

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

20 April 2023 (am)

Subject SP9 – Enterprise Risk Management Specialist Principles

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.

1 You are given the following information about ABC, a small EU-regulated general insurance company:

- ABC has a gross annual premium income of €50m, writing fire, motor, health and liability business to both individual and commercial customers.
- ABC uses international reinsurers to reinsure risks in excess of its risk appetite.
- ABC mainly invests in cash, cash equivalents and high-quality bonds.
- All liabilities are in euros.
- In the country in which ABC operates, third-party liability cover and employer liability insurance are required by legislation.

The Risk Function of ABC sets out the key risk categories and allocates a positive, balanced or negative risk appetite to each.

- (i) (a) Describe the key categories of risk, other than strategic risk, faced by ABC. [9]
- (b) Justify the risk appetite that ABC's Risk Function could allocate for each risk category described in part (i)(a). [9]
- (ii) Discuss, with reference to the four responses to a risk, how ABC may mitigate some of the risks identified in part (i). [4]
- (iii) Propose, with reasons, suitable risk mitigation tools for ABC, under each risk category identified in part (i). [9]

On 11 March 2020, the World Health Organisation declared the coronavirus (COVID-19) outbreak to be a pandemic, in recognition of its rapid spread across the world.

ABC uses 'analysis of emerging risks' as one of its risk identification tools, and previously identified pandemic risk as one of its emerging risks.

- (iv) (a) Describe the benefits to ABC of carrying out an analysis of emerging risks. [3]
- (b) List four possible emerging risks, other than pandemic risk, that ABC may have identified over the years. [3]
- (v) Describe the impact of the pandemic on ABC's financial condition and risk profile. [12]

ABC uses the Solvency II standard formula to estimate its capital requirements. Following the onset of the pandemic, ABC considers building an internal model.

- (vi) Discuss the benefits and challenges to ABC of adopting an internal model. [3]

- (vii) Discuss model and parameter risk in the context of ABC choosing to use an internal model during a pandemic event. [3]

A proprietary model has been run using ABC's data, and it produces the following results for a pandemic event:

Probability (%)	0.5	1	5	10	20
Net loss (€m)	8	4	2	0.5	0.1

The expected net loss for a pandemic event according to the proprietary model is €0.2m.

ABC has backtested the proprietary model against its own historic data over the last 20 years, which covers two pandemic events in 2002 and 2020. ABC's historic data shows losses of €3m in 2002, and losses of €0.8m during 2020.

- (viii) Comment on the results of the proprietary model in the context of ABC's backtesting results. [4]

The pandemic has generally been well contained due to the actions taken by governments worldwide to reduce the virus transmission rate.

- (ix) (a) Explain how tail dependence may be relevant to an insurer's consideration of risk during a global pandemic. [2]
- (b) Describe examples of specific tail risk interactions that ABC may have prepared for during a global pandemic. [4]

ABC has run its annual stress and scenario testing analysis. One of the scenarios simulates an economic recession, and assumes:

- a reduction in premiums for fire insurance by x%. No reduction in premiums assumed for all other classes of business.
- an increase in the number of total claims by y%.
- a reduction in total asset values by z%.
- a reduction in reinsurance counterparty credit rating by 2 rating notches (from A+ to A-).

The results of running this scenario on ABC's balance sheet are as follows:

<i>Balance sheet item</i>	<i>Change vs. base scenario</i>		
	<i>Projection year 1</i>	<i>Projection year 2</i>	<i>Projection year 3</i>
Change in the solvency capital requirement (€m)	+1	+0.8	+0.2
Impact on profit (€m)	-8	-3	-3

- (x) Discuss the different types of stress and scenario testing that ABC may have considered using. [6]

- (xi) Comment on the assumptions used in ABC's economic recession scenario. [4]
- (xii) Analyse the outcomes of ABC's stress testing exercise. [4]

Following a review of the impact of the pandemic, ABC is considering outsourcing certain functions. It is considering outsourcing the storage of all its data to an external outsourcing service provider via 'cloud' functionality. ABC undertakes a risk assessment prior to the commencement of such an arrangement.

- (xiii) (a) Discuss the key risks that ABC should consider as part of its cloud outsourcing risk assessment.
- (b) Outline the potential steps that ABC could take to reduce the impact of the risks described in part (xiii)(a).

[6]

[Total 73]

2 The Board of a large retail bank is considering its enterprise risk management framework.

(i) Describe how the bank can achieve a good corporate governance framework. [2]

(ii) Provide examples of effective internal controls that the bank should incorporate in its operations. [4]

The bank uses the three lines of defence model, with properly resourced and well established control functions.

(iii) Describe how the three lines of defence model may be applied to the bank, and set out its advantages and disadvantages. [6]

The bank's Risk Function regularly reviews and proposes the risk appetite to the Board.

(iv) Define the risk appetite and describe the process used by the bank to establish it. [5]

The Board uses red–amber–green statuses to monitor its exposures. Green indicates that a risk metric is within acceptable limits, amber acts as an early warning and red is a breach. The table below sets out the risk dashboard of the bank for the last two quarters. The Risk Function drafts its quarterly risk report based on these metrics.

<i>Risk metric</i>	<i>Red</i>	<i>Amber</i>	<i>Green</i>	<i>Previous quarter</i>	<i>This quarter</i>
Common equity tier 1 (%)	<10.5	10.5–11.5	>11.5	15.4	14.9
Risk adjusted return on capital (%)	<10	10–15	>15	11.2	12.6
Invested assets allocation limits	Breach, no exception approved	Breach but exception approved	No breach	Breach but exception approved	Breach but exception approved
Number of information technology system outages	4+	2–3	0–1	1	1
Number of complaints	100+	80–100	<80	65	88

(v) Set out the points to be included in the Risk Function's quarterly risk report, including a discussion of each of the risk metrics shown in the table. [10]

[Total 27]

END OF PAPER