

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

22 April 2021 (am)

Subject SP5 – Investment and Finance Specialist Principles

Time allowed: Three hours and fifteen minutes

<p>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.</p>

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

- 1** An investment company offers five different funds (Funds A to E) to its retail clients. The investment company has noted that over 75% of these clients opt for Fund A, even if the investment company would expect the other funds to be more suitable for these clients.

The information pack that clients receive lists the funds in alphabetical order, from A to E, with a brief description of each fund.

- (i) Suggest a possible reason why most of the clients choose Fund A. [1]

The investment company has decided to revise its client information pack.

- (ii) Describe what issues the company may face in getting its clients to choose the most appropriate fund for their investment needs. [3]

- (iii) Suggest how the information in the client information pack could be presented to overcome the issues described in part (ii). [1]

An investor has been losing money on their investments and a friend has suggested that they are trading excessively (overtrading).

- (iv) Suggest possible reasons why the investor may be overtrading. [3]

- (v) Outline the steps the investor could take to reduce their overtrading. [2]

[Total 10]

- 2 The decision has been made to introduce a new derivative whose payout is based on the movement of a country's equity market. For the derivative to be successful it needs to be based on an appropriate index.

- (i) List the characteristics that the index needs to have. [3]

A developing country has recently established a stock exchange. There are currently five stocks listed, two of which pay a dividend. Dividends are currently paid to investors free of tax and both stocks went ex-dividend at the start of the second day.

The stock exchange wishes to create a market capitalisation weighted index to measure the performance of the listed companies. Assume a starting index value of 1,000. Details of the companies in the index are given in the table below.

<i>Company</i>	<i>Company initial market capitalisation (€m)</i>	<i>Initial price (€)</i>	<i>Price at end of first day (€)</i>	<i>Price at end of second day (€)</i>	<i>Dividends paid per share (€)</i>
1	350	2	2.05	2.05	
2	200	1.75	1.7	1.65	0.05
3	650	1.5	1.6	1.55	
4	400	3	3	2.95	
5	450	0.75	0.8	0.75	0.06

- (ii) Calculate the value of the capital index at the end of the first day. [2]
- (iii) Calculate the value of the capital index at the end of the second day. [2]
- (iv) Calculate the total return of the index over the 2 days. [4]
- (v) Discuss the issues the exchange may face when trying to attract users onto its exchange. [3]

[Total 14]

- 3** Following adverse publicity regarding one of its investments a large global investment management group has decided to fully adopt the Principles for Responsible Investment (PRI) within 12 months.

The directors of the investment management group want to construct a list of questions that should be asked by their investment analysts when these analysts are in contact with companies they cover.

- (i) Suggest possible questions the analysts could ask these companies. [4]
- (ii) Outline the additional questions that could be asked if the companies were investing in real estate. [4]

Having collected all the information, it becomes apparent that there are PRI issues with a number of stocks that the investment group holds.

- (iii) Suggest ways that the investment group could address these issues. [4]
- [Total 12]

- 4 Consider a forward contract with price P_0 . The spot price of the underlying is S_0 . The risk-free rate of interest is j , and the time to expiry of the contract is c .

j is continuously compounded.

- (i) (a) Write down an expression for P_0 , in terms of S_0 , j , and c .
 (b) Comment on the validity of the assumptions that underlie this expression.

[3]

The current forward price of an asset is less than the price determined by the expression in part (i).

- (ii) Explain, in your own words, how a trader would be able to generate a risk-free profit. [4]
 (iii) Give the formula for the size of the profit. [1]

An airline knows it will need to purchase fuel for its future operations and wishes to hedge 75% of its purchases for 3 years using forward contracts.

The airline estimates it will need to purchase the amount of fuel on the dates shown in the table below:

	<i>1 July 2021</i>	<i>1 July 2022</i>	<i>1 July 2023</i>	<i>1 July 2024</i>
Fuel to be purchased (metric tonnes)	1,980,000	2,000,000	2,200,000	2,400,000

- (iv) Determine the number of hedging contracts it should purchase on 1 July 2021 for delivery on these dates. [3]

It turns out that the spot price at expiry is as shown below.

	<i>1 July 2021</i>	<i>1 July 2022</i>	<i>1 July 2023</i>	<i>1 July 2024</i>
Spot price (US dollars)	600	610	580	650
Risk-free rate on US government bonds (p.a.)	–	1.20%	1.30%	1.50%

The risk-free rate on US government bonds is continuously compounded.

- (v) Calculate the profit or loss at the expiry of the contracts compared with the case in which the airline had not hedged its fuel requirements. [3]
 (vi) Comment on the advantages and disadvantages of the airline's hedging policy. [3]

[Total 17]

5 The trustees of a pension scheme are concerned about the impact that volatility in equity markets could have on the asset value of the scheme. The trustees are considering several ways to protect the scheme's portfolio against a potential fall in the market value of equities.

(i) Describe the possible approaches the trustees could take. [5]

(ii) Discuss the potential issues with each of the approaches in part (i). [4]

The pension scheme's investment adviser has suggested that the trustees could consider an equity derivative strategy that combines purchasing downside protection and selling some upside in equity return. The strategy would have an initial cost of zero.

The investment adviser has outlined three strategy alternatives:

1. Accept the first 10% of an equity market fall and be fully protected after that. The upside return potential of up to 7% p.a. is retained.
2. Full protection for the first 25% of an equity market fall. Upside return potential of up to 5% p.a. is retained.
3. Accept the first 5% of an equity market fall and be protected for the next 20% of any equity market fall. Upside return potential of up to 8% p.a. is retained.

(iii) Comment on each of these strategies. [9]

[Total 18]

- 6 The government of a particular country has announced a change to how pension scheme benefits are increased with respect to inflation. These changes will impact the XYZ pension scheme.

The trustees of the XYZ pension scheme have an agreed target of being fully funded with a 70% chance of success within a 10-year timeframe. The trustees were about to carry out an Asset Liability Modelling (ALM) exercise.

- (i) Describe the key steps that should be *modified* in carrying out the ALM exercise given the change in circumstances noted above. [7]

The output from the ALM exercise is summarised in the table below:

<i>Investment strategy</i>	<i>Chance of being fully funded within the timeline (%)</i>	<i>Timeline to being 100% funded (years)</i>	<i>Investment risk impact</i>
A	60	10	Higher risk
B	70	15	No change
C	70	20	Lower risk
D	65	12	No change

- (ii) For each strategy A–D:
- (a) comment on the ALM output.
- (b) outline the factors that the trustees should consider when choosing the investment strategy. [6]

The scheme uses Value at Risk (VaR) to support the calculation of downside risk.

- (iii) Discuss the areas you would probe further in relation to this calculation for investment strategy C. [6]
- [Total 19]

- 7 A fund management group is studying a proposal to outsource its back office functions to a specialist company that operates facilities in countries where labour costs are substantially lower.

The Risk Manager of the fund management company has been asked to comment on the proposals.

- (i) Outline the features of the proposal that the Risk Manager will be most interested in with regards to the risks to the fund management group. [5]

It has been decided to go ahead with the outsourcing.

- (ii) Suggest possible actions the company could take to minimise the risks to the fund management group. [5]

[Total 10]

END OF PAPER