



INSTITUTE OF ACTUARIAL  
& QUANTITATIVE STUDIES

**Subject:** Actuarial practice 1

**Chapter:** Unit 1

**Category:** Practice question

**Q1. CP1-APRIL 2023-PAPER 1-Q7**

(i) Propose, with reasons, three risks that a defined benefit scheme may wish to hedge. [3]

(ii) Explain why a defined benefit scheme may choose to use liability hedging. [2]

(iii) Discuss the risks that may still exist for a defined benefit scheme even if it has hedged its liabilities. [5]

[Total 10]

**Q2. CP1-APRIL 2023-PAPER 2-Q1**

A country with a population of 50 million people has a small town with 50,000 inhabitants located on an island situated a short distance from the mainland. The only connection that the island has to the mainland is one bridge that is now over 50 years old. The road that connects the town on the island to the mainland passes mainly through an important habitat for birds that has been subject to increasing environmental protections over the last 50 years.

The local government for the town recognises that the road and bridge are a critical link between the island and mainland. The maintenance of both the road and bridge is a priority for the local government; however, the connection to the mainland must always be operational. Maintenance of the bridge is typically planned at least 2 years in advance considering the age of the bridge, operational requirements and the local government's financial resource constraints. Occasionally, there will be a need to carry out emergency maintenance on the bridge.

Until 10 years ago, coastal sea flooding of the road from the town to the mainland was very rare. However, in the last 10 years, the frequency and severity of storms that cause flooding and other damage to the road have increased. On one recent occasion, a severe storm and associated coastal flooding caused damage to both the road and bridge, making them unavailable for a week.

The local government has proposed to engage an actuary to undertake a review of its transportation road and bridge link with the mainland. The review will consider the island's infrastructure requirements and assessment of risks for its link with the mainland for the next 50 years, including considering climate change risk.

Currently the local government pays for maintenance costs of the road and bridge link as they arise. A suggestion has been made that a 20-year fixed-cost maintenance contract could be set up to manage the risks and cost of maintaining the road and bridge.

- (i) List the stakeholders who will be part of the transportation review. [6]
  - (ii) Describe three potential conflicts of interest that could arise between the stakeholders identified in part (i). [3]
  - (iii) Set out the factors, including any further investigations, an actuary would need to consider before agreeing to undertake this review. [7]
  - (iv) Describe the possible risks that the actuary should consider in their review. [9]
  - (v) Suggest four possible actions to mitigate the risks identified in part (iv). [4]
  - (vi) Discuss the possible issues with using a model that assesses the impact of climate change in the review. [5]
  - (vii) Assess the suitability of a 20-year fixed-cost maintenance contract for the road and bridge link. [11]
  - (viii) Discuss other possible ways that the government could fund the maintenance contract. [5]
- [Total 50]

### Q3. CP1-APRIL 2023-PAPER 2-Q2

A developed country has an established and sophisticated insurance market. Insurance companies use advanced pricing and underwriting approaches when writing their business. Many insurance companies operate in the country. A wide range of products are available to individuals and businesses.

The government of the country is concerned that it is becoming more difficult for people living in relative poverty to access or afford the insurance products they need. The government is conducting research to find out why this is the case and what actions can be taken to ensure people living in relative poverty can access and afford insurance products.

An insurance company operating in this country offers a wide range of products. It has recently rebranded and is now operating as an ethical insurance company. It is introducing new ethical principles to the way it operates, the products it offers and the investments it holds. The insurance company is keen to work with the government on providing more affordable products.

- (i) List six types of insurance products an individual may need to purchase. [3]

- (ii) Discuss why the cost of insurance may be more expensive for those living in relative poverty. [11]
  - (iii) Explain why the government may be concerned about citizens living in relative poverty finding it difficult to access and afford the insurance they need. [6]
  - (iv) Describe the actions that the government could take to enable these citizens to access and afford insurance. [11]
  - (v) Discuss possible ways an insurance company could ensure the products it offers are ethical. [8]
  - (vi) Discuss how rebranding as an ethical company will affect the investments the insurance company holds. [7]
  - (vii) Suggest how the ethical insurance company could provide insurance products to help those living in poverty to access the insurance they need. [4]
- [Total 50]

#### **Q4. CP1-SEPTEMBER 2022-PAPER 1-Q8**

- (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]

#### **Q5. CP1-SEPTEMBER 2022-PAPER 2-Q2**

A private company has been awarded a contract by the government of a developed country (Country Y) to build and operate Country Y's first national aquarium ('the aquarium').

The aims of the aquarium are to:

- gain an international reputation.
- be a tourist attraction.
- breed, and subsequently release back into the wild, rare and endangered fish.

Based on its intention to honour all of the aims, the company has just been granted permission by the government of Country Y to be the sole provider of the aquarium.

The company has asked an Actuary for advice on certain aspects of this project.

In particular, the company would like advice on how to achieve the aims of the aquarium while maximising its return on capital.

The company first needs to decide on a location for building the aquarium. It will then put in place a team to take responsibility for the construction and subsequent day-to-day running of the aquarium. The company still needs to decide on the precise mix of activities to be undertaken by the aquarium, once opened.

- (i) Outline the issues to be considered in choosing a suitable location for the aquarium. [6]
- (ii) Suggest possible types of insurance that the aquarium may require. [3]

Assume that the company has now purchased the land on which they will be able to build the aquarium. The company is now seeking advice on the financial impact of the possible activities to be undertaken by the aquarium, once opened.

