32. (1.5 points)

ABC Insurance Company purchases a catastrophe treaty on January 1 at a rate of 5% of gross earned premium. This treaty will cover losses resulting from a catastrophic event generating a loss exceeding 10% of gross earned premium. The treaty limit is 100% of gross earned premium.

a. (0.75 point)

If no catastrophe occurs, briefly explain how the purchase of this reinsurance treaty will affect the company's:

i. Surplus
ii. Net loss reserve
iii. Investment income

b. (0.75 point)

If there is a catastrophe generating a loss of 50% of gross earned premium, briefly explain how the purchase of this reinsurance treaty will affect the company's:

i. Surplus
ii. Net loss reserve
iii. Investment income

Assume that non-catastrophe loss levels are unaffected by the catastrophe event.

CONTINUED ON NEXT PAGE

Sensitivity testing typically involves an **incremental change in a risk factor** (or a limited number of risk factors). It is typically conducted over a **shorter time horizon**, for example an instantaneous shock. Sensitivity testing requires **fewer resources** than scenario testing and can be used as a simpler technique for assessing the impact of a change in risks when a quick response or when more frequent results are needed. Sensitivity testing is typically more simple.

**Actual candidate answer for full marks:**

a)

a. Risk identification and control.
b. Support capital management.

b)

a. Scenario testing: Presents a hypothetical state of the insurer by changing certain risk factors and then determining if such change is reasonable. It includes ripple effects and is more complex. The objective is to alter the financial condition of the company
b. Sensitivity testing: It relates to a change in one single factor and sees the impact on interrelated risks. Fewer resources, simpler. The shock is almost immediate or instantaneous.

**Examiner's report:**

For part a), most of the candidates managed to get full credit.

For part b), most candidates were able to define sensitivity and scenario testing. Only a few candidates managed to get full credit by comparing and contrasting the two elements.

## Question 32

**Answer key:**

Part A

- Surplus – Buying the cat reinsurance decreases surplus if no cat event occurs, due to the cost of reinsurance.
- Loss reserves – Net reserves are not impacted if no cat event occurs.
- Investment income is reduced

Part B

- Surplus - the risk of significant drop is substantially mitigated when a large cat occurs and the treaty is in place
- Net reserves are at lower level since the cat losses are covered by reinsurance
- Investment income is reduced

Alternative answer

Part B, for reserves, also accept if candidate mentioned that there is no change to loss reserve and that the cat losses are covered by reinsurer (assume 10% is disappear)

Part B, for investment income, also accept if candidate mentioned that investment income will also be protected.  Without the treaty, the company might be forced to sale or liquidate some investment to cover loss.  With treaty, we can afford to not sell or sell only a little of the investment assets to cover our limited loss.

Part B, for investment income, also accept if candidate mentioned that investment income depends on timing of event but will be ultimately higher

**Actual candidate answer for full marks:**

Part A

- i. Surplus decrease due to cost of treaty
- ii. No change
- iii. Investment income decreases due to cost of treaty (less money to invest)

Part B

- i. Surplus will be higher if treaty is purchased since there is less impact from the catastrophe
- ii. Net loss reserve will be lower if treaty is purchased since part of the cat loss is ceded to reinsurer
- iii. Investment income is lower due to cost of treaty (less money to invest)

**Examiner's report:**

This question covers basic reinsurance accounting concepts.  It is also a simpler version of an example listed in the actual reading.  Students, in general, scored high in this question.

## Question 33

**Answer key:**

1. set up sound and comprehensive earthquake exposure risk management policy that is subject to oversight by the Board of Directors and is implemented by senior manager
2. earthquake exposure data needs to be appropriately captured and regularly tested for consistency, accuracy, and completeness
3. Earthquake models should be used with a sound knowledge of their underlying assumptions and methodologies, as well as with a high degree of caution that reflects the significant uncertainty in such estimates
4. PML estimates should properly reflect the total expected ultimate cost to the insurer, including considerations for data quality, non-modelled exposures, model uncertainty, and exposures to multiple regions
5. it needs to ensure that they have an adequate level of financial resources and appropriate contingency plans to successfully manage through a major earthquake.

Many alternative answers are accepted as long as the candidate demonstrated that they understand there are five areas to be covered and that an explanation for each area is given.  For example, for the data element, we also accepted a candidate saying that data needs to be geocoded and system would need to be able to cope with this data.

**Actual candidate answer for full marks:**