INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

November 2026

CP1- Actuarial Practice (Paper B)

Time allowed: 3 Hours 15 Minutes

Q.1) GenLife is a biotechnology start-up established five years ago. The company researches and develops new medicines for the treatment of rare diseases.

Its activities include:

- laboratory research into new medicines
- testing medicines on animals before human clinical trials
- storing valuable biological samples at very low temperatures
- analysing large amounts of research data using computer systems
- working with universities and pharmaceutical companies to develop new treatments.

The company operates from a single research campus and employs around 800 people, including scientists, veterinarians, laboratory technicians, engineers and administrative staff.

GenLife has recently received additional funding from investors and plans to expand its operations internationally over the next three years.

i) List the broad categories of risk that GenLife may face. **[3]**

ii) Identify the key stakeholders in GenLife and briefly state why each has an interest in the company. **[6]**

iii) Outline the reasons why GenLife should have an enterprise risk management framework. **[3]**

iv) Discuss the insurance arrangements that may be appropriate for GenLife as it prepares for clinical trials and international expansion. **[11]**

Six months ago, several research animals escaped from a secure facility following human error during maintenance work. The animals were recovered within a few hours and no people were injured. However, the incident received widespread media attention and resulted in increased inspections by regulators.

In addition:

- a competitor recently suffered a cyber-attack that disrupted its research for several weeks;
- insurers have indicated that premiums for biotechnology companies are increasing;
- GenLife is planning to begin human clinical trials within the next two years.

The Board wishes to review the company's overall risk management framework and insurance arrangements before proceeding with its expansion plans.

v) Discuss the challenges that insurers may face when assessing and pricing the risks presented by GenLife. **[10]**

vi) Recommend improvements to GenLife's enterprise risk management framework following the recent incident. **[8]**

vii) The Board is considering retaining a greater proportion of its risks in order to reduce insurance costs. Recommend suitable approaches to risk retention, financing and transfer strategy for GenLife, and justify your recommendations **[8]**

As part of its review, the Board is concerned that some events, although unlikely to occur, could have severe financial, operational or reputational consequences for GenLife. For example, a major failure of the cryogenic storage systems could result in the loss of valuable biological samples and several years of research. Such events could also affect several areas of the business simultaneously. The Board wishes to understand how much risk the company should be prepared to accept and whether it could withstand such events.

viii) Discuss how GenLife should determine its risk appetite and set appropriate risk tolerances. Explain how scenario analysis could be used to support this process. **[8]**

[57 Marks]

Q.2) LifeSure is a large life insurance company that currently offers term assurance and whole-life assurance products. Premium rates are determined using a relatively small number of rating factors, together with information obtained during underwriting.

Advances in technology, data availability and predictive analytics have increased the amount of information that could potentially be collected about individual policyholders.

LifeSure is considering developing more highly personalised life insurance products. Personalisation could affect the benefits offered, product features, underwriting process, premiums and ongoing interaction with policyholders.

i) Describe ways in which LifeSure could personalise its life insurance products for individual policyholders. **[6]**

LifeSure is considering two approaches:

- Approach A: premiums are fixed at outset, but policyholders may provide wearable data to receive rewards and personalised services.
- Approach B: premiums may be adjusted periodically using information from wearable devices and other behavioural data.

ii) Compare the two approaches from the perspectives of LifeSure and its policyholders. **[7]**

As the number of rating factors increases, the number of policyholders with any particular combination of characteristics becomes progressively smaller.

iii) Discuss the implications of this for the pricing of LifeSure's products. **[8]**

LifeSure introduces a product under which policyholders can obtain premium reductions by providing ongoing health and lifestyle data. After launch, LifeSure observes that some policyholders provide data intermittently, some change their behaviour when rewards are available, and others choose not to provide data at all.

iv) Discuss the issues these behaviours could create for LifeSure and how LifeSure might respond. **[8]**

The directors believe that greater personalisation could improve the attractiveness of LifeSure's products and enable premiums to reflect individual risk more closely.

A director argues:

"Advances in data and predictive analytics mean that LifeSure can increasingly estimate the mortality risk of each individual policyholder. Each policyholder should therefore pay a premium reflecting their own risk, rather than lower-risk policyholders subsidising higher-risk policyholders."

v) Discuss how excessive personalisation could conflict with the principles underlying insurance and suggest ways in which LifeSure could manage these concerns. **[9]**

The Board has decided that LifeSure should explore greater personalisation but wishes to avoid moving immediately to fully individualised pricing.

vi) Recommend how LifeSure should introduce greater personalisation into its products, giving reasons for your recommendations. **[5]**

[43 Marks]

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