- (iii) Suggest the main activities that the aquarium could choose to undertake, and the cashflows that would be associated with each activity. [6]
- (iv) Outline the risks that the private company will have in building the aquarium and then subsequently the activities mentioned in part (iii). [5]
- (v) Suggest possible actions that the aquarium could take to mitigate the risks mentioned in part (iv). [5]
- (vi) Describe the modelling that could be undertaken to decide on the optimum mix of possible activities. [6]
- (vii) Discuss how the aquarium could be funded, both for the building of the aquarium but also the ongoing running of the activities set out in part (iii). [6]
- (viii) Discuss, from the point of view of the company, possible methods it could use to remunerate the Actuary for the advice. [3]

[Total 40]

**Q6. CP1-APRIL 2022-PAPER 1-Q1**

In a developing country, the market for life assurance and savings products is currently unregulated. The regulator is about to introduce a new regulatory regime for this market, and has chosen a regime that allows freedom of action of the life assurance companies but prescribes the outcomes that will be allowed.

Discuss the suitability of this regime for the stated market. [5]

**Q7. CP1-APRIL 2022-PAPER 1-Q5**

A general insurance company writes business interruption insurance. An entirely new disease has emerged, and a number of policyholders have made claims for business interruption due to this new disease. The insurance company is considering whether to accept liability for these claims.

- (i) List the professionals or stakeholders that could be involved in deciding whether to accept liability for these claims. [3]
- (ii) Discuss the issues the insurance company needs to consider in deciding whether to accept liability for these claims. [8]

[Total 11]

**Q8. CP1-APRIL 2022-PAPER 2-Q2**

Background A regulator in Country C is reviewing the regulatory reserving and capital requirements for insurance companies and the technical provisions in respect of pension schemes. The regulator has a particular concern that the allowance for credit risks being calculated is insufficient for traded and illiquid corporate bonds. This concern relates to both the bond credit ratings and valuations of the bonds.

Insurance companies and pension schemes can assess the credit rating of an asset using its internal processes and controls. This is referred to as an internal credit rating. The alternative to an internal credit rating is an external credit rating provided by an independent regulated credit rating agency.

The regulator is considering the following three options for credit ratings for corporate bonds in order to address its concerns:

- (a) A requirement will be introduced that only credit ratings provided by regulated credit rating agencies can be recognised for bonds. All other bonds will be treated as unrated.
- (b) Credit ratings used for regulatory purposes must be determined by the regulator.
- (c) The regulator will continue to allow both internal and regulated credit rating agency ratings to be used.

The regulator will introduce a requirement that a firm or pension scheme can only recognise internal credit ratings for regulatory purposes if the firm or scheme can demonstrate the effectiveness of its credit rating system. To demonstrate the effectiveness of its credit rating system, it will need to demonstrate the reliability of its credit rating being within a tolerance range of credit ratings that could be obtained from regulated credit rating agencies for a sample of its bonds.

The regulator is required to assess the effectiveness, implications, relevance, importance, suitability and/or value of changes to regulations including the impact on insurance companies and pension schemes before implementing changes.

#### Questions

- (i) Outline why a pension scheme or insurance company invests in corporate bonds. [6]
- (ii) Write down the purpose of a regulator. [2]
- (iii) Explain why a regulator would review regulations and supervisory practices. [6]
- (iv) Outline how key stakeholders will be affected by the regulator's review of regulatory reserving and capital requirements. [5]
- (v) Describe the skills and experience of the specialists the insurance regulator will need to consult, in order to review and update its regulations for credit risk. [7]
- (vi) Assess the three options for credit ratings for the regulator. [18]
- (vii) Discuss, for each of the three options, the supervisory challenges for the regulator. [6]

[Total 50]

#### Q9. CP1-SEPTEMBER 2021-PAPER 1-Q1

Two people, both aged 30, are planning to retire at age 65. Person A is a member of a defined benefit scheme and Person B is a member of a defined contribution scheme.

They have both received statements from their respective scheme provider, which show the same projected pension benefits at age 65.

Compare the risks affecting the retirement benefits that Person A and Person B will receive. [5]

#### **Q10. CP1-SEPTEMBER 2021-PAPER 1-Q2**

A company wishes to appoint an actuary to provide advice on setting up a new retirement benefit scheme for its employees. Due to a global pandemic, face-to-face meetings are no longer permitted due to the risk of infection.

- (i) Outline the information that the actuary should gather prior to accepting the appointment. [3]
- (ii) Outline the difficulties the actuary may face as a result of the limitations on face-to-face meetings, while determining whether to accept the appointment. [2]

[Total 5]

#### **Q11. CP1-SEPTEMBER 2021-PAPER 1-Q5**

An insurance company in a developing country is planning to launch microinsurance products for farmers who live in remote parts of the country.

- (i) Suggest possible microinsurance products that may meet the farmers' needs. [3]
- (ii) Explain how the insurance company would approach the design of microinsurance products. [4]

[Total 7]

#### **Q12. CP1-SEPTEMBER 2021-PAPER 1-Q7**

An investment management firm is launching a new range of funds to be marketed as ethical investment funds.

- (i) Outline possible ethical criteria that the new range of funds will need to meet. [3]

One of the firm's directors has expressed a concern that ethical investment funds will always produce lower returns than investment funds without these restrictions. Therefore, the lower performance of the ethical investment funds risks damaging the firm's brand.

- (ii) Discuss whether ethical investment funds have lower expected returns than investment funds without these restrictions. [4]
  - (iii) Propose how the firm could mitigate risks to its brand and profitability. [5]
- [Total 12]

### **Q13. CP1-SEPTEMBER 2021-PAPER 1-Q8**

A shareholder-owned food supermarket has decided to start offering a savings account to its customers in partnership with a bank that it has already selected.

The bank will pay the supermarket:

- a fixed fee for each savings account set up.
- a percentage fee based on the annual average balance held in savings accounts.

The bank will pay the supermarket for the required operational infrastructure relating to the savings accounts and will retain any profits or losses made.

Describe how the actuarial control cycle could be used to measure and maximise the benefits to the shareholders of the supermarket of this arrangement. [12]

### **Q14. CP1-APRIL 2021-PAPER 1-Q1**

Suggest, with reasons, types of insurance that the government of a country may require its citizens to hold. [5]

### **Q15. CP1-APRIL 2021-PAPER 1-Q5**

A pension scheme uses an algorithmic trading system for its investment in domestic equities.

