27. (2.75 points)

a. (1.5 points)

Identify and briefly explain the A. M. Best's three keys to strong catastrophe risk management.

b. (1.25 points)

Fully describe the methodology used in the A. M. Best's Capital Adequacy Ratio (BCAR) model for the natural catastrophe stress test.

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Net Required Capital = $\sqrt{B_1^2 + B_2^2 + B_3^2 + \frac{B_4}{2}^2 + (\frac{B_4}{2} + B_5)^2 + B_6^2} + B_7$

Capital Required for Credit Risk:

C.R. for receivable from agents = 0.05 x (1,800) = 90

C.R. for rein recoverables =

Sum (Balance + Reserve Def) x (Capital Factor) x (Reinsurance dependence factor)
= [(50,000 + 850) x 0.02 + (20,000 + 2,000) x 0.06 + (5,000 + 350) x 0.2] x [1.25]
= 4,303.75

Total Capital required for credit risk = 90 + 403.75 = 4,393.75

Total Net Capital Required =

$\sqrt{4{,}577^2 + 10{,}842^2 + 1{,}839^2 + \frac{4{,}393.75}{2}^2 + (\frac{4{,}393.75}{2} + 41{,}000)^2 + 18{,}000^2} + 35$ = 48,374

BCAR = 66,000 / 48,374 = 136%

This is favourable as a BCAR > 100% is considered favourable

Examiner's report:

In general, candidates did very poorly on this question and many left the question completely blank. The examiners were expecting candidates, at a minimum, to understand the test and identify the components of the test.

Question 27

Answer key:

a)

1. Data Quality

   Proper coding of loss exposure is essential to ensure meaningful model output. All property attributes need to be obtained. Additional information can improve loss estimates.
   In addition to capturing the information, verifying data on a timely basis is also important. Safeguards should be implemented to prevent manipulation of data, and auditing of the underwriting information is critical.
   A.M. Best expects higher rated companies to be those that emphasize strong catastrophe management with a superior understanding of and emphasis on quality of underwriting data.

2. Monitor Exposure

   A.M. Best believes that careful monitoring of zonal and other specific aggregates, including what-if scenario testing using severe events in areas with concentrated exposures, is critical to understanding maximum potential loss.
   A.M. Best also expects those companies that are considered strong risk manages to review aggregate loss-exposure accumulation.

2. Controls

   The final key to strong catastrophe risk management is the integration of the monitoring of exposure into the underwriting process.
   For companies with material catastrophe exposure, the management of that exposure should be a continual process, not just an annual run of models.

(Note: Consideration was also given for other explanations if they demonstrated understanding of the concept from the article).

b)

1. Calculate the after tax net per occurrence PML of the first event (including retention, co-insurance and reinstatement premiums); this amount is subtracted from surplus.
2. Reinsurance recoverable are increased by 40% of the difference between gross and net pretax loss and LAE of the first event
3. 40% of the net pretax loss and LAE of the first event is added to existing reserves to capture the potential for adverse development
4. The aftertax net PML for an additional event is deducted from risk-adjusted surplus
5. Where hurricanes are the major risk, the PML for the second event is the same as for the first, as the occurrence of a major hurricane has no influence on the potential severity of subsequent events.
   Where earthquakes are the major exposure, the second event is reduced to a 1 in 100 year loss.

Actual candidate answer for full marks

a.
data: correct coded for loss exposure & geocoded
monitor: use more than one cat models. monitor aggregate loss exposures.
control: limit aggregate exposure, use reinsurance program. Cat management integrated to UW process etc.

b.
test on both events for hurricane at 1-100 yr return PML.
EQ at 1-250 yr return for first event
1-100 yr return on second event

first step: subtract the surplus of the Net after tax PML for first event (including retention, installed premium, etc).

2nd step: increase 40% reinsurance recoverable of (Gross PML – Net pre tax PML)

3rd step: increase adverse development of Net pre-tax PML

4th step: considered the 2nd even for Net after tax PML.

Examiner's report:
Candidates did fairly poorly on this question and many candidates left the question blank. Candidates that had read the paper and answered the questions generally did well on part a), as expected, and more poorly on part b) which was a more technical question.

Question 28

Answer key: