

# **INSTITUTE AND FACULTY OF ACTUARIES**

## **EXAMINATION**

27 September 2021 (am)

**Subject SP5 – Investment and Finance**

**Specialist Principles**

Time allowed: Three hours and twenty minutes

|                                                                                                                                                |
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| <p>In addition to this paper you should have available the 2002 edition of the<br/>Formulae and Tables and your own electronic calculator.</p> |
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If you encounter any issues during the examination please contact the Assessment Team on  
T. 0044 (0) 1865 268 873.

- 1** A pension fund is considering implementing a Liability Driven Investment (LDI) strategy.
- (i) State the key benefits of adopting this strategy. [4]
  - (ii) State the key reasons for making use of repo transactions in LDI strategies. [2]
  - (iii) Outline the main drawbacks with a partially unfunded approach to LDI. [2]
  - (iv) (a) Suggest possible issues that could arise with a static LDI benchmark.  
(b) Suggest possible actions to mitigate these issues. [2]
  - (v) Explain, with reasons, why a strategy using interest rate swaps and inflation swaps in an LDI solution may NOT be preferred. [7]
- [Total 17]

- 2** An investor owns shares in an airline company, FlyHoliday. A global crisis outside of the company's control is expected to severely restrict the activity of FlyHoliday and all similar companies for a 12-month period.

At the start of the crisis, the value of FlyHoliday's shares fell substantially. The investor wishes to assess whether they should sell the shares, continue to hold them or purchase more shares.

- (i) Comment on the relevance of the information contained in FlyHoliday's most recent financial statements. [7]
  - (ii) Describe the other factors the investor should take into account. [6]
  - (iii) Set out how the investor should use the information in parts (i) and (ii) to decide whether to sell their shares, hold them or purchase more shares in FlyHoliday. [5]
- [Total 18]

**3** Two funds, A and B, have the following characteristics:

| <i>Fund</i> | <i>Expected return (%)</i> | <i>Beta</i> |
|-------------|----------------------------|-------------|
| A           | 6                          | 1.0         |
| B           | 9                          | 1.5         |

A Fund of Funds Manager wants to construct a portfolio, P, which has an expected return of 7.5% while keeping beta to a minimum.

- (i) (a) Determine how funds A and B may be combined to produce the result that the Fund of Funds Manager requires.
- (b) Calculate the beta of the resulting portfolio, P.

[2]

The Fund of Funds Manager has details of two other funds, C and D, the characteristics of which are:

| <i>Fund</i> | <i>Expected return (%)</i> | <i>Beta</i> |
|-------------|----------------------------|-------------|
| C           | 7                          | 1.1         |
| D           | 9                          | 1.5         |

The Manager is able to short funds C and D.

- (ii) Determine how portfolio P could be combined with funds C and D to produce a portfolio, Q, that has a beta of zero.
- (iii) Calculate the expected return of portfolio Q.

[4]

[1]

[Total 7]

**4** An investor holds a concentrated portfolio of publicly quoted equities and has an investment horizon of more than 10 years and wishes to maximise returns. The investor expects to have additional cash that will be invested over this time period. The investor also has a preference for paying low fees.

The investor now wishes to diversify their portfolio.

- (i) Discuss whether investing in private equity collective funds would be suitable for meeting the investor's needs.
- (ii) Discuss whether investing in real estate collective funds would be suitable for meeting the investor's needs.
- (iii) Comment on the factors the investor should take into account in selecting a suitable vehicle when investing in unlisted assets.

[7]

[7]

[6]

[Total 20]

- 5** One of the main export industries of a small country, C, is facing declining demand due to cheaper alternatives being produced in another country. A substantial further decline would result in mass unemployment in C.

The government is considering use of the following four economic policies:

- monetary
- fiscal
- prices and incomes
- exchange rate.

Discuss how the government of C could use these policies in order to address this situation.

[9]

- 6 An investment bank has decided to introduce an infrastructure index to allow investors in infrastructure projects to benchmark their performance.

- (i) Suggest possible issues that the investment bank will face in constructing this index. [4]

A Fund Manager has six infrastructure assets in their portfolio, Assets 1–6. Four of the assets are still under construction and two are complete. The table below shows details of the six assets:

| <i>Asset</i> | <i>Value at start of year 1</i> | <i>Investment in year 1</i> | <i>Income in year 1</i> | <i>Value at end of year 1</i> |
|--------------|---------------------------------|-----------------------------|-------------------------|-------------------------------|
| 1            | 75                              |                             |                         | 80                            |
| 2            | 12                              | 15                          |                         | 30                            |
| 3            | 80                              |                             | 5                       | 78                            |
| 4            | 40                              | 10                          |                         | 45                            |
| 5            | 100                             | 50                          |                         | 165                           |
| 6            | 0                               | 75                          |                         | 80                            |

The investment figure represents the amount spent on construction of the asset during the period.

Investments are made in the middle of the year.

Income is paid at the end of the year and there is no tax payable.

- (ii) Calculate the total return produced by each of the assets. [3]
- (iii) Calculate the total return produced by the portfolio. [1]

The following year, the assets and the portfolio produced the following returns:

|           |        |
|-----------|--------|
| Asset 1   | 5.00%  |
| Asset 2   | 13.33% |
| Asset 3   | 3.85%  |
| Asset 4   | 0.00%  |
| Asset 5   | 10.53% |
| Asset 6   | 4.26%  |
| Portfolio | 6.70%  |

The index discussed in part (i) produced the following returns:

Year 1: +6%

Year 2: +6.5%

- (iv) Comment on the performance of the portfolio. [2]
- (v) Describe the main issue the Fund Manager might have faced in calculating the results in part (ii). [1]
- (vi) Suggest how the issue discussed in part (v) may be dealt with. [2]

[Total 13]

- 7
- (i) Write down the single behavioural bias that is most prominent in each of the following situations:
- (a) Following a major stock market crash, investors are less inclined to invest in equity funds and more inclined to invest in bond funds.
  - (b) An investor selects investment funds on the basis of strong past performance.
- [2]
- (ii) Describe how the bias concerned affects people's decisions for each of the situations described in part (i). [2]

A psychologist conducts an experiment, based on work carried out by behavioural psychologist Daniel Kahneman. Subjects are invited to place a bet on one of the following three events, or series of events. They are given a short period of time to choose. The reward for a 'win' is the same in each case.

- (a) To draw one black pencil from a bag containing 50 black pencils and 50 red pencils. One draw is permitted.
- (b) To draw seven black pencils in seven consecutive draws from a bag containing 90 black pencils and 10 red pencils
- (c) To draw at least one black pencil in seven consecutive draws from a bag containing 10 black pencils and 90 red pencils.

In view of the time constraint, subjects are not able to calculate precise probabilities for these outcomes, but they may make estimates.

- (iii) Describe how they may use an anchoring and adjustment heuristic to make their choice. [4]

The psychologist has not told subjects that the actual probabilities of (a), (b) or (c) occurring are 50%, 48% and 52%, respectively. However, the most popular bet was (b), followed by (a), followed by (c).

- (iv) Discuss how the use of an anchoring and adjustment heuristic might have led to the relative popularity of the three choices given above. [4]
- (v) (a) State two situations in which an anchoring and adjustment heuristic may influence investment decisions.
- (b) Explain how an anchoring and adjustment heuristic may influence investment decisions in the situations mentioned in part (v)(a).

[4]

[Total 16]

**END OF PAPER**