- (i) Outline the potential risks associated with algorithmic trading for this pension scheme. [3]
- (ii) Discuss the professional and technical standards that may apply to actuaries giving advice to a pension scheme. [6]

[Total 9]

### **Q16. CP1-SEPTEMBER 2020-PAPER 1-Q2**

A bank in a developing country and a large international insurer have established a joint venture insurance company. The company's first product will be a term assurance, sold

by tied agents (i.e. sales people who only sell the products of one company) through the bank's branches.

Describe how the Actuarial Control Cycle can be used in the pricing and ongoing financial management of the term assurance product. [8]

### **Q17. CP1-SEPTEMBER 2020-PAPER 1-Q9**

A number of countries are members of a union where member countries can access each other's markets. In return, member countries follow a consistent set of regulations governing, among other things, financial services.

Country F, a developed country that has been a member of the union for many years, has recently decided to leave the union. The government of Country F is proposing a full review of its regulations, including for financial services.

- (i) Outline the principal aims of regulation of financial markets. [2]
- (ii) Describe possible regulatory regimes the government of Country F could consider implementing. [3]
- (iii) Suggest an advantage and a disadvantage of each of the regimes identified in part (ii). [3]
- (iv) Outline the potential risks to the domestic financial services industry that Country F faces as a result of changing its regulatory regime now. [4]
- (v) Discuss why the countries remaining in the Union might be concerned about any changes to Country F's regulatory regime. [4]
- (vi) Suggest how the countries in the Union might seek to mitigate any risks in relation to (iv) and (v). [4]

[Total 20]

### **Q18. CP1-APRIL 2020-PAPER 1-Q4 (CHECK)**

An insurance company sells long-term care products in two countries. These countries are both developed and have similar population sizes.

The theoretical value of the benefits provided by the products is the same in both countries. The premiums charged are, however, very different.

Discuss possible reasons for the difference in premiums. [8]

**Q19. CP1-APRIL 2020-PAPER 1-Q6 (check)**

- (i) Outline the reasons for underwriting an insurance risk. [4]

A life insurance company in Country A has so far offered products only to its own domestic market. Country A is a well-developed country. The company is about to start selling a new term assurance product in Country B. Country B is a remote under-developed country. The company is considering the underwriting processes it will apply in Country B.

- (ii) Explain ways in which the company's underwriting processes for Country B might need to be modified compared with its existing approach in Country A. (Details of how to price the business are not required.) [8]

[Total 12]

**Q20. CP1-APRIL 2020-PAPER 1-Q8 (CHECK)**

A wealthy individual has a large cash lump sum. He has asked an actuary to advise on how he might invest this sum to provide for himself and his family in retirement, and to be able to leave an amount as an inheritance.

- (i) Describe how the actuary would assess the individual's future liabilities. [4]
- (ii) Identify four key risks, from the viewpoint of the individual, which the actuary should consider when giving their advice. [2]
- (iii) Describe how each of the risks in (ii) might be mitigated. [6]

[Total 12]

**Q21. CP1-APRIL 2020-PAPER 1-Q10**

- (i) Describe motor third-party liability insurance. [3]

In a certain country, motor third-party liability insurance is not compulsory. Its government is proposing to provide motor third-party liability insurance to all motorists and pay for the related claims.

- (ii) Suggest reasons for the government's proposal. [3]

- (iii) Describe the areas where an actuary could provide advice to the government in relation to the proposal. [6]
  - (iv) Discuss how stakeholders, other than the government, might be affected if the proposal was implemented. [5]
- [Total 17]

## **Q22. CP1-APRIL 2020-PAPER 2-Q1 (CHECK)**

Background Country B is well developed with sophisticated financial markets and financial institutions. A report has been produced by leading experts that concludes that climate change could have a material impact on financial markets and financial institutions in Country B.

The report also highlighted that to successfully manage the financial risks arising from climate change it will be necessary for all businesses in Country B to:

- make changes to governance.
- make changes to risk management.
- use scenario analysis for risk identification and assessment.

A large insurance company in Country B, NEF Insurance, sells term assurance, annuities, property insurance, motor insurance and savings products. NEF Insurance is undertaking a project to assess how climate change could impact its operations, the investments it holds, and the products it sells to help determine any appropriate actions it should take.

NEF Insurance invests in a wide range of investments including equities, property, government and corporate bonds, loans secured on commercial property and loans secured on infrastructure. The government of Country B has committed to an internationally agreed target of keeping global average temperature rise since pre-industrial times below 2°C. The government has, to date, announced three policy measures directed at reducing greenhouse gas emissions. These measures will affect people and businesses.

These policy measures are:

- requirements to improve the energy efficiency of commercial properties starting in 3 years. The minimum standards will be progressively strengthened over the following 10 years. Financial penalties and restrictions on use of properties will apply if the minimum standards are not met.
- requirements for organisations to hold permits at least equal to the quantity of greenhouse gas emissions it actually emitted. To avoid financial penalties an

organisation will need to purchase sufficient permits. The government will reduce the number of permits each year and introduce an emission trading system allowing organisations to buy and sell permits.

· the sale of new petrol and diesel cars will be banned in 20 years. The board of NEF Insurance believe that the government's policy measures will have a wide-ranging impact on all aspects of their business.

- (i) Outline the factors that would impact the preference of investors for a particular asset class. [5]
- (ii) Discuss ways that the investments of NEF Insurance could be affected by climate change. [6]
- (iii) Describe the changes an insurance company may need to make to each of the following in response to climate change risks:
  - (a) governance
  - (b) risk management. [6]
- (iv) Discuss how climate change might affect NEF Insurance's business including its operations, the investments it holds and the products it sells. [10]
- (v) Discuss how the actuarial control cycle can be used to assist companies preparing for climate change. [6]
- (vi) Assess, for each of the government's policy measures, how that measure is expected to affect NEF Insurance. [10]

NEF Insurance has committed to undertaking the scenario analysis as recommended by the experts' report.

