INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

15 September 2022 (am)

Subject CP1 – Actuarial Practice
Core Practices

Paper One

Time allowed: Three hours and twenty 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.

© Institute and Faculty of Actuaries

1 An investor is considering investing in one of the following funds:

- UK Government Bond Fund – with a target return of 1% p.a.
- UK Equity Fund – with a target return of 3% p.a.

The funds are exactly the same size, are both well diversified and have the same fund manager.

Suggest possible reasons why the predicted target returns for the two funds are different. [4]

2 The regulation of defined benefit schemes in a country requires that the assumptions used to determine the scheme's provisions for liabilities are the actuary's best estimate of future experience plus a margin for prudence.

Outline how sensitivity analysis can be used to determine the appropriate margin for prudence. [4]

3 A defined benefit scheme that is open to new entrants and future accrual has shown in its latest accounts that the scheme's funding deficit has deteriorated since the last scheme valuation.

Suggest possible reasons that could explain the change in funding deficit shown in the accounts. [5]

4 An investment management company only invests in domestic equities and has a target to outperform the return on the main domestic equity index over a rolling 3-year period.

(i) Discuss how the systematic and diversifiable risks associated with the fund can be mitigated. [3]

(ii) Describe the roles and responsibilities of various stakeholders in the risk management process at the investment management company. [3]

[Total 6]

5 An insurance company has just reviewed its pricing assumptions. Following the review, the company revised the annual renewal expense pricing assumption on one of its products to £60 per policy. The average annual renewal expense for this product over recent years has been £85 per policy.

Discuss possible reasons why the annual renewal expense assumption has been set to be less than the average annual renewal expense over recent years. [7]

6 An insurance company uses financial derivatives to manage its exposure to options and guarantees across a range of financial products it has sold to investors. The range of financial products includes ones that pay benefits on death, on surrender and on maturity.

(i) Outline the options and guarantees that the insurance company could offer at death, surrender and maturity. [3]

(ii) Explain why the insurance company may use financial derivatives to manage risk in these products. [4]

[Total 7]

7 A manufacturing company is carrying out a review of all of its global operations to try to understand where it is most exposed to financial, operational, economic and other risks.

(i) Explain with examples how scenario analysis may be used to assist in this review. [5]

(ii) Explain why stress testing may be preferable to scenario testing in some situations. [3]

[Total 8]

8 (i) Explain how the principles of pooling risk are applied in the business of motor insurance. [4]

A company selling motor insurance has recently moved into insuring very high-value cars. They have noticed that this book of business has been less profitable than their standard business.

(ii) Suggest reasons why this book of business may be less profitable. [2]

(iii) Outline how the company may make changes to increase the profitability of this book of business. [3]

[Total 9]

9 An established life assurance company has been selling term assurance for some years and is about to start selling a new term assurance product.

The new product will be sold to people whose lifestyle and fitness will be monitored by them wearing a wristband.

The wristband collects data that will be shared with the insurance company. Policyholders will then be offered various benefits and rewards from the insurance company depending on the data collected from them.

(i) Discuss the additional data governance issues that may arise from this new product compared to the existing term assurance business. [6]

(ii) Outline the main limitations of the wristband data as a means of determining the level of benefits and reward to be given to a policyholder. [3]

[Total 9]

10 An insurance company is investigating replacing its existing method for pricing its car rental insurance policies with a more sophisticated approach. It is planning to use publicly and commercially available data as a starting point for pricing these policies.

(i) Suggest the types of publicly and commercially available data that the insurance company could use. [2]

(ii) Discuss why the new data may be an improvement on the existing method used to price for risk. [3]

(iii) Outline the problems that may be involved in using this new data. [3]

(iv) Discuss how suitable this new data would be for pricing its other motor insurance policies. [5]

[Total 13]

11 A company is planning to introduce e-scooters (a two-wheeled vehicle powered by batteries) for short-term rental in a large city.

(i) Outline the risks that the company will need to consider before going ahead with this project. [5]

The company has investigated options to mitigate the risks it faces from renting e-scooters. They have decided that insurance will be needed to cover the risks from part (i). An insurance company has been asked to quote for this business.

(ii) Discuss the factors the insurance company will need to consider when pricing this business. [6]

(iii) Outline other possible actions the company providing e-scooters may consider in order to manage the risks before going ahead with the project. [3]

[Total 14]

12 A regulator is reviewing a life insurance company's financial resilience using stress and scenario testing that considers a 5-year time horizon.

(i) Explain why the regulator has chosen a 5-year time horizon. [3]

(ii) Suggest, with reasons, the risks that could be included. [3]

(iii) Suggest the financial measures that could be included in the review. [3]

The regulator has proposed an approach with four distinct time stages.

Stage 1	*Stage 2*	*Stage 3*	*Stage 4*
Balance sheet and capital requirements calculated immediately following stresses to: • interest rates. • credit spreads (no credit rating downgrades). • equity prices.	Balance sheet and capital requirements calculated immediately following stresses to: • interest rates. • credit spreads. • credit rating downgrades. • equity prices. • property prices.	Same stresses as Stage 2. Balance sheet and capital requirements calculated after changing the asset mix.	Same stresses as Stage 2 plus stress to longevity and lapse assumptions. Balance sheet and capital requirements calculated after changing the asset mix.

(iv) Assess the regulator's proposal for testing the company's financial resilience including its reasoning for including each stage. [5]

[Total 14]

END OF PAPER