each question on a new page.*

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

Graph paper is NOT required for this paper.

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 As at 31st December 2015, a pension scheme's assets valued at £200m were divided equally between two separate unitised investment funds. These funds are invested in different asset classes. Annual contributions to the pension totalled £10m and were divided between the funds, as shown in the table below.

£ millions	**Fund A**		**Fund B**	
	Unit price (p)	*Cash flow (£m)*	*Unit price (p)*	*Cash flow (£m)*
31 December 2015	100	8	200	2
31 December 2016	90	5	240	5
31 December 2017	114	2	254	8
31 December 2018	133		270	
Total:		**15**		**15**

A trustee of the pension scheme states that the time-weighted rate of return for Fund B was higher than that of Fund A over the three-year period, and therefore concluded that Fund B has been a better investment.

(i) (a) Show that the trustee's statement is correct.
(b) Comment on the trustee's conclusion that Fund B has been a better investment.

[3]

(ii) Calculate the money-weighted rate of return for Funds A and B. [2]

The trustee also states that, "given its better performance, it would have been better to have invested all the contributions into Fund B".

(iii) Comment on this statement. [5]

[Total 10]

2 A group of pension scheme trustees are considering implementing a Liability Driven Investing (LDI) approach to setting the investment strategy for their pension scheme.

(i) Describe the main principles of LDI. [4]

(ii) Describe the two main risks that LDI aims to manage for a pension scheme. [5]

Three pension schemes (A, B and C) follow an LDI approach. The investment managers have provided the following data on the sensitivity of the assets and liabilities to changes in interest rates in their respective schemes.

	Scheme A	*Scheme B*	*Scheme C*
Change in present value of the liabilities due to a 1 basis points move in interest rates	£500k	£1000k	£1000k
Change in present value of the assets due to a 1 basis points move in interest rates	£100k	£400k	£800k

(iii) Determine the hedge ratio of each scheme. [2]

(iv) Comment on the hedge ratios from part (iii) and on their implications for funding. [3]

[Total 14]

3 (i) State the differences in the construction of the Dow Jones Industrial Average index and the Standard & Poor's 500 index. [3]

(ii) (a) State the possible uses of market indices by investors.
(b) Explain the suitability of the two indices in part (i) for each use.
[9]

An investor has investments in funds invested in the US stock market. These funds are actively managed, well diversified and income is accumulated within the fund. The investor compares their performance over a three-year period with the two indices in part (i) and the comparison is shown below.

	Value of funds	*Dow Jones Index*	*S&P 500 Index*
Start of period	US$5,000	10,000	2,000
End of period	US$6,500	14,000	2,400

(iii) Suggest possible reasons for the differences in performance shown in the table above. [5]

The following information for an index is available:

Capital index at start of year 0	100
Capital index at start of year 1	110
Capital index at start of year 2	120
XD adjustment at start of year 0	0
XD adjustment at end of year 0	5
XD adjustment at end of year 1	10

(iv) Calculate the total return for the index over the two-year period. [2]
[Total 19]

4 (i) List the main participants in global foreign exchange markets. [3]

The investment manager of a global macro hedge fund wishes to speculate on currency markets using forward contracts. On 1 April the following conditions prevail in the market:

Spot exchange rate (US dollar per euro)	1.1500
Annualised six-month interest rate (US dollar)	2.5%
Annualised six month-interest rate (euro)	0.5%

The investment manager expects the spot rate on 1 October of the same year to be 1.1600 US dollar per euro.

(ii) Determine whether the manager should buy or sell the forward contract. [4]

Using the trade indicated above, the manager wishes to target a profit of $100,000 if their expectation proves correct.

(iii) Determine the size of the forward position the manager should open. You should ignore transaction costs. [4]

(iv) Describe the factors the manager should take into account when considering the risks associated with this trade. [5]

[Total 16]

5 The trustees of a newly established pension scheme are arranging to have the assets of the scheme managed by external investment managers.

Describe the legislative and regulatory principles the trustees should follow to ensure the assets are managed appropriately by the external fund managers. [12]

6 (i) Describe what is meant by the terms systematic and unsystematic risk. [2]

An equity portfolio has a target beta of 1.5.

(ii) Describe the meaning of:

(a) Beta
(b) A beta of 1.5.

[2]

The portfolio has a covariance of return with the return on the market of 0.665 and the variance of the market return is 0.5.

(iii) Calculate the value of beta for this portfolio. [1]

(iv) Suggest how the fund manager could adjust the portfolio to achieve the target value of beta of 1.5 given your answer to part (iii). [3]

(v) State the advantages and disadvantages of using beta as a portfolio management tool. [4]

A market neutral hedge fund plans to take a large positive position in a major bank and is looking to offset this exposure with a negative position in another security.

(vi) Outline the characteristics of the security that the hedge fund would want to purchase to achieve market neutrality. [4]

[Total 16]

7 One of the funds managed by an investment company has been losing clients and the management has decided that they will convert the fund into an ethical fund in the hope that it will prove popular with investors.

(i) Describe what is meant by an ethical investment strategy. [5]

(ii) Suggest the issues that need to be considered as part of an ethical investment strategy. [4]

(iii) Discuss how the issues set out in part (ii) can be addressed. [4]

[Total 13]

END OF PAPER