- (vii) Outline the non-financial risks that NEF Insurance should consider in their scenario analysis. [6]

A credit rating agency is making changes to its rating methodology for companies in Country B. It is proposing amending its rating methodology to include allowance for environmental, social and governance risks. A credit rating given by a credit rating agency is an indication of credit worthiness.

- (viii) Explain why a credit rating agency is making changes to its rating methodology. [4]

[Total 53]

**Q23. CP1-SEPTEMBER 2019-PAPER 1-Q2**

An established retail bank in a developed country has recently been losing market share. The bank is also facing rising costs from increased rents of its branches and staff salaries.

The bank's Board has decided to become an internet only bank, offering all services online to its retail customers with no physical branches.

(i) List the stakeholders who might be affected by such a change. [2]

The Board of the bank believes that the reduction in costs should increase future profitability and the new model will attract new customers.

(ii) Describe the risks that might negatively impact the bank's plans. [8]

[Total 10]

**Q24. CP1-SEPTEMBER 2019-PAPER 1-Q6**

A developed country has introduced legislation which requires the following for corporate governance of boards of insurance companies:

- separation of roles of chairman, chief executive, finance director and chief risk officer
- the majority of the board to consist of non-executive directors
- a director representing employees and pensioners
- a minimum of 40% of directors to be male
- a minimum of 40% of directors to be female
- the regulator must approve all board and senior management appointments.

Discuss the appropriateness of the new legislation from the perspective of the main stakeholders. [15]

**Q25. CP1-SEPTEMBER 2019-PAPER 2-Q1**

Background XYZ is a general insurance company in a developed country, specialising in motor insurance. It has been one of the market leaders by market share for ten years. However, it has not made a profit in the last two years.

An overseas insurance company, ABC Corporation ('ABC'), is looking to purchase XYZ and has been provided with the following information:

Motor insurance results

An initial analysis of XYZ's claims experience shows that overall, claim numbers over the last two years have increased by 20%. In particular, there has been a significant increase in claims connected to car and motorcycle accidents.

Company retirement benefit schemes

XYZ has two retirement benefit schemes: a defined benefit scheme and a defined contribution scheme. Five years ago the defined benefit scheme closed to future service. Members of that scheme joined the defined contribution scheme in respect of future service.

Three years ago, XYZ agreed to make annual payments into the defined benefit scheme for the following ten years to eliminate the funding deficit. However, recent results suggest that the deficit has increased, indicating that XYZ may be required to increase its payments into the defined benefit scheme.

The defined contribution scheme is a with-profits policy managed by a life insurance company which provides investment and administration services. The policy guarantees a minimum investment return of 3% p.a. on funds invested before retirement. XYZ matches employee contributions into the scheme up to a maximum of 5% of salary.

Other information

You have also been provided with the following information:

- XYZ ran a promotional campaign last year to increase the number of motor insurance policies sold to young people between the ages of 18 and 24.
- From next year, the government is introducing legislation which will require all pension scheme funding deficits to be eliminated within five years.

- (i) Set out the reasons why ABC may wish to purchase XYZ. [5]
- (ii) Describe, using examples, how XYZ can manage and control its risks in connection with its motor insurance policies. [10]
- (iii) Set out possible reasons for the worsening of the funding position in the defined benefit scheme. [10]
- (iv) Discuss potential options available to improve the funding position of the defined benefit scheme. [8]
- (v) Discuss the key risks of the defined contribution pension scheme. In your answer you should comment on each risk from the perspective of XYZ and the scheme members. [7]

[Total 40]

**Q26. CP1-APRIL 2019-PAPER 1-Q1**

- (i) List four key stakeholders in the risk governance of a life insurance company. [2]
- (ii) Describe how each of the stakeholders in part (i) could contribute to the risk governance of the company. [4]

[Total 6]

**Q27. CP1-APRIL 2019-PAPER 2-Q1 (CHECK ONLY TILL PART IX)**

Background A university in Country A has a large campus in a city.

The university currently has 30,000 students and 5,000 employees. The university offers its employees various benefits. These include life cover, cover for sickness and disability, as well as membership of a pension scheme. Some employees are in a defined benefit pension scheme and others in a defined contribution scheme.

The university is looking to significantly increase the number of students it has as part of its expansion plan to become a world leading university. It is considering whether to expand the current campus, open a new campus in a different city or open a new campus in a different country. It is consulting a number of different professional advisers as part of this process.

The government in Country A has recently announced legislation which will substantially increase the state pension benefits to all citizens in Country A. At the same time state pension benefits increase so will the state pension age. The net effect is expected to give rise to additional costs and tax rates in Country A are expected to rise to help fund these costs.

The university is concerned about the long-term affordability of its pension commitments and has asked your company to advise if this may be a suitable opportunity to consider closing the defined benefit scheme and also to reduce contributions to the defined contribution scheme.

**Questions**

- (i) Suggest why the government may have decided to increase the state pension. [4]
- (ii) Outline why the university may be concerned about its pension commitments. [3]
- (iii) Discuss the options that may be available to the university regarding its pension commitments. [8]
- (iv) Discuss the impact of the university's expansion on its stakeholders. [5]

- (v) Discuss how actuaries could contribute to the university's expansion plan. [5]
- (vi) Outline how the university could raise the capital needed for its expansion plan. [4]
- (vii) Discuss the risks involved in the expansion plan, indicating for each how that risk might be managed. [6]
- (viii) Suggest the types of insurance cover the university may need. [4]
- (ix) Outline other areas, in addition to the expansion plan, on which actuaries could provide advice to the university. [3]

Your employer has recently set up a new department dealing with 'Big data'.

- (x) Outline what is meant by 'Big data'. [2]
  - (xi) Discuss the challenges involved in using 'Big data'. [3]
  - (xii) Suggest ways that 'Big data' could be useful to the university. [3]
- [Total 50]

### **Q28. CP1-APRIL 2019-PAPER 2-Q2**

**Background** The government of a developed country (Country B) is concerned about the low levels of personal savings by its citizens. The government is inviting a wide range of banks, insurance companies and investment companies to provide new and simple types of savings products to help meet its concerns.

The government is considering offering a range of incentives to help encourage increased savings.

The government wants the new types of savings products to:

- be low cost from the saver's point of view
- give the saver maximum flexibility on when they pay money into and take money out of the product.

An established investment company is considering launching a suitable product.

The company will administer this product as a unit-linked savings plan. There will be no death benefit. For this plan, the government will allow only one charge to be applied. The charge will take the form of an annual management charge levied on the unit fund,

subject to a maximum of 0.75% of the fund value. The company wishes to make the product appeal to a wide range of potential savers.

The product will be aimed at all potential investors including those who might be less financially sophisticated.

The company needs to be able to compete with planned products of its competitors; some of these products are simple and non-linked.

#### Questions

- (i) Discuss why the government might want to increase the levels of personal savings in Country B. [7]
- (ii) Suggest, with reasons, possible encouragement and incentives that could be offered by the government to increase the levels of personal savings. [7]
- (iii) Discuss how the company's need to administer the product as a unit-linked plan, and yet be able to appeal to the complete range of financial sophistication of its target market, could be achieved by appropriate wordings of its marketing literature. [8]
- (iv) Discuss the advantages and disadvantages of the government's restriction on charges on the unit-linked plan, from the viewpoint of savers. [5]
- (v) Describe how and when the charges on the unit-linked plan could be disclosed to savers. [4]

The company has now launched the savings product.

- (vi) Discuss the possible risks to the company. [15]

A group of private investors is considering setting up a new company to provide the same type of unit-linked product as the established investment company.

- (vii) Outline the main issues and opportunities that private investors would face, compared with the established investment company. [4]

[Total 50]

#### **Q29. CP1-SEPTEMBER 2018-PAPER 1-Q5 (CHECK)**

Two companies in the same industry have approached an actuary to advise them on the benefits packages they offer their respective employees.

- PXU has been established for over 25 years and has around 1,000 employees based in five locations around the country.
  - Unicorn was set up six months ago and has ten employees, based in a single location in the same country.
- (i) Outline how the issues to be considered, in designing the benefits packages, may differ between the two companies. [4]

The actuary proposes to both companies that they offer a flexible benefits system. Under this arrangement, employees are offered the option at the start of each year to revise the level of an existing benefit or to choose different benefits, which the employees “buys” either by reducing their pay or by giving up part of their existing benefits.

- (ii) Describe how a flexible benefit approach can help meet the different needs of employees. [2]

As part of its new flexible benefits programme, PXU decides to partner with an insurance company, GGG, to offer life insurance cover to its employees.

- (iii) Set out the main risks involved in this arrangement for:
- (a) PXU.
  - (b) The employees of PXU.
  - (c) GGG. [6]

Unicorn proposes to award its employees shares in the company at the end of each year, based on the individual employee’s performance over the year.

- (iv) Discuss the practical issues that Unicorn needs to consider in implementing this proposal. [5]

[Total 17]

### **Q30. CP1-SEPTEMBER 2018-PAPER 1-Q6**

- (i) State the principal aims of regulation. [2]
- (ii) Describe the areas of an insurance company’s operation that may be regulated. [8]
- (iii) Discuss the challenges that exist for the regulator in regulating insurance companies. [8]

[Total 18]

### **Q31. CP1-SEPTEMBER 2018-PAPER 2-Q1(CHECK)**

Unit 1

PRACTICE QUESTION

Buyco is intending to purchase another company. An actuary has been asked to comment on the liabilities associated with the pension scheme of the target company.

- (i) Outline the factors that the actuary should take into account in order to ensure they are able to carry out a professional job and accept the appointment. [5]
- (ii) Describe why is it important that these factors are addressed. [3]

[Total 8]

### **Q32. CP1-SEPTEMBER 2018-PAPER 2-Q4(CHECK)**

The Government in a developing country is looking at measures to control the cost of providing a universal state pension. The main features of the universal state pension are:

- An income payable to all citizens for the remainder of their lives from when they reach age 65;
  - The income is initially set to be equal to 50% of the average annual wage in the country;
  - The income will increase in line with price inflation each year;
  - Individuals must have lived in the country for at least 10 years before becoming eligible; and
  - Citizens are not required to pay in contributions.
- (i) Suggest reasons why the Government would want to control its state pension costs. [4]

The Government's proposal to control costs is to introduce one of the following options:

- A – Individuals must contribute for at least 5 years to be entitled to the universal state pension.
  - B – Increase the age the pension becomes payable to age 66.
  - C – Pension no longer increases once in payment (but past increases are guaranteed).
- (ii) Discuss the advantages and disadvantages of each of the proposals. [6] After consultation, the Government decides to implement option B.
  - (iii) (a) Discuss the possible options that the Government has to implement option B.  
(b) Outline the practical issues that it would have to consider in implementing this change. [5]

[Total 15]

### **Q33. CP1-APRIL 2018-PAPER 2-Q5**

- (i) State the main roles of a professional body. [2]

- (ii) Suggest the problems that can arise if such a body's rules on professional standards are too demanding. [4]
- (iii) Outline the areas that an actuary is usually required to certify when performing a statutory certification of the adequacy of the valuation of assets and liabilities for an insurance company. [5]

[Total 11]

#### **Q34. CP1-APRIL 2018-PAPER 2-Q6**

A small general insurance company is based in a rural area. It mainly sells pet insurance. The majority of this business is obtained through local veterinary practices that act as agents and refer their customers to the insurance company.

The owner of one of the largest veterinary practices in the area has proposed that the insurance company expands by providing livestock insurance for the large local farming community.

- (i) Suggest how both the nature of the cover provided under this new line of business and the expected claims experience for livestock insurance is likely to differ from that of the existing pet insurance business. [5]
- (ii) Suggest the potential problems the insurance company would need to consider were it to expand as proposed. [7]
- (iii) Discuss how reinsurance might be used to mitigate some of the problems described in part (ii). [6]

[Total 18]

#### **Q35. CP1-APRIL 2018-PAPER 2-Q7**

A general insurance company is considering launching a cyber insurance policy aimed at small businesses.

- (i) Outline the cover that could be provided by this policy. [4]
- (ii) Comment on how the needs and responsibilities of each of the relevant stakeholders might influence the design of the product. [4]
- (iii) Discuss the factors the company needs to consider when designing the product. [5]

- (iv) Comment on how your answer to part (iii) would change if the policy was aimed at:
- (a) large companies.
  - (b) individuals. [6]

[Total 19]

### **Q36. CP1-APRIL-2018-PAPER 2-Q8**

- (i) Explain why regulation may exist to ensure that customers are treated fairly by providers of financial products. [4]
- (ii) Discuss, for each of the following scenarios, whether the customer has been treated fairly:
- (a) A motor insurance policy where a car has been written off in an accident and the amount offered to the customer is half what the customer considers it to be worth.
  - (b) A pet insurance policy where the claim has not been paid because the maximum annual limit has been reached.
  - (c) A personal pension where the income in retirement is a quarter of the amount that had been projected at outset.
  - (d) A with profits policy which has declared no bonuses for the past five years.
  - (e) A home insurance policy where no payout was made following a fire because the customer had not adhered to the conditions of the contract relating to switching on the burglar alarm. [12]
- (iii) Suggest how a regulator could ensure that the customers in part (ii) are treated fairly. [5]

[Total 21]

### **Q37. CP1-SEPTEMBER 2017-PAPER 1-Q1**

An insurance company sells policies which aim to cover long-term care costs for people once they are unable to look after themselves in their own homes.

The insurance company operates in a developed economy which is experiencing reduced government spending following a recession. Demand for these long-term care policies has increased significantly in the years since the recession started.

Discuss which external environment factors may have contributed towards this increase in demand. [7]

**Q38. CP1-SEPTEMBER 2017-PAPER 1-Q4 (CHECK)**

- (i) Outline the principal reason why groups of individuals may wish to pool risk events that they are exposed to. [2]
- (ii) State the ideal criteria to be met before an insurance company would be willing to provide insurance protection for risk events. [3]

The government of a developed country is increasing its use of nuclear power plants. These plants are owned and operated directly by the government. The government's objective is that nuclear power plants will provide a significant proportion of the country's energy needs.

The government is considering possible ways of covering the potential costs arising from incidents at its nuclear plants.

- (iii) Discuss how effective insurance or other risk pooling approaches might be in covering these costs. [6]

[Total 11]

**Q39. CP1-SEPTEMBER 2017-PAPER 1-Q5**

The climate of a country has been changing with flooding increasing in frequency and severity across many regions.

- (i) During the same period premiums for the average household insurance cover have risen considerably and the range of premiums by region and within regions has widened significantly. (i) Describe why the change in climate could have caused such a change to the distribution of market premiums. [4]

The government of the country is concerned that household insurance cover is now becoming unaffordable for many people especially in high risk areas.

- (ii) Explain the reasons why the government is concerned about the unaffordability of household insurance cover. [3]

The government is proposing two possible proposals to make household insurance cover more affordable:

- Provide direct government subsidies to certain households to be used towards the cost of household insurance cover.
- Introduce a cap on the premium insurance companies charge for household insurance cover.

(iii) Discuss how effective the proposals could be in addressing the government's concerns. [4]

(iv) Discuss other potentially significant consequences for the household insurance market. [4]

[Total 15]

#### **Q40. CP1-SEPTEMBER 2017-PAPER 2-Q1**

Describe Employers' Liability insurance. [4]

#### **Q41.CP1-SEPTEMBER 2017-PAPER 2-Q3**

In a particular country, actuaries are required to comply with a series of principles-based rules referred to as Technical Actuarial Standards (TASs). Describe the issues an actuary should take into account when deciding on the materiality and proportionality of the principles in any particular TAS in relation to actuarial work. [8]

#### **Q42 (CHECK). CP1-SEPTEMBER 2017-PAPER 2-Q7**

For many years a large life insurance company has written substantial volumes of a flexible unit-linked investment product in a particular country. The product:

- provides a benefit of the full value of the units held on surrender at any time.
- allows the policyholder to vary their contributions.
- provides no additional benefit on death (other than the full value of the units).

The company is now planning to launch a guaranteed version of this product in a different country. All of the above product features will remain unchanged but a benefit guarantee will be added. The detailed terms and conditions of the guarantee are yet to be specified but the basic features are:

- at various points in time, units will be able to be cashed in for the higher of full value of the units and a minimum monetary amount.
- the minimum monetary amount is based on an accumulation of contributions at guaranteed rates of interest set at outset.

- (i) Suggest possible reasons why the company may have decided to offer this guarantee. [5]
- (ii) Consider a guaranteed contract that has just been issued and received its first contribution. Explain how the guarantee will have a value to the customer, immediately and in the future. [4]
- (iii) Propose ways in which the detailed terms and conditions of the guarantee could be set to minimise the financial impact of the guarantee to the company. [9]
- (iv) Explain why derivative investments are likely to be used to help the company manage the guarantee. [4]
- (v) Discuss why derivative investments may not be completely effective in managing the risks associated with the guarantee. [3]

[Total 25]

#### **Q43. CP1-APRIL 2017-PAPER 1-Q1**

Outline the areas in which an actuary can advise upon the risks relating to contingent benefits. [5]

#### **Q44 (check). CP1-APRIL 2017-PAPER 1-Q4**

A general insurance company provides liability insurance for hairdressers.

- (i) Outline four types of liability that may be covered. [4]
- The number of policies and premium income for this business has been increasing each year. The financial results for this business, however, show that profits are reducing each year, compared to what was expected.
- (ii) Describe how the expected profits for this business could be projected in future years. [4]
  - (iii) Outline possible reasons for the reduction in profitability. [5]
  - (iv) Suggest levers that the company could use to increase profits. [3]
  - (v) Suggest reasons why the insurance company may wish to continue to offer this insurance. [4]

[Total 20]

**Q45. CP1-APRIL 2017-PAPER 2-Q2**

A manufacturer of fireworks is currently assessing the risks it is exposed to:

- (i) Outline these risks. [3]
- (ii) Discuss the circumstances that might lead to a risk:
  - (a) not needing financial coverage.
  - (b) being retained (taken on by the manufacturer).
  - (c) being fully transferred.
  - (d) being partially transferred. [4]
- (iii) List six insurance products that could be used to assist in some of the risks being partially or fully transferred. [3]

[Total 10]

**Q46. CP1-APRIL 2017-PAPER 2-Q5 (CHECK)**

A country is designing a new scheme to protect policyholders in the event that a provider of benefits becomes insolvent or is unable to meet its capital requirements.

- (i) Describe how the costs of the protection scheme could be met. [5]
- (ii) Discuss the issues that need to be considered in designing the protection scheme which will need to provide a balance between the beneficiaries' interests and the costs of the protection scheme for each of the following:
  - (a) a range of long-term term assurance contracts
  - (b) savings contracts providing a minimum guaranteed annual return
  - (c) compulsory medical insurance contracts
  - (d) a staff defined benefit scheme [10]

[Total 15]

**Q47. CP1-APRIL 2017-PAPER 2-Q7**

An insurance company is considering launching a new health insurance product.

- (i) Outline how each of the components of the actuarial control cycle could be used to manage the launch of the new product. [8]
- (ii) Outline the main aspects of the external environment to be considered for the new product. [5]

- (iii) Discuss how the expenses could be allocated when pricing this new product. [6]

The insurance company has decided to use the model prescribed by the regulator to calculate statutory solvency for reserving for the new health insurance product.

- (iv) Suggest reasons why the company has decided to use this model rather than building its own internal model. [4]

[Total 23]

#### **Q48. CP1-SEPTEMBER 2016-PAPER 1-Q2**

A 55 year old individual lives alone in a large property which, they intend to sell.

The proceeds of the sale are to be used in a combination of three ways:

- to assist with the purchase of a smaller property for the individual to live in
- to provide capital for each of the individual's two adult children to use as deposits to purchase their own homes
- to act as free capital for the individual's own use

- (i) Set out the individual's likely financial needs. [6]  
 (ii) Assess whether the chosen strategy will help meet these needs. [4]

[Total 10]

#### **Q49. CP1-SEPTEMBER 2016-PAPER 2-Q1**

Describe the following:

- (a) liquidity risk  
 (b) market risk  
 (c) operational risk  
 (d) business risk [6]

#### **Q50. CP1-SEPTEMBER 2016-PAPER 2-Q2**

A defined benefit pension scheme provides, as the default option, a level pension to each member with a 50% spouse's pension on the death of the member.

However, the scheme allows members reaching retirement to choose any particular rate of payment escalation and any particular percentage spouse's pension.

The amount of the amended level of pension is then determined by the scheme applying adjustment factors to the default level of pension.

An actuary is advising the trustees of the pension scheme on what adjustment factors should be used, so as to minimise additional risks to the funding of the scheme under this arrangement.

- (i) Explain how the actuary should set the adjustment factors. [7]
- (ii) Outline how the actuary can use the actuarial control cycle in producing the advice. [4]

[Total 11]

#### **Q51. CP1-SEPTEMBER 2016-PAPER 2-Q4**

- (i) Define information asymmetry. [1]
- (ii) Discuss the information asymmetries, between the policyholder and the insurance company, for the following:
  - (a) an impaired life annuity policy
  - (b) a car insurance policy with two named drivers
  - (c) an insurability option where an individual can increase the level of life cover without supplying medical evidence [8]
- (iii) Discuss how the information asymmetries in (ii) could be mitigated. [4]

[Total 13]

#### **Q52. CP1-SEPTEMBER 2016-PAPER 2-Q6**

- (i) List aspects of the external environment which can have implications for the main providers of benefits on contingent future events. [5]

An insurance company has been selling a wide range of pension products across a wide range of countries for a number of years.

- (ii) Discuss how each of the aspects of the external environment can have implications for this insurance company. [15]

[Total 20]

#### **Q53. CP1-APRIL 2016-PAPER 2-Q2 (CHECK)**

Lily and Poppy want to open a flower shop. They have conducted an initial appraisal and have concluded that this project is viable and the net present value and payback period are both satisfactory.

Poppy has now suggested that, rather than open one shop, they should open a chain of flower shops. She states that this would be more profitable and so they should aim for this more ambitious project.

Discuss this suggestion. [11]

#### **Q54. CP1-APRIL 2016-PAPER 2-Q4**

Legal action is being taken by former professional players of a major national sport for long-term health issues related to past head injuries which they suffered whilst playing the sport. The legal action is being taken against the sports club owners who employed the players. You have been asked to provide advice to the club owners on structuring a settlement scheme to make payments to the former players.

Discuss how an actuary can contribute to structuring this settlement scheme. [15]

#### **Q55. CP1-APRIL 2016-PAPER 2-Q5**

A government provides a retirement benefit to its citizens in the form of a basic state pension. This pension is the same for everyone but it is relatively low in comparison with the average cost of living.

- (i) Outline the problems individuals may face if they were to rely on this basic state pension as their main source of income in retirement. [3]

The government is proposing to introduce a second element to state pension provision. Individuals and the government will both pay contributions into a fund which will be used at retirement to provide a pension in addition to the basic state pension. All individuals will be required to participate. There is no tradition of employers providing pensions arrangements for their employees in this country.

- (ii) Explain why the government might adopt this policy. [3]

The government is considering the following approach to determine the secondary pension. The fund will be held and managed by the government.

Option A – The pension will be based on a proportion of annual salary earned over the period to retirement. There will be a maximum limit to the amount of salary that will qualify. The salary above this limit will be ignored when determining benefits and contributions.

- (iii) Discuss the merits of Option A in terms of meeting the government's objectives. [8] The government decides instead to implement Option B. It also decides to outsource the administration and fund management.

Option B – A pension will be purchased with the individual's fund, the accumulated value of contributions made by and on behalf of the individual.

(iv) Set out possible ways the outsourced services could be charged for. [3]

(v) Discuss the risks the administrators and fund managers may face. [8]

[Total 25]

#### **Q56. CP1-SEPTEMBER 2015-PAPER 1-Q2**

An actuarial consultancy is giving advice to a life insurance company that is designing a retirement income product for customers.

(i) (a) List the stakeholders who could be affected by the actuarial advice.

(b) Outline how the advice could affect the listed stakeholders. [6]

(ii) Outline the information about the life insurance company that should be sought in order to be able to give advice. [3]

[Total 9]

#### **Q57. CP1-SEPTEMBER 2015-PAPER 1-Q3**

(i) Define:

(a) liquidity risk.

(b) operational risk. [2]

(ii) Describe how the following companies can manage the risks defined in part (i):

(a) a general insurance company that specialises in pet insurance.

(b) a global airline company.

(c) a property unit trust. [9]

[Total 11]

#### **Q58. CP1-SEPTEMBER 2015-PAPER 2- Q1**

An insurance company has been selling a critical illness insurance product for a number of years.

In general, the premiums payable under this product are towards the higher end of the range of premiums prevalent in the marketplace for this type of business. However, over

many years, the insurance company has developed a reputation for being flexible and relatively generous when deciding on whether to pay claims.

The company now intends to introduce a new “basic” critical illness product.

The existing product will continue to be sold.

The premiums payable under the new “basic” product will be considerably lower than those under the existing product. To compensate, under the new “basic” product, tighter and more stringent medical criteria will need to be satisfied before a claim will be paid.

These criteria will be rigorously enforced.

- (i) Explain why policyholders who opt for the new “basic” product as opposed to the existing product may end up feeling that they have been unfairly treated. [4]
- (ii) Suggest with reasons two actions that the insurance company could take to reduce the risks of policyholders feeling that they have been unfairly treated under the new “basic” product. [2]

[Total 6]

#### **Q59. CP1-SEPTEMBER 2015-PAPER 2-Q2**

A new regulation is being introduced which will ban the payment of any commission in connection with all insurance contracts. This will apply both to policies bought directly from insurance companies and those bought via a third party (e.g. independent advisors).

Instead, third parties will have to charge their customers (i.e. policyholders) explicitly. This will be in the form of a fee for their services. That is, policyholders will pay a premium for their policy plus a fee to any third party.

Discuss the possible implications of this new regulation for market premiums and hence for insurance companies. [10]

#### **Q60. CP1-SEPTEMBER 2015-PAPER 2-Q3**

- (i) Describe the ideal criteria for risk events to be insurable. [4]

An insurance regulator is concerned that a large number of term assurance claims are being declined. Hence, a new regulation is being introduced that only permits term assurance claims to be declined if the relevant insurance company can prove that the claim is fraudulent. The regulation will apply to both new and existing policies.

- (ii) Discuss the potential implications of this new regulation on insurance companies' approaches to claims and claims management. [6]

- (iii) Suggest other possible actions that insurance companies may have to take in relation to new term assurance policies. [3]

[Total 13]

**Q61. CP1-APRIL 2015-PAPER 1-Q2**

A charity is being established to raise funds for a range of community groups within a small town. The charity will have a board of trustees, and it will run a number of fundraising events throughout the year.

Describe the types of insurance covers that could be suitable for the charity. [6]

**Q62. CP1-APRIL 2015-PAPER 1-Q4 (CHECK)**

Space Tourism plc has been developing a space travel programme for members of the public. It will have large operational costs, and fuel will be a high proportion of these costs. In recent years the cost of fuel has increased and the volatility of the fuel price has also increased. To protect against these rising fuel prices and volatility, Space Tourism has bought fuel price futures.

- (i) Explain why Space Tourism has bought these futures. [2]
- (ii) Discuss the reasons why futures may not be fully effective in meeting Space Tourism's objectives. [3]
- (iii) Outline how the futures exchange could manage its risk exposure. [6]

[Total 11]

**Q63. CP1-APRIL 2015-PAPER 2-Q1**

Outline reasons why an individual may purchase life insurance that is not the most appropriate for their needs. [5]

**Q64. CP1-APRIL 2015-PAPER 2-Q4**

- (a) Define longevity risk.
- (b) Explain why an individual might want to transfer this risk. [2]
- (i) List the four main providers of benefits to an individual [2]

- (ii) Describe how these providers can help individuals by sharing the financial risks associated with longevity, commenting on how effective these mechanisms might be for transferring longevity risk over the next fifty years. [7]
- (iii) Suggest how longevity risk for a defined benefit pension scheme might be transferred within the alternative risk transfer market, explaining why investors might wish to accept this risk. [3]

[Total 14